CSP #207777 – Mary McLeod Bethune Elementary School – Renovations & Additions

Pre-Proposal Meeting

Agenda

Date & Time: **Monday, January 6th, 2025, at 3:00 PM (CST)**
Location: **Mary McLeod Bethune Elementary School**
1665 Duncanville Road, Dallas, TX 75211

1. Introduction: Michael Evans, Dikita Project Manager

Welcome attendees on behalf of Dallas ISD Construction Services, **Mary McLeod Bethune Elementary,** and Construction Services of Dallas Independent School District

Project Goal: Deliver a project fulfilling program requirements as defined by Education Specifications, Technical Design Guidelines, in accordance with the contract documents, applicable regulations, on time and on budget.

Introduction of Project Team:	Program Management Firm (DIKITA)
Dallas ISD Construction Services	Dorion Hasty, Dallas ISD Contract Manager Deborah Burkhalter-Ellis, Dallas ISD Procurement Services Alvaro Meza, Safety & Quality
School Representative	**Principal Sandra Hernandez**
A/E Firm	Evan Evans, Principal Architect, E. Evans Associates, Inc.
M/WBE	Wilton Munnings Dallas ISD, M/WBE Bond Program Manager Josh Berrios, MWBE Coordinator Tameka Sadler, SSP Consulting
Program Management Team	Walter Dansby, Program Director Stephanie Rodriquez, Controls Manager Michael Evans, Project Manager Jessika Herrera, Controls Coordinator

Introduction of other team members in Attendance: Program Management Firm (DIKITA)

Attendance Verification: Distribution of sign-in sheet.

CSP #207777 – Mary McLeod Bethune Elementary School – Renovations & Additions

Pre-Proposal Meeting

Agenda

Project Manual Front End Document, Section 00 11 17: Intention to Propose Form - if your firm will be submitting a proposal for this project, please submit this form to the attention of: Dallas ISD Procurement Services c/o Bond/Construction Services at Email: ProcurementCS@dallasisd.org

Project Information:

1. **Dallas Independent School District Bond Program**
   CSP Package: **CSP #207777**
   School Name/Org. No.: **Mary McLeod Bethune Elementary School/ ORG#274,**

2. Procurement Process: Program Management Firm (DIKITA)

Procurement/ Bidding documents: Available to both GCs and Subs for purchase at: **Thomas Printworks** (Attention: **Jon Sauve**), **3610 Oak Lawn Avenue, Dallas, TX, 75219**. Phone**: 469-320-4940** Email: **jon.sauve@thomasprintworks.com**. Documents are also available at Plan Rooms for viewing (see page # of this agenda).

Communications: **All questions during the bidding process are to be submitted in writing to:**
Attention: Dallas ISD Procurement Services
Email: procurementcs@dallasisd.org

Responses to questions will be given via addenda only. The printers will issue all addendums to all registered plan holders. The addenda will also be listed on DISD's website under 'Bond Vendor Opportunities'. https://www.dallasisd.org/Page/1275

Critical Bidding Dates:

Last Day for receiving questions from Contractors:	January 13, 2025, close of business.
Last Day for issuing Addenda:	January 21, 2025, close of business.
Proposal due Date/Time and Location:	

Proposal due Date/Time and Location: Construction Services Office **9400 North Central Expwy, 8th Floor, Dallas, Texas, 75231**

- Receipt of Proposals (**Part 1-A, 1-B and Part 1-C**) DISD Bond Office: **Tuesday, February 4, 2025, at 2:00 PM CST.**
- Receipt of MWBE Forms **(Part 2)** at DISD Bond Office: **Wednesday, February 5, 2025, at 3:00 PM CST.**
- Proposal Opening and Public Reading by Zoom: **Join Teams Meeting**

  Meeting ID: 233 823 248 808

  Passcode: Ae7XB3x6

  Monday, February 5, 2025, at 3:00 PM local time and or shortly after all proposal submittals (Part 2) are received.

Proposal Packaging: Requirements

CSP Process - Gives the District the ability to identify the Best Value Bidder for the project, not necessarily the low bidder – Cost carries **40%** of the weight. The Evaluation Criteria are published in the Project Manual for this CSP in Section 00 21 13 under the Instruction to Proposers.

- Explain Selection Criteria – Scoring based on data provided only.
- Do not miss the information. No subjectivity.
- The Evaluation Committee will contact the references provided two times only.

Post Bid:
Target Board Approval Meeting – **April 24, 2025**

3. Safety Program: Alvaro Meza or Safety Representative

- Ensure to Include on the bid package, Current EMR/Letter from Insurance carrier.
- Submit Contractor's own safety plan or DISD's Minimum Safety Guidelines can be adopted. Ensure to mark if a contractor is adopting the DISD Manual.
- If you are adopting the Minimum Guidelines, it should be noted on your company letterhead and submitted with the Proposal.
- Safety Coordinator qualifications and percentage on project.

All bidders to note:

- Contractor is ultimately responsible for safety.
- A Site-Specific Safety Plan must be developed and implemented post-award, by the selected Contractor.
- A Site-Specific Safety Orientation must be developed and implemented post-award, by the selected Contractor.
- Approved Barriers: Outdoor 6 Ft Chain link fence/ Indoor: Hard cover, Plywood, Drywall
- Badges required at all times.
- The project in this package is not a greenfield site.
- *Awarded Contractor must develop a site-specific COVID-19 Exposure Prevention, Preparedness, and Response that can help guide protective actions against COVID-19. Plan must be based on information available from the CDC, OSHA, and all applicable public officials.*

4. M/WBE Program Requirements: Josh Berrios & Walter Munnings

- District's M/WBE participation goal is 30% for construction-related projects.
- M/WBE Compliance Guidelines and Forms are required for all solicitations over $50,000.
- The M/WBE team is available to provide lists of certified M/WBE subcontractors upon request.
- Bonding and technical assistance will be provided by SSP Consulting, LLC Office: (214) 220-9098 or (972) 725-7318 to M/WBEs and small business owners interested in bidding on district construction projects as a prime contractor or subcontractor. Tameka Sadler (C49893@dallasisd.org, tsadler@sspconsulting.com) is the point of contact.
- Failure to submit the M/WBE Compliance Guidelines and Forms package to the District by 3:00 p.m. on Bid Day 2 will result in a loss of points.
- M/WBE Coordinators Josh Berrios, **972.925.4161**; josberrios@dallasisd.org and Walter Munnings, 972-925-7222; wmunnings@dallasisd.org

Agenda

5. Contract Issues: **Deborah Burkhalter-Ellis**

- General Contractor AIA contract template. No changes will be allowed.
- Contract Time: **Target substantial completion: January 1, 2026**
- Project Construction Budget including all allowances: **Total CCL: $ 3,384,117.28**
- Insurance Certificates
- Bonds

6. Specific Project Requirements: Evan Evans

- Critical phasing Phase I, Phase II
- Substantial completion date for this school
- School calendar
- Construction staging area
- Swing space
- Coordination with other Contractors & Vendors: Atmos, Oncor, Technology etc.
- Noise control
- Custodian overtime costs
- Respect the community, neighborhoods, and City requirements.

Scope of Work: Evan Evans

- Provide Security System Upgrades (Infrastructure Only: conduit, boxes, etc.)
- Provide Secure Vestibule
- Demo and Renovate Administration Area
- Replace Existing Marquee Sign
- Remove and Replace Roofing
- Remove and Replace Failed Waterproofing Joints
- **Alternates Include:**
  - Remove and Replace all Ceilings
  - Replace Fire Alarm
  - Replace Exterior Lighting Controls
  - Replace Exterior Lighting with LED Fixtures
  - Replace Interior Lighting Controls
  - Replace Interior Lighting (other than corridor) with LED Fixtures
  - Replace Sound System
  - Mechanical Improvements
  - Replace MDF/IDF AC Units

CSP #207777 – Mary McLeod Bethune Elementary School – Renovations & Additions

Pre-Proposal Meeting

Agenda

Walk Thru Schedule: **Evan Evans and Deborah Burkhalter-Ellis**

School ORG #	School Name	Time	School Address and Location of Meeting
274	Mary McLeod Bethune ES	**3:00 PM**	1665 Duncanville Road, Dallas, TX 75211

Project Schedule: **Evan Evans**

7. Questions & Answers

Please send your questions in writing to: procurementcs@dallasisd.org

DALLAS INDEPENDENT SCHOOL DISTRICT
CONSTRUCTION SERVICES

Project Manual

VOLUME 1 OF 2

CSP 207777

ORG 274 – MARY MCLEOD BETHUNE ELEMENTARY SCHOOL – RENOVATION
J274_P0236_1

A/E FIRM
E. EVANS ASSOCIATES, INC

MEP ENGINEER: THE ALEX GROUP
STRUCTURAL ENGINEER: EJES, INC

ROOFING CONSULTANT: MAYFIELD BUILDING ENVELOPE CONSULTANTS
TECHNOLOGY CONSULTANT: CEDRICK FRANK ASSOCIATES

December 22, 2024

DALLAS INDEPENDENT SCHOOL DISTRICT
CONSTRUCTION SERVICES

Project Manual

VOLUME 1 OF 2

CSP 207777

ORG 274 – MARY MCLEOD BETHUNE ELEMENTARY SCHOOL – RENOVATION
J274_P0236_1

A/E FIRM
E.EVANS ASSOCIATES, INC

December 22, 2024

ARCHITECT AND CONSULTANT'S SEALS PAGE

ARCHITECT:

E. EVANS ASSOCIATES, INC.

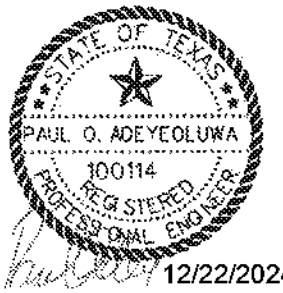
Evan U. Evans
13140 Coit Road
Suite 230
Dallas, TX 75240
214-340-4440

12/22/2024

CIVIL ENGINEER:

EJES, INC

Paul Aldey, P.E.
12801 N. Central Expressway
Suite 700
Dallas, TX 75243
214-343-1210

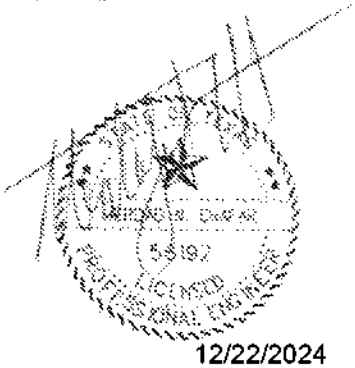


12/22/2024

STRUCTURAL ENGINEER:

EJES, INC

Mehrdad Ghafar, P.E
12801 N. Central Expressway
Suite 700
Dallas, TX 75243
214-343-1210



12/22/2024

MEP ENGINEER:

THE ALEX GROUP, INC

Alex Gholmieh, P.E.
2761 E. Trinity Mills Rd
Suite 108
Carrollton, TX 75006
972-820-6400

12/22/2024

SECTION 00 01 10 – TABLE OF CONTENTS

Division 00

00 01 00 Project Manual Cover
00 01 01 Project Title Page
00 01 07 Seals Page
00 01 10 Table of Contents
00 01 15 List of Drawing Sheets
00 11 13 Advertisement for CSP

Proposal Requirements
00 11 17 Intention to Propose Form
00 21 13 Instructions to Proposers

Project Information
00 31 00 Available Project Information
00 31 18 School Operation Parameters Statement

Proposal Documents
00 41 10 Overall Proposal Packaging Checklist
00 41 11 (a) Materials Escalation Price Reconciliation Form
00 41 11 Proposal Form – Base Bid (Part 1-A of the CSP)

00 41 12 Proposal Form – Alternates and Unit Pricing (Part 1-C of the CSP)
00 41 13 Technical Proposal (Part 1-B of the CSP)
00 43 13 Proposal Guarantee Bond (Part 1-A of the CSP)
00 45 00 DISD Required forms combined (Part 1-A of the CSP)
00 45 20 Certificate of Non-Discrimination (Part 1-A of the CSP)
00 45 22 Notification of Hazardous Materials Affidavit (Part 1-A of the CSP)
00 45 23 Family Conflict of Interest Questionnaire (Part 1-A of the CSP)
00 45 39 MWBE Compliance Guidelines and Forms (Part 2 of the CSP)

Contract Forms
00 43 43 Prevailing Wage Rates Schedule
00 52 10 Standard form of Agreement between Owner and Contractor
00 52 11 General Conditions of the Contract for Construction
00 55 00 Notice to Proceed Forms
00 61 13 Performance Bond Form
00 61 16 Payment Bond Form
00 73 19 Dallas Independent School District Construction Minimum Safety Program Guidelines Manual

Division 01

General Requirements
01 10 00 Summary of Work
01 21 00 Allowances
01 22 00 Unit Prices
01 23 00 Alternates
01 25 00 Substitution Procedures
01 29 00 Payment Procedures
01 29 73 Schedule of Values
01 31 00 Project Management and Coordination
01 32 00 Construction Progress Documentation
01 32 16 Construction Progress Schedule
01 32 33 Photographic Documentation
01 33 00 Submittal Procedures
01 35 43 EPA Lead-Based Paint Renovation, Repair, and Painting Program
01 40 00 Quality Requirements

01 42 00 References
01 45 23 Testing Adjusting and Balancing for HVAC
01 50 00 Temporary Facilities and Controls
01 52 14 Temporary Facilities for Students
01 60 00 Product Requirements
01 73 00 Execution
01 77 00 Closeout Procedures & Checklist
01 78 23 Operation and Maintenance Data
01 78 39 Project As-Builts & Record Documents
01 79 00 Demonstration and Training
01 91 00 General Cx Requirements (1-28-20 Final)
01 92 00 Hazmat Report
01 93 00 Geotechnical Report

Division 02

Existing Conditions
02 41 16 Structure Demolition
02 41 19 Selective Demolition

Division 03

Concrete
03 20 00 Concrete Reinforcing
03 30 00 Cast – In – Place Concrete

Division 04

Masonry
04 20 00 Unit Masonry
04 72 00 Cast Stone Masonry

Division 05

Metals
05 12 00 Structural Steel Framing
05 21 00 Steel Joist Framing
05 31 00 Steel Roof Decking
05 40 00 Cold-Formed Metal Framing
05 50 00 Metal Fabrications

Division 06

Wood, Plastics, and Composites
06 10 00 Rough Carpentry
06 10 53 Miscellaneous Rough Carpentry
06 16 00 Structural Sheathing Weather Barriers
06 40 23 Interior Architectural Wood Work
06 41 13 Wood-Veneer-Faced Architectural Cabinets

Division 07

Thermal and Moisture Protection
07 11 13 Bituminous Damp-Proofing
07 21 00 Building Insulation
07 22 00 Roof Insulation
07 25 00 Weather Barriers
07 26 00 Vapor Retarders

07 52 00 Modified Bituminous Membrane Roofing
07 60 00 Sheet Metal Work
07 62 00 Sheet Metal Flashing, Trim & Accessories
07 70 00 Roof Specialties & Accessories
07 71 00 Roof Specialties
07 72 00 Roof Accessories
07 81 00 Cementitious Fireproofing
07 84 13 Penetration Fire Stopping
07 92 00 Joint Sealants

Division 08

Openings
08 11 13 Hollow Metal Doors and Frames
08 14 16 Flush with Frame Wood Doors
08 41 13 Aluminum Framed Entrances & Storefronts
08 71 00 Door Hardware
08 80 00 Glazing
08 83 00 Mirrors
08 84 00 Plastic Glazing – Including Multiwall, Framing & Accessories

Division 09

Finishes
09 22 16 Non Structural Metal Framing
09 24 00 Cement Plastering
09 29 00 Gypsum Board
09 30 13 Ceramic Tiling
09 51 13 Acoustical Panel Ceiling
09 65 13 Resilient Base and Accessories
09 68 13 Carpet Tiles
09 91 00 Paints and Coatings

Division 10 – 21 - Not Used

Division 22

Plumbing
22 05 23 General-Duty Valves for Plumbing and Piping
22 05 29 Hangers and Support for Plumbing Piping and Equipment
22 05 48 Vibration and Seismic Controls for Plumbing and HVAC Piping
22 05 54 Identification for Plumbing, HVAC, and Fire Piping and Equipment
22 08 00 Commissioning of Plumbing
22 13 16 Sanitary Waste and Vent Piping

Division 23

Heating Ventilating and Air Conditioning
23 00 50 Basic Mechanical Materials and Methods
23 05 00 Common Work Results for HVAC
23 05 13 Common Motor Requirements for HVAC Equipment
23 05 19 Meters and Gages for Plumbing Piping
23 05 93 Testing, Adjusting, And Balancing for HVAC
23 07 13 Thermal Insulation for Ducting
23 08 00 Commissioning of HVAC
23 09 24 Building Management Control System
23 31 14 Metal Ducts

23 33 00 Air Duct Accessories
23 37 13 Diffusers, Registers, and Grilles
23 56 71 Dx Condensing Units
23 58 33 Power Ventilators
23 62 00 Packaged Compressor and Condenser Units

Division 24 – 25 – Not Used

Division 26

Electrical
26 04 99 Electrical Demolition
26 05 00 Common Work Results for Electrical
26 05 19 Low-Voltage Electrical Power Conductors and Cables
26 05 23 Control-Voltage Electrical Power Cables
26 05 26 Grounding and Bonding for Electrical SYSTEMS
26 05 29 Hangers and Supports for Electrical Systems
26 05 33 Raceway and Boxes for Electrical Systems
26 05 53 Identification for Electrical Systems
26 08 00 Commissioning of Electrical Systems
26 08 13 Electrical Acceptance Testing
26 27 16 Electrical Cabinets and Enclosures
26 27 26 Wiring Devices
26 28 23 Disconnect Switches – Fused and Non-Fused
26 29 01 Contactors
26 29 13 Enclosed Controllers
26 51 00 Lighting Fixtures

Division 27

Communications
27 05 00 Common Work Results for Telecommunications

Division 28

Electronic Safety and Security
28 13 00 Video Intercom Access Control System
28 16 00 Intrusion Detection
28 31 10 Fire Alarm System

Division 29 – 30 – Not Used

Division 31

Earthwork
31 63 29 Drilled Concrete Piers and Shafts

Division 32

Exterior Improvements
32 13 13 Concrete Paving

Division 33 – Not Used

SECTION 00 01 15 – LIST OF DRAWING SHEETS

The list below is a description of the documents provided to the contractor as part of this Request for Competitive Sealed Proposal – 207777

1.01 Drawing List with Revision Number and Date: August 23, 2023

1.01.A Project Manual List with Revision Number and Date: December 22, 2024

ORG 274 – MARY MCLEOD BETHUNE ELEMENTARY SCHOOL - RENOVATION

Drawings:

General:

G1.1	COVER SHEET
G1.2	CODE ANALYSIS AND LIFE SAFETY
G1.3	SITE, LEVELS 1 & 2 CONSTRUCTION PHASING PLANS

Civil:

C1.0	GRADING PLAN

Structural:

S1.0	STRUCTURAL LEGENDS / SYMBOLS & NOTES
S2.0	ENLARGED STRUCTURAL FOUNDATION & FRAMING PLANS
S3.0	MARQUEE SIGN
S4.0	STRUCTURAL DETAILS
S5.0	STRUCTURAL DETAILS

Architectural:

A0.1	ASBUILT LAND TITLE SURVEY
A1.0	SITE PLAN WITH ROOF PLAN
A1.1	STANDARD SITE DETAILS
A3.1	LEVEL 1 COMPOSITE AND ENLARGED DEMOLITION FLOOR PLANS
A3.2	OVERALL LEVEL 2 - DEMOLITION FLOOR PLAN
A4.0	OVERALL ROOF & ENLARGED ROOF DEMOLITION PLANS
A5.0	MARQUEE SIGN ELEVATIONS / SECTIONS AND DETAILS
A6.1	OVERALL LEVEL 1 – FLOOR PLAN
A6.2	LEVEL 1 - ENLARGED ADMIN / SECURE ENTRY FLOOR PLAN – AREA “A”
A6.3	OVERALL LEVEL 2 – FLOOR PLAN
A7.0	OVERALL ROOF PLAN
A8.0	EXTERIOR FRONT & ENLARGED BUILDING ELEVATIONS
A9.1	OVERALL LEVEL 1 – REFELECTED CEILING PLAN – DEMO
A9.2	OVERALL LEVEL 1 – REFLECTED CEILING PLAN – NEW
A10.1	BUILDING WALL SECTIONS AND DETAILS
A10.2	MISC ROOF DETAILS
A10.3	MISC ROOF DETAILS
A11.1	DOOR ELEVATIONS / DOOR / WINDOW / SECTIONS AND DETAILS
A11.2	SIGNAGE PLAN & GRAPHICS / SCHEDULES / ELEV. / DETAILS
A12.0	ROOM, DOOR & WINDOW FINISH SCHEDULES / ELEVATIONS / DETAILS
A13.0	PARTITION TYPES
A14.0	INTERIOR CABINETS ELEVATIONS / SECTIONS & DETAILS
A15.1	TDLR TYPICAL SPECIFICATIONS AND DIAGRAMS

A15.2	TDLR HANDICAP REQUIREMENTS
A15.3	TDLR HANDICAP REQUIREMENTS

Mechanical:

MD1.01	LEVEL 1 PLAN – AREA “A” HVAC DEMOLITION
MD2.01	DEMO ROOF PLAN – HVAC DEMOLITION
M1.01	LEVEL 1 PLAN – AREA “A” - HVAC
M1.02	LEVEL 1 PLAN – AREA “B” - HVAC
M1.03	LEVEL 1 PLAN – AREA “C” - HVAC
M1.04	LEVEL 2 PLAN – AREA “A” - HVAC
M1.05	LEVEL 2 PLAN – AREA “C” - HVAC
M2.01	ROOF PLAN – HVAC
M3.01	MECHANICAL LEGEND & NOTES
M3.02	MECHANICAL DETAILS & SCHEDULES

Electrical:

ED1.01	LEVEL 1 PLAN – AREA “A” ELECTRICAL DEMOLITION
ED1.02	LEVEL 1 PLAN – AREA “B” ELECTRICAL DEMOLITION
ED1.03	LEVEL 1 PLAN – AREA “C” ELECTRICAL DEMOLITION
ED1.04	LEVEL 2 PLAN – AREA “A” ELECTRICAL DEMOLITION
ED1.05	LEVEL 2 PLAN – AREA “C” ELECTRICAL DEMOLITION
E0.00	SITE PLAN – ELECTRICAL
E0.01	SITE PLAN – LIGHTING PHOTOMETRIC PLAN
E1.01	LEVEL 1 PLAN – AREA “A” - LIGHTING
E1.02	LEVEL 1 PLAN – AREA “B” - LIGHTING
E1.03	LEVEL 1 PLAN – AREA “C” - LIGHTING
E1.04	LEVEL 2 PLAN – AREA “A” - LIGHTING
E1.05	LEVEL 2 PLAN – AREA “C” - LIGHTING
E2.01	LEVEL 1 PLAN – AREA “A” – POWER
E2.02	LEVEL 1 PLAN – AREA “B” – POWER
E2.03	LEVEL 1 PLAN – AREA “C” – POWER
E2.04	ROOF PLAN - ELECTRICAL
E3.01	LEVEL 1 PLAN – AREA “A” - SPECIAL SYSTEMS
E3.02	LEVEL 1 PLAN – AREA “B” - SPECIAL SYSTEMS
E3.03	LEVEL 1 PLAN – AREA “C” - SPECIAL SYSTEMS
E3.04	LEVEL 2 PLAN – AREA “A” - SPECIAL SYSTEMS
E3.05	LEVEL 2 PLAN – AREA “C” - SPECIAL SYSTEMS
E4.01	ELECTRICAL LEGENDS & LIGHT FIXTURE SCHEDULE
E5.01	ELECTRICAL DETAILS
E5.02	ELECTRICAL DETAILS

Plumbing:

PD0.00	SITE PLAN - PLUMBING DEMOLITION
PD1.01	LEVEL 1 PLAN – AREA “A” – PLUMBING DEMOLITION
PD1.02	LEVEL 1 PLAN – AREA “B” - PLUMBING DEMOLITION
PD1.03	LEVEL 1 PLAN – AREA “C” – PLUMBING DEMOLITION
P0.00	SITE PLAN - PLUMBING
P1.01	LEVEL 1 PLAN – AREA “A” - PLUMBING
P1.02	LEVEL 1 PLAN – AREA “B” - PLUMBING
P1.03	LEVEL 1 PLAN – AREA “C” - PLUMBING

P1.04	LEVEL 2 PLAN – AREA “A” - PLUMBING
P1.05	LEVEL 2 PLAN – AREA “C” - PLUMBING
P2.01	ROOF PLAN - PLUMBING
P3.01	PLUMBING LEGEND & SCHEDULES

Technology:

T0.1	TECHNOLOGY NOTES
T0.2	TECHNOLOGY LEGEND AND DETAILS
T1.0	TECHNOLOGY SITE PLAN
T1.1	TECHNOLOGY LEVEL 1 COMPOSITE FLOOR PLAN
T1.2	TECHNOLOGY LEVEL 2 COMPOSITE FLOOR PLAN
T7.1	TECHNOLOGY DETAILS
T7.2	TECHNOLOGY DETAILS

Procurement Services December 22, 2024

The Dallas Independent School District ("District") is soliciting Competitive Sealed Proposals ("CSP") from qualified sources relative to the provision of the following request For Competitive Sealed Proposals ("CSP"). This procurement will be managed under the Dallas ISD Construction Services department.

For information on how to obtain the CSP documents, go to the District's **Construction Services** website **http://www.dallasisd.org. Click on "Departments;" click on "Construction Services/Bond Office;" click on "Bond Vendor Opportunities;"** then click on the bid package number. Follow the Document Distribution instructions to obtain the CSP documents. The CSP documents contain the necessary information to submit a CSP to the District, including construction documents, selection criteria, estimated budget, project scope, schedule, and other information that contractors may require to respond to the request.

Please return the "Intention to Propose" form (Specification Section 00 11 17) to the Construction Services Procurement Director listed on the form.

CSP #	Description	Closing Date	Buyers Initials
207777	MARY MCLEOD BETHUNE ELEMENTARY SCHOOL – RENOVATION	February 04, 2025	DBE

A pre-proposal meeting will be held at 10:00 AM on January 06, 2025, via Teams for all interested parties. This meeting is not mandatory, but information discussed will be extremely helpful in preparation of the proposal.

Join Teams Meeting
Meeting ID: 233 823 248 808
Passcode: Ae7XB3x6

All general contractors and sub-contractors are encouraged to attend this meeting. Contractors will meet A/E(s) and PM at the school to start site tours. The first site tour will take place immediately following the pre-proposal. The following is the schedule for each site tour:

School Org#	School Name	Date	Time	School Address, Location of Meeting
274	MARY MCLEOD BETHUNE ELEMENTRAY SCHOOL – RENOVATION	January 06, 2025	3:00 PM	1665 Duncanville Road Dallas, TX 75211

All Construction Services procurements must be physically delivered to the Construction Services office, at the Linus D. Wright Dallas ISD Administration Building 9400 North Central Expressway, Suite 800 Dallas, TX 75231. (Call 972.925.7200 for directions). Delivery to other locations will result in rejection of a CSP.

Completed CSP Package **Part 1-A, 1-B and 1-C are due on Tuesday, February 4, 2025, at 2:00 PM** (local time).

Completed CSP Package **Part 2 is due on Wednesday, February 5, 2025, at 3:00 PM (**local time).

Any materials received after the respective closing dates / times will not be considered.

The District will open and read the names of the proposers and prices submitted in responsive CSPs beginning at 3:00 P.M. local time upon submittal of Part 2 of the Package, via Teams.

Join Teams Meeting

Meeting ID: 295 502 668 376
Passcode: je7nq3W5

No further information will be officially released until after the date the Agenda is publicized for the Board of Trustees briefing.

The right is reserved to reject any or all bids, proposals, CSPs or statements of qualification and to waive technicalities.

The Dallas Independent School District is committed to the ideals of equal opportunity in all its business endeavors.

The Dallas Independent School District's Construction Services projects have a 30% Minority and Women-Owned Business Enterprise (M/WBE) construction goal.

RUN TWO TIMES ONLY AS FOLLOWS:
December 22, 2024, and December 29, 2024

DALLAS INDEPENDENT SCHOOL DISTRICT

PROCUREMENT SERVICES – CONSTRUCTION SERVICES

DOCUMENT DISTRIBUTION

CONSTRUCTION SERVICES

CSP 207777
ORG 274 – MARY MCLEOD BETHUNE ELEMENTARY SCHOOL – RENOVATION
J274_P0236_1

SOLICITATION TIMELINE:

Issue Date:	December 22, 2024
First Advertisement Date	December 22, 2024
Second Advertisement Date	December 29, 2024
Preproposal Meeting	January 06, 2025 - Virtual: 10:00 AM - Walk-Through: 3:00 PM
Question Deadline	January 13, 2025
Question Responses from the District	January 21, 2025
CSP Response Due Dates Pt 1-A and Pt 1-B	February 04, 2025, at 2:00 PM
CSP Response Due Date Pt 2	February 05, 2025, at 3:00 PM
CSP Evaluation	February 11, 2025
Anticipated Board Approval	**April 24, 2025**

1. DOCUMENT DISTRIBUTION:

   The attached "Document Distribution" page details how documents and addenda will be distributed.

2. ESTIMATED CONSTRUCTION BUDGET INCLUDING ALLOWANCES:

   Total Estimated Construction Budget (CCL + IC+ Allowances) for CSP 207777 $3,384,117.28

3. Scope of Work. The Work consists of:

   ORG 274 – Mary McLeod Bethune Elementary School – Renovation – Project Consists of the following:

   1. Provide Security System Upgrade, including card access readers, cameras, and door contacts etc.
   2. Provide Secure Front Vestibule, Renovate and Expand Administration.
   3. Replace Existing Marquee Sign.
   4. Replace Existing Roof: A, B & C
   5. Replace Existing Waterproofing / Sealant Joints

6. Mechanical / HVAC Improvements including New Split System and Rooftop Units, Replace Condenser Water Piping, Controls, Condenser Water Pumps, and Air-Cooled Chiller.

4. Contact Information:

Technical questions and all other questions related to this solicitation are to be referred to:

Attention:	**Dallas ISD Procurement Services**
Email:	**ProcurementCS@dallasisd.org**

Please notate the solicitation number **CSP 207777** in the subject line of your email.

DOCUMENT DISTRIBUTION
CSP PACKAGE 207777

Documents will be distributed as follows:

Hard copy and file distribution are provided, beginning

Printing Company Name:	**Thomas Printworks**
Attention:	**Jon Sauve**
Address:	**3610 Oak Lawn Avenue**
City, State and Zip	**Dallas, TX 75219**
Phone:	**214-880-0022**
Email:	**Jon.Sauve@thomasprintworks.com**

Any addendum issued will be listed or posted at the **Dallas ISD Construction Services** website http://www.dallasisd.org/ **Click on "Departments"; click on "Construction Services/Bond Office"; click on "Bond Vendor Opportunities"**; then click on the bid package number. Any and all addenda that are too large in size for the website will not be posted on the District website. However, all such addenda will be listed on the website with the date of issuance of each addendum, and instructions to proposers for procuring such addenda from **Thomas Printworks.**

Documents are available as follows:

- **Full size sets of plans and specifications and USB drives of the same information and details are available for purchase at the Printing Company noted above. Purchase price must be obtained directly from the Printing Company.**

- **The purchases of additional USB drives of proposal documents in PDF format are available only to purchasers of at least one (1) full size plans and specifications. Purchase price must be obtained directly from the Printing Company.**

- **Addenda will be available from the Printing Company for purchase. Purchase price must be obtained directly from the Printing Company.**

Delivery pricing can be obtained from **Thomas Printworks**

The bidder or proposer is responsible for obtaining all Addenda prior to submitting a bid or proposal to the District.

A list of Plan Rooms and other entities that have documents available for viewing are as follows:

DRAWINGS AND SPECIFICATIONS ARE AVAILABLE AT THE FOLLOWING:

Dallas/Fort Worth Minority Supplier Development Council
Sha'Ron Richardson
construction@dfwmsdc.com
214-630-0747
8828 N. Stemmons Freeway, Ste. 550
Dallas, TX 75247

Regional Hispanic Contractors Association
John H. Martinez
john@regionalhca.org
972-786-0909
3918 North Hampton Rd.
Dallas, TX 75212

Regional Black Contractors Association of North Texas, Inc.
John Proctor
info@blackcontractors.org
214-565-8946
2627 Martin Luther King Jr. Blvd,
Dallas, TX 75215

Fort Worth Hispanic Chamber of Commerce
Gilbert Juarez
gilbert@pic-printing.com
https://www.fwhccplanroom.com/
817-625-5411
1327 N. Main Street
Fort Worth, TX 76164

Greater Dallas Hispanic Chamber of Commerce
Gabriela Carvallo
gabriela@gdhcc.com
214-521-6007
1402 N. Corinth St., Ste 225
Dallas, TX 75215

Construction Connect
Michael Stubbs
Content@ConstructConnect.com
800-364-2059
30 Technology Parkway South, Ste 100
Norcross, GA 30092

Dodge Data & Analytics formerly McGraw-Hill Construction Dodge
support@construction.com
877-784-9556
4300 Beltway Place, Ste. 180
Arlington, TX 76018

Dallas Black Chamber of Commerce
Tigist Solomon
tsolomon@dbcc.org
214-702-6652
2922 Martin Luther King Jr. Blvd., Building A, Ste. 104
Dallas, TX 75215

Fort Worth Metropolitan Black Chamber of Commerce
Jeremiah Anderson
janderson@fwmbcc.org
817-871-6558
1150 South Fwy, Ste. 211
Fort Worth, TX 76104

Virtual Builders Exchange, LLC
Heidi Shaffer
heidi@virtualbx.com
210-564-6900
4047 Naco Perrin, Ste.100
San Antonio, TX 78217

SECTION 00 11 17 – INTENTION TO PROPOSE FORM

Please return this Intention to Propose Form within **Five (5) Days** of receipt of this Request for Competitive Sealed Proposal Package. Doing so will enable us to keep a record of interest in this project. It is your responsibility to continue to monitor the District Website for any modifications or addenda issued prior to the submittal deadline. Email this form to:

ATTN: **Dallas ISD Procurement Services c/o Bond/Construction Services**
Linus D. Wright Dallas ISD Administration Building
9400 North Central Expressway, Suite 800
Dallas, TX 75231
E-mail: ProcurementCS@dallasisd.org

Subject: Dallas ISD Construction Services
CSP 207777

Dear **Procurement Services:**

We hereby acknowledge receipt of the proposal documents for the above referenced COMPETITIVE SEALED PROPOSAL (CSP) Package, and confirm that:

(Check appropriate box)

☐ We do intend to submit a proposal for this work. We understand that this proposal will be prepared by us at no cost or obligation to: E. Evans Associates, Inc. or Dallas ISD.

☐ We do not intend to submit a proposal on this work. The reason(s) we decline to offer a proposal is as follows:

_____

_____

_____

Yours sincerely,

_____ _____
Name Signature

_____ _____
Firm Title

_____ _____
Phone Date

_____
Fax

_____
Email Address

SECTION 00 21 13 – INSTRUCTIONS TO PROPOSERS

1.01 GENERAL INFORMATION

1.01.1. Scope

In accordance with the Texas Government Code Chapter 2269 the Dallas ISD is requesting Competitive Sealed Proposals (CSP) from general construction contractors. The following instructions by the Dallas Independent School District are intended to afford proposers an equal opportunity to participate in the proposal process.

1.01.2. Discrepancies and Interpretations

Proposer must notify the Architect/Engineer during procurement, at least ten (10) business days prior to the scheduled Proposal opening date, with any questions arising out of the drawings or specifications or if discrepancies, ambiguities or omissions are found in the Proposal documents, or if further information or interpretation is desired.

Answers to inquiries will be provided in writing to all proposers in addenda form. All provisions and requirements of such addenda will supersede or modify affected portions of the Proposal documents. All addenda will be incorporated into and bound with the Contract Documents. No other explanation or interpretation will be considered binding.

1.01.3. Submittal Procedures

Submit the Proposal in sealed packages of sufficient size to hold all of the copies of the Proposal documents. These should be packaged following the instructions in Specification Section 00 41 10 – Overall Proposal Packaging Checklist.

Provide a properly formatted label, using page one of the advertisement, on the exterior of the Proposal envelope or package providing the proposer's identification including due date and time.

If the Proposal is submitted by mail, place the sealed Proposal package in a mailing envelope addressed as required in this section. Delivery of the Proposal prior to the advertised time set for the Proposal opening is the responsibility of the proposer. Dallas ISD is not responsible for mail delivered from the post office.

1.01.4. Preparation of Competitive Sealed Proposals

The Proposal must be based on conditions at the project site, the project Drawings, the project manual and any addenda issued.

All original Proposal Forms must be authoritatively executed and submitted on the Proposal forms furnished by Dallas ISD.

If the **Technical Proposal** form does not provide sufficient space to adequately respond to a question, the proposer should attach additional 8 1/2" X 11" white paper sheets as required, referencing the page and question numbers to which the response pertains.

A Proposal with omissions, alterations, conditions, or carrying riders or other qualifiers which modify the Proposal form may result in the proposal being deemed as non-responsive.

If the proposer chooses to issue a "No Response" (N/R) to a question on the Proposal, an explanation of this action is required. Failure to do so may be viewed by Dallas ISD as incomplete and may subject the entire Proposal to rejection.

Only one proposal shall be submitted by each proposer. If two or more Proposals are submitted, either in one envelope or in separate envelopes, such multiple Proposals will be deemed as non-responsive. The blank Proposal form bound in the Specification is for the proposer's information reference only.

Facsimile or emailed proposals will not be accepted and modifications are not allowed. Any modifications not inside the proposal envelopes/packages will not be considered part of the Contractor's proposal.

The proposer will receive no compensation or reimbursement of expenses incurred in the preparation of this Proposal.

Dallas ISD reserves the right to reject any or all Proposals. Dallas ISD also reserves the right to waive errors and omissions in any proposal if it deems it in the best interest of Dallas ISD to do so.

1.01.5. Public Information and Notice of Confidentiality

Dallas ISD considers all Proposal information, documentation and supporting materials submitted in response to this Request for Competitive Sealed Proposal to be non-confidential and / or non-proprietary in nature, and therefore, shall be subject to the public disclosure under the Texas Public Information Act (*Texas Government Code*, Sec. 552.001, et seq.) after the award of the contract. Exceptions to this are listed in this Project Manual.

The Proposer must identify and designate those portions of their technical Proposal which contain trade secrets or other proprietary data. If the Proposal includes such data, the proposer shall:

Mark the cover sheet of the Technical Proposal with the following phrase: "This Proposal includes data that shall not be disclosed outside Dallas ISD, and the A/E design team and shall not be duplicated, used or disclosed in whole or in part for any purpose other than to evaluate this Proposal."

Mark each sheet and the specific data on that sheet that the proposer wishes to restrict with the following phrase: "Use or disclosure of this specifically marked data is subject to the restrictions regarding confidentiality cited on the cover sheet of this Proposal."

1.01.6. Proposal Guaranty Bond

A Proposal bond on Dallas ISD Proposal Guarantee Bond Form, from a Surety authorized to transact business in the State of Texas, in the amount of not less than ten percent (10%) of the greatest total amount of the proposed contract amount (Base Price plus all Allowances), payable without recourse to the order of the Dallas ISD Board of Trustees, must accompany the Proposal as a guarantee that, if awarded the Contract, the proposer will promptly enter into and execute the Contract and Performance and Payment Bonds on the forms provided.

The Proposal Guarantee Bond must be accompanied by a properly dated and executed Power of Attorney with a raised Surety seal on each document. Failure to do so will constitute an irregular Proposal which may be deemed as non-responsive. Use of a Surety company's bond form is not acceptable and may result in the Proposal being deemed as non-responsive.

Should the successful proposer fail to execute and return to Dallas ISD, the Contract and Bonds within ten (10) calendar days after the date of transmittal of the Contract Documents for execution, the Proposal Guaranty becomes the property of Dallas ISD.

No cashier's checks, official checks, or other items will be accepted. Only a Proposal Guaranty Bond as described in this paragraph for proposal security.

Deadline for Signing Contract and DALLAS ISD's Rights if Delay

The completion of this Project is crucial and must remain on a timely schedule. In order to keep the Project on a judicious schedule, the selected proposer must:

a. Sign the Contract no later than ten (10) calendar days after the date of Board approval when the selected proposer has been notified that it is the successful proposer, and

b. Provide the safety plan for the Project and all required bonds and insurance no later than five (5) business days after the successful proposer has signed the contract.

If the selected proposer fails to meet the district's specified deadline of ten (10) calendar days, the Dallas ISD has the right to:

a. Award the contract to the next successive responsive proposer subject to the district's ranking and evaluation.

1.01.7. Insurance

Original Certificates of Insurance, as well as copies of the original insurance policies and endorsements as required by the contract documents are due not later than 5 business days after execution of contract by the owner.

1.01.8. Ownership of the Competitive Sealed Proposal and Contractor's Proprietary Information

Submitted Proposals, documentation and supporting materials shall become the property of Dallas ISD.

1.01.9. Site Investigation

It is the responsibility of each proposer to examine the project site, existing improvements, and adjacent property and be familiar with existing conditions, and the full scope of the work before submission of a Proposal. By submitting a proposal, the Proposer certifies his acceptance of this requirement.

After investigating the project site and comparing the Drawings and Project Manual with the existing conditions, the proposer should immediately notify the A/E of any conditions for which requirements are not clear; or about which there is any question regarding the extent of the Work involved.

Should the successful proposer fail to make the required investigations and should a question arise after award of contract as to the extent of the Work arising from existing conditions, the A/E will review the issues and make a recommendation to the Project Manager.

Requests for site visits by individual proposers after the formal Pre-Proposal Meeting for the purpose of evaluating and preparing a proposal, will not be accommodated. State law requires proper background checks and badging or accompaniment by District personnel for site visits. It is not practical for the District to provide such accompaniment for individual proposers outside the prescribed Pre-Proposal and Site Visit parameters. Therefore the only viable and appropriate opportunity for viewing the site prior to the proposal date is to attend the Pre-Proposal Meeting and Site Visits.

1.01.10. Evaluation and Contract Award Process

Proposals will be opened publicly to identify the names of the proposer and their respective proposed contract amount (Base Price which includes all Allowances) beginning at 3:00pm Central time upon submittal of Part 2. Other contents of the Proposals will be afforded security sufficient to preclude disclosure of the contents prior to award.

The Proposal Evaluation Committee will evaluate the Proposals. The criteria for evaluation and selection of the successful proposer for this award will be based upon the factors listed in the Evaluation Criteria herein and in the Request for Competitive Sealed Proposal documents.

The Proposal Evaluation Committee consists of the following:

- Construction Services Staff ("CSS")

- M/WBE (“M/WBE”)
  DALLAS ISD M/WBE Program Manager

- Construction Proposal Evaluators (“CPE”)
  Five (5) Owner Representatives and or other in-house staff (as assigned)

- Safety Manager Consultant (“SM”)

After opening the Proposals, the Proposal Evaluation Committee will evaluate and rank each Proposal with respect to the published selection criteria. This ranking will be used to make an advisory recommendation to the Dallas ISD Board of Trustees and is subject to their approval. Per Texas Government Code Ch. 2269, Dallas ISD may negotiate a contract with the selected proposer offers for cost adjustment and other elements of the Proposal. Other than the data read at the Proposal opening, Dallas ISD will endeavor not to disclose any information derived from the Proposals submitted by competing firms in conducting such discussions. The selected Contractor will be required to sign the Dallas ISD Contract form once the district’s Board of Trustees grant the formal recommendation for award at the particular monthly publicly held Board meeting.

If Dallas ISD determines that it is unable to reach a satisfactory agreement with the first ranked proposer, Dallas ISD will formally and in writing, terminate discussions with that proposer. Dallas ISD will then proceed with negotiations with each successive proposer as they appear in the order of ranking until an agreement is reached, or until Dallas ISD has rejected all Proposals. After termination of discussions with any proposer, Owner will not resume discussions with that proposer.

Following execution of a contract agreement between Dallas ISD and the successful contractor(s), the proposers will be notified about the outcome of the selection process.

The award or rejection action regarding this Proposal is at the sole discretion of Dallas ISD. Dallas ISD makes no warranty regarding that a contract will be awarded to any proposer.

If a Contract is awarded, it will be awarded to the proposer offering the best value to Dallas ISD. Dallas ISD is not bound to accept the lowest priced Proposal, if that Proposal is judged and or determined not to be the best value for Dallas ISD.

1.02.1 RECEIPT OF PROPOSALS

See Specification Section 00 41 10 Overall Proposal Packaging Checklist - for packaging instructions and Section 00 11 13 Advertisement for CSP for proposal receipt instructions and details

1.03.1 ADDENDA, ALLOWANCES, ALTERNATES AND UNIT PRICES

Addenda. Contractors are required to acknowledge receipt of all addenda issued prior to the Proposal due date. Failure to acknowledge all addenda in the Proposal Form will result in the Proposal being deemed as non-responsive.

Allowances. Contractors are required to include the Allowances described in Section 01 21 00 in the Base Proposal. Refer to the General, Supplementary and Other Conditions of the Contract for Construction for other related details on allowances.

Contingency Allowance. All construction contracts shall contain an Owner Controlled Contingency Allowance (OCCA). The contingency allowance is to be used only for expenditures which do not require a change order. The contingency allowance may be used to pay for changes in the work including but not limited to those resulting from hidden or unforeseen conditions.
The contingency allowance may be used to pay claims. Use of the contingency allowance must be authorized in advance by the Owner’s Project Manager. Refer to Specification Section 00 41 11, for the contingency allowance. The contractor shall not be entitled to markups or profit related to use of the Owner Controlled Contingency Allowance.

Alternates. Contractors are required to submit prices for the Alternates described in Section 01 23 00 to add work or to deduct work from the Base Proposal. Contractor shall be responsible for any changes in the Work affected by acceptance of Alternates. Refer to Drawings and Technical Specifications Sections for items of work affected by Alternates. Election of Alternates will be exercised at the option of the Owner. Contractor will include as part of each alternate, miscellaneous devices, accessory objects and similar items incidental to, or required for, a complete installation. The amount shown in Specification Section 00 41 12 for each alternate shall include all plant, labor, material, equipment, overhead, profit, insurance and other costs incidental to the performance under the alternate. Failure to provide this information as an alternate is unacceptable and may result in the Proposal being deemed as non-responsive.

Unit Prices. Contractors are required to submit unit prices for any items that are listed in Spec. Section 01 22 00. The amount shown in Specification Section 00 41 12 for each unit price listed task/item shall include all overhead, profit, insurance and other costs incidental to the performance of the listed task/item. Failure to provide the requested unit pricing may result in the Proposal being deemed as non-responsive.

1.04.1 EVALUATION CRITERIA

Evaluation for ranking of firms submitting proposals will be based on the criteria shown in the following table (the weighting of each item by the points shown indicate the relative importance of each item and shall be utilized in the ranking of Proposal). Carefully review the submittal requirements, as failure to submit a Proposal in the proper format and in proper number may cause that Proposal to be rejected. The selection shall follow the Texas Government Code Chapter 2269, Contracting and Delivery Procedures for Construction Projects. The firm that offers the best value to the district based on published selection criteria and on its ranking evaluation will be selected. The District shall first attempt to negotiate a contract with the selected firm. Should negotiations be unsuccessful, the firm will be notified in writing of the decision to end negotiations, and the District will proceed to the next firm in the order of selection ranking until a contract is reached or all proposals are rejected. Based upon the proposal material submitted, the following criteria will be used to evaluate firms.

Criteria Number	Criteria Description	Category Value
1	**Purchase Price**	
1a	**[1] Proposal Price - This section will be scored according to published formula by Construction Services Procurement personnel and provided for all evaluators:**	40 points
	Category Total:	**40 points**
2	**Reputation of Vendors and of the Vendor's Goods or Services**	
2a	**References – Designated evaluators will check references to score this section:**	5 points
	Category Total:	**5 Points**
3	**The Quality of the Vendor's Goods or Service**	
3a	**Safety Plan, and Insurance Rate Modifier (IRM):**	5 points
3b	**Proposed Project Team(s) and Management approach to proposed projects:**	12 Points
	Category Total:	**17 Points**
4	**The Extent to which the Goods or Services Meet the District's Needs**	
4a	**General Contractor's current/past K-12 new or renovation construction experience:**	10 points
4b	**Proposed Construction schedule and phasing plan:**	5 points
	Category Total:	**15 points**
5	**The Vendor's Past Relationship with the District**	
5a	N/A	0 points
	Category Total:	**0 points**
6	**The impact on the Ability of the District to Comply with Laws and Rules Relating to Historically Underutilized Businesses (M/WBE)**	
6a	Proposer demonstrated a commitment to the district's M/WBE program by providing enhancements to the administration of the proposer's contracting process for the work to be done by M/WBE firms. Examples of this commitment may include any of the following: expedited payments, Mentor Protege Programs, early release of retainage, expanding the pool of diverse subcontractors to firms that have not done business with the district, etc.	3 Points
6b	Proposer submitted a list of two (2) M/WBE subcontractor references.	2 Points
6c	Proposer is a certified M/WBE OR Proposer submitted a Jooint Venture Agreement with a certified M/WBE OR Proposer submitted a Prime Subcontractor Teaming Agreement with a certified M/WBE.	5 Points
6d	Proposer submitted a diverse list of certified M/WBE subcontractors, subconsultants or suppliers that meets or exceeds the district's M/WBE aspirational goal in meaningful and significant roles OR Proposer demonstrated outreach designed to meet the M/WBE project goals with a diverse M/WBE team of subcontractors, suppliers and subconsultants.	5 Points
6e	Proposer demonstrated a comprehensive framework and understanding of the district's M/WBE program by: providing a written and detailed M/WBE compliance plan, designating a high ranking individual who will be responsible for M/WBE contract compliance, monitoring and reporting, ensuring no unauthorized changes to M/WBE subcontractors, adhering to the M/WBE commitment and subcontractor payment terms, executing the M/WBE subcontracting schedule, complying with the district's M/WBE Program.	5 Points
	Category Total:	**20 Points**
7	**The Total Long-Term Cost to the District to Acquire the Vendor's Goods and Services**	
7a	Financial status of the vendor (as rated by Dun & Bradstreet):	3 Points
	Category Total:	**3 Points**
8	**Any other Relevant Factor Specifically Listed in the Procurement Document**	
8a	N/A	0 points
	Category Total:	**0 points**
	Total	**100 Points Maximum**

[1] Proposed Pricing Formula:

Maximum Score = Forty (40)

Minimum Score = Zero (0)

Notes: Low Bidder can only receive the full 40 points if at or under the advertised Construction Budget Estimate (A7)

Notes: Bids that are under budget will only lose 1 point per % from Low Bidder (Column G)

Notes: Bids that are over budget will be penalized 1 point per % from Low Bidder to the Budget & 2 points per % from the Budget

Notes: The low bidder is awarded points up to 20% over budget. If Low bid is 20% or more over Construction Budget Estimate (A7), no bidder shall receive any points for price.

NOTE: If all bidders are 20% or more over budget resulting no points being awarded, Dallas ISD shall use an alternative price evaluation formula to award points for the bids received. Low bidder will be awarded 5 points and each bidder will lose 1 point per percent from the low bid.

Formula = P10-G10*100 P= Max Points Allowed (40) G= % from Low Bid

Step 1- Determine Low Bidder (Column C)

Formula = =IF(Bid=$E$6,"Low Bidder","-")

E6 = Low Bid

Step 2- Calculate Bid Delta ($) from Budget (Column D)

Formula = =Bid-$A$7)

A7 = Construction Budget Estimate

Step 3- Calculate Bid Delta (%) from Budget (Column E)

Formula = =ROUND((Bid-$A$7)/$A$7,2))

A7 = Construction Budget Estimate

Step 4- Determine if Bid is Over or Under Budget (Column F)

Formula = =IF(Bid<=$A$7,"Under Budget","Over Budget"))

A7 = Construction Budget Estimate

Step 5- Calculate Bid Delta (%) from Low Bid (Column G)

Formula = =IF(C10="low bidder",0,ROUND(E10-MIN($E$10:$E$40),2)))

C10 = Low Bidder vs Not Low Bidder

Step 6- Calculate Points Lost for Bids Under Budget. (Column H)

Bid Proposals that are UNDER the Construction Budget Estimate provied will be scored with an escalator of 1. 1 Point Per Percent from low bid will be deducted from max points of 40.

Pricing Formula = =IF(C10="low bidder",0,IF(F10="under budget",ROUND((G10*100)-K10,0),IF(MIN($E$10:$E$40)>0%,0,ROUND(-MIN($E$10:$E$40)*100,0)))))

Under Budget

Step 7- Calculate Points Lost for Bids Over Budget. (Column K)

Bid Proposals that are OVER the Construction Budget Estimate provided will be scored with an escalator of 1 from the Low Bid to the Budget and an Escalator of 2 from the Budget to their bid. 1 Point Per Percent from the low bid will be deducted from low bid to budget & 2 points per percent from budget to their amount from max points of 40.

Pricing Formula = =IF(F10="under budget",0,IF(F10="OVER BUDGET",IF(C10="low bidder",ROUND((E10*100),0),ROUND((E10*100),0)))))

Step 8- Add Multiplier to Points Lost for Bids Over Budget (Column M)

Bid Proposals that are OVER the Construction Budget Estimate provied will be scored with an escalator of 1 from the Low Bid to the Budget & an Escalator or 2 from the Budget to their bid. 1 Point Per Percent from low bid will be deducted from low bid to budget & 2 points per percent from budget to their amount from max points of 40.

Pricing Formula = =IF(C10="low bidder",K10*2,IF(F10="under Budget",0,(E10*100)*2)))

Step 9- Calculate Total Points Lost (Column N)

Add Points Lost from Step 7 (Column J) + Points Lost from Step 8 (Column M)

Pricing Formula = =J10+M10)

Step 10- Calculate Total Points Awarded (Column Q)

Subtract Points Lost from Max Points of 40

Pricing Formula = =IF(C10="low bidder",K10*2,IF(F10="under Budget",0,(E10*100)*2)))

C10 = Low Bidder vs Not Low Bidder

SECTION 00 31 00 - AVAILABLE PROJECT INFORMATION

1.01 PROJECT NAME/ADDRESS

CSP 207777, consisting of improvements to:

Org #	PROJECT NAME	PROJECT TYPE	ADDRESS
274	MARY MCLEOD BETHUNE ELEMENTARY SCHOOL – RENOVATION	Renovation	1665 Duncanville Road Dallas, TX 75211

1.02 OWNER

Dallas Independent School District
Construction Services
Linus D. Wright Dallas ISD Administration Building
9400 N. Central Expressway Suite 800
Dallas, TX 75231

State Notification-

- A copy of the 10-day Abatement and/or Demolition notification submitted to the State, must be forwarded to the following departments within reasonable time frame:
- Dallas ISD Environmental-DDANIELS@dallasisd.org
- Bond Safety Department- almeza@dallasisd.org

Guidelines for Facility Owner Section-

- 10-day Abatement and Demolition State Notification, the below information must be included on **the facility owner section:**
- Name: Dallas Independent School District- Construction Services
- Attention: Contract Manager
- Address: 9400 N US 75-Central EXPY, STE 800 Dallas, TX 75231

1.03 OWNER'S PROJECT MANAGER (PM)

Dikita Enterprises Inc will be the Owner's Project Manager (PM) for the management of planning, design, permitting, construction, and post-construction for this CSP. All correspondence and communication during the contract finalization, construction and post-construction processes shall be directed to the Architect/Engineer firm (A/E) with copy to **Dikita Enterprises, Inc.** During construction, the PM shall have authority to act on behalf of Dallas ISD for Owner related direction.

Michael Evans, Project Manager
Dallas Independent School District
Construction Services
Linus D. Wright Dallas ISD Administration Building
9400 N. Central Expressway Suite 800
Dallas, TX 75231
Phone: **972-925-7234**
E-mail: **C0122495@dallasisd.org**

1.04 ARCHITECT/ENGINEER FIRM (A/E)

E. Evans Associates, Inc has been retained by Dallas ISD as the primary Architect/Engineer (A/E) for this bid package. All Drawings and Specifications have been prepared by the Architect/Engineer (A/E), including those dated **August 23, 2023** All correspondence and communication regarding these documents shall be directed to the Architect/Engineer (A/E) with a copy to Project Manager.

E. Evans Associates, Inc
13140 Coit Road, Suite 230
Dallas, TX 75249
Main Contact: **Evan Evans**
Phone: **214-240-4440**
Fax: **214-340-0205**
Email: **eevans@eevansassoc.com**

1.05 Summary of Work. See related Section 01 10 00 Summary of Work

1.06 Project Schedule. The Contractor shall diligently prosecute and achieve Substantial Completion of the Work no later than as shown below.

Org # -SCHOOL NAME and PROJECT TYPE	SUBSTANTIAL COMPLETION	Final COMPLETION
274 – MARY MCLEOD BETHUNE ELEMENTARY SCHOOL – RENOVATION	January 01, 2026	60 days after Substantial

A Notice to Proceed (NTP) will be required before any work may commence. The NTP will be issued to the contractor when signed contracts, and any other required forms required, are returned to the Owner with valid bonds and insurance

A separate contract will be issued by Dallas ISD for each school. The Contractor will be required to provide Payment and Performance Bonds for each contract. Contractor shall be responsible for all permit costs including plan review fees.

1.07 Estimated Construction Budget (including allowances). The estimated construction budget for each school and total for the package is shown in the table below. The Owner reserves the right to reject any and all proposals if they exceed the estimated construction budget amount. The total base proposal amount for the package, which includes the listed allowances, will be considered in the evaluation of the Contractor's proposal.

For accounting purposes each school construction budget stands alone. In Section 00 41 11 Proposal Form Base – Base Bid (Part 1-A of the CSP), Proposers are required to enter a cost per school breakdown of their proposed Base Bid amount including allowances so that the cost per school can be verified against the per school budget during negotiations. These breakdowns are not for evaluation purposes and will not be read at the proposal opening.

School Org #	School Name and Project Type	Construction Cost Limitation (CCL)	In Contract Owner Controlled Contingency (IC)	Total Other Owner Allowances	Estimated Construction Budget (CCL + IC + Allowances)
274	MARY MCLEOD BETHUNE ELEMENTARY SCHOOL – RENOVATION	$3,222,968.84	$161,148.44	$0.00	$3,384,117.28

1.01 **Student Safety is Priority-One**. The General Contractor ("the Contractor") has the duty of care to perform the Work safely. The Dallas ISD Safety Program and School Operational Parameters are incorporated into the Project Contract Documents. **Under the AIA 101 and 201, the Contractor's Superintendent is the person responsible for the daily safe execution of the Work.** The Contractor recognizes the critical need for the safety of all persons involved with the construction project, and most specifically the safety of students and the campus staff, and the need to conduct any and all construction operations in such a way as to NOT endanger the students and to NOT DISRUPT THE SCHOOL OPERATIONS.

The Contractor's Superintendent will plan his work with the students' safety as priority one. **On a daily basis, the Contractor will plan and execute his work (in coordination with the campus Principal, but under DISD Construction Services direction) with the utmost care to not endanger the students' safety or the schools' operations. To this end, for each active project, the Contractor's safety manager and the Contractor's job site specific safety person MUST attend each DISD monthly Safety Committee Meeting. The PMF PM will also attend.**

Daily Contractor Operations:

- Prior to the start of each work shift, daily jobsite specific Job Hazard Analysis (JHAs) will be provided by the Contractors' subs and reviewed by the Contractor.

- Prior to the end of each work shift, the Contractor's Superintendent will walk the site, and take the requisite action, to physically field verify that the campus has been made safe for student occupancy (the following morning), to protect the Work, materials and equipment from vandalism and theft. All gates and doors must be secured, and all warning signs must be posted.

- And at the end of the workday, the Contractor WILL audit the campus life safety systems and then call Central Control at 214.932.5627, to confirm to Central Control that the fire alarm system and security systems are back on normal operations.

- **The Contractor will not rely on DISD ("the Owner") staff, school personnel, or PMF PM to perform his end of shift duties of making the campus safe for occupancy and auditing the life safety systems.**

The Superintendent must have OSHA 30-Hour Training and must be proficient in enforcing the Dallas ISD Safety Program and School Operations Parameters. Each Foreman, that will be working on site, must have the OSHA 10-Hour Training.

2.01 **School Operating Hours.** For Contractor construction purposes, access to school facilities shall be limited during the school's normal working hours. During school operating hours, student occupancy and use is priority one. **And during normal hours, on a daily basis, the Contractor will plan and execute his work (in coordination with the campus Principal, but under DISD Construction Services direction) with the utmost care to not endanger the students' safety or the schools' operations.** To this end, during school operating hours, the Contractor will incorporate student safety as priority one in his daily task specific Job Hazard Analysis ("JHAs") and there will be no digging during normal school operating hours.

3.01 **Normal hours** are defined as the time and days when DISD provides for custodial staff to be on site. The cost for DISD custodial staff, during normal working hours on normal working days, shall NOT be included in the Contractor's proposal. During procurement, the Contractor is free to call the campus to inquire as to the campus normal hours of operation. The DISD School calendar is readily available on the Dallas ISD website with a listing of the campus working days.

4.01 **After Hours Access.** The campus custodian must be on site when the Contractor is working after hours. **The Contractor is responsible for all after-hours custodial costs.** This cost shall be included in the Contractors proposal price. After hours are defined as the time when DISD does not have custodial staff on site. The Contractor will incur custodial overtime costs, at the rate of $30 per hour, for DISD custodial staff presence at the school site. The Contractor will not rely on DISD

("the Owner") staff or school to perform the Contractor's housekeeping duties. Custodial staff will be on site only to allow the Contractor access to the campus. Custodial staff will not perform cleanup work for the Contractor.

The Contractor is responsible for all after-hours custodian costs on days and times including but not limited to nights, weekends, DISD non-working days, and holidays. Any request by the Contractor to enter areas of the school, after normal operating hours, shall be coordinated and approved in advance per the (5) step process outlined on the DISD **'After Hours Access Request Form'**.

The contractor shall utilize the After-Hours Access Request form and submit said form to DISD at least two (2) working days prior to the needed access date. Contractor shall submit copies of each fully executed form(s) to the Project Manager ("PMF") via email each day and during each weekly progress meetings so that they may be attached to the meeting minutes. Upon request, the PMF PM will provide the After-Hours Access Request form to the Contractor in electronic format. **After execution of the Work, the Contractor must email all custodial forms to the PMF prior to leaving the site. Noncompliance will require the Contractor to daily hand deliver (the following morning) the end of the day executed OT form to the bond office.**

5.01 **Holidays, Spring, Summer, Fall, and Winter Break Operations.** The Contractor will explicitly show each holiday, spring, summer, fall, and winter break and each SPA on his schedule. The Contractor will plan the project's construction operations to perform major portions of the Work after hours, during holidays, and at times when the campus is NOT occupied. The heating scope should be performed during the summer and the cooling scope should be performed during the heating season.

The DISD School Calendar is available on the Dallas ISD website with a listing of all the holidays and breaks. Any requirement by the Contractor to enter areas of the school during the evenings, non-working days, and holidays shall follow the (5) step process outlined on the DISD 'After Hours Custodial Request Form' and the area will be made safe for student occupancy (the following morning).

6.01 **Summer School Status**. The Contractor will plan the construction Work to perform major portions of the Work during the summer, after hours, during holidays, and at times when the campus is NOT occupied. The heating scope should be performed during the summer and the cooling scope should be performed during the heating season. The Dallas ISD School Calendar is available on the Dallas ISD website with a listing of all the holidays and breaks.

To the extent feasible, the Owner will plan NOT to have summer school at school sites affected by construction. Select campuses may have summer programs and or early school start dates. **Upon mobilization to the campus, it is the Contractor's responsibility to coordinate with the campus Principal to phase the Work in such a way as to incorporate summer programs and or early campus start dates into the project Work schedule.**

WHEN WORKERS AND DISD TEACHERS/STAFF ARE BOTH WORKING IN THE SAME AREA, THE CONTRACTOR'S SUPERINTENDENT (OR SAFETY MANAGER) WILL HAVE THE STAFF & STUDENTS SAFETY AS PRIORITY ONE. SPECIFICALLY, (2) WEEKS BEFORE THE STUDENTS RETURN FROM SUMMER BREAK, THE CONTRACTOR WILL TRANSITION FROM DAY TO NIGHT WORK. DURING THIS TWO-WEEK PERIOD, IF FOR ANY REASON THE CONTRACTOR HAS TO WORK DURING THE DAY THEN THE CONTRACTOR'S SUPERINTENDENT (OR SAFETY MANAGER) WILL WALK, MONITOR, AND COMMAND AND CONTROL HIS WORKFORCE UNDER THE EXPLICIT SCOPE OF MONITORING TO KEEPING THE STAFF/STUDENTS SAFE.

7.01 **State Testing Dates**. The Contractor will NOT be allowed to perform construction activities during critical achievement test periods. After hours work will NOT be allowed on testing days. During state testing periods, the Contractor's Superintendent will be required be on site prevent his workers from being on site during testing periods. The campus State testing dates are campus specific. **Upon mobilization to the campus, it is the Contractor's responsibility to coordinate**

with the campus Principal to inform himself of the requisite state testing days and to explicitly include said campus testing dates into the project Work schedule.

For each calendar year, Contractor shall allow for a minimum of 11 testing days for Elementary Schools, 18 testing days for Middle Schools and 23 testing days for High Schools. Actual testing days and dates may vary for each school and must be confirmed with the respective school Principal.

The System-wide Testing Schedule may be available under the School Calendar on the Dallas ISD website. The Contractor should consult this calendar to determine the number of testing days that will take place during the duration of the Project and the Contractor shall include those days in his proposal.

8.01 **The Contractor Will Not Disrupt the Campus Utilities, Critical Systems, or Critical Areas of Operation**. The Contractor has the duty of care to perform the Work safely and in a manner to NOT impact the campus Critical systems and to not disrupt school operations. The campus critical systems and areas of operation are areas/systems that are required for campus occupancy. **The campus critical systems include but are not limited to the campus air conditioning systems, the campus utilities (water, sewer, electrical, etc.), the campus life safety systems, the internet, the MDF/IDF rooms, and critical areas such as the kitchen and the campus admin areas.** Any renovation work that would require a shutdown of a critical system or impact an area of operation MUST be accomplished during after hours, weekends, non-working days, holidays, and other times when the school is not in operation. All critical system and areas of operation shutdown SPAs must be shown on the project schedule and planned for in advance so that the campus is ready for student occupancy. To this end, the Contractor must provide DISD with a written Critical System Safe Plan of Action ("Critical System SPA") notification no less than 10 calendar days in advance.

A shutdown of a critical system requires written Owner approval. **The Contractor will not impact a critical system or a critical area of operation without explicit written approval from the Owner.** To this end, the Contractor MUST provide a written Critical Systems and Areas of Operation Safe Plan of Action ("Critical System SPA") and MUST decide for temporary systems or services that are acceptable to the Owner. The Contractor must provide temporary power for the campus life safety systems. During an electrical power shutdown, the life safety and campus security systems must remain operational under temporary power. And during power shutdowns the campus food must be refrigerated under temporary power to prevent spoilage.

9.01 **10-Day Notice of Power Shutdown**. The Contractor has the duty of care to perform the Work safely and in a manner to NOT damage the Owner's equipment. **To this end, the Contractor must provide the Owner with a written proposed Power Shutdown Safe Plan of Action ("Power Shutdown SPA") no less than 10 calendar days in advance of the shutdown.** The COMPLETE proposed SPA will be transmitted via email to both the Project Management Firm PM (PMF) and the DISD Safety Manager. After review by the Owner's Safety Manager (with 10 calendar days in advance notice), the PMF PM will transmit said Power Shutdown SPA to DISD's Contract Manager, DISD Central Maintenance Office, the A/E team, and the campus custodial staff. All utilities shutdowns must be shown on the project schedule.

During electrical power shutdowns, the life safety and campus security systems must remain operational. The Contractor must provide temporary power for the campus life safety systems. And during power shutdowns the campus food must be refrigerated under temporary power to prevent spoilage.

10.01 **Worker Identity Badges**. The Contractor must provide each construction workers with a DISD approved third party issued identification badge, that shall be worn, visibly at all times while the worker is present on the campus construction site. **All workers must undergo a background check via Dallas ISD's approved third party vendor. After badging, prior to being allowed on site, each worker must attend a 2-hour DISD Safety Orientation. The Contractor is responsible for all badging and safety orientation costs.**

11.01 **Construction Fencing, Parking and Staging Areas**. Because the Work is a Phased project, the Contractor SHALL include the cost of all hard barriers and signage in his bid. The Contractor SHALL include the cost of covered walkways in his bid. The Contractor SHALL provide hard barriers and signage at his own cost. No CAEAs or additional funds will be provided to the Contractor for fencing, signage, parking, relocation of the jobsite trailer and or relocation of the staging areas.

Six-foot fencing and privacy cloth SHALL be provided to enclose the Contractor's laydown areas and job site trailer. Contractor site activities, storage offices, and fabrication shall be limited to the areas enclosed by construction fences. Contractor parking SHALL be limited to the area enclosed by the construction fence or other Owner approved areas adjacent to school property. The Contractor SHALL include the cost of offsite parking for his workers in his bid.

Because the Work is a Phased project, the Contractor shall include the cost of all required hard barriers and signage in his bid. The Contractor will incorporate all costs associated with deenergizing and or relocating hard barriers, electrical exit signs, etc. for each phase of the phased Work. The Contractor must coordinate all temporary barriers with the Fire Marshall. As the Contractor shuts down a part of the school, the Contractor SHALL erect, at his own cost, a floor to ceiling barricade to completely separate his work area from the campus occupants. The barrier shall be made of 3/4" plywood, it shall extend from floor to ceiling, wall to wall, shall have a door that can be locked, and shall be painted on the Owner's side. This barrier shall remain in place until the Work is completely finished. Safety warning signage shall be displayed near the temporary barrier. Temporary construction barriers and safety signage must be provided at tie-ins from Additions to existing structures.

12.01 **Fire Alarm System Maintenance, Operation, Removal and Certification**. Life Safety Systems are critical systems for occupancy and may only be disabled under a SPA and WRITTEN Owner approval. The Contractor shall be responsible for all costs and coordination of any disconnection, removal, shunting, reconnection, testing, and re-certification of the fire alarm and security systems as required to accomplish the Work. The Contractor is responsible for maintaining the existing fire alarm system, security system, and life safety systems operational throughout construction duration. If the Contractor requires the temporary or permanent relocation of fire alarm devices in order to complete the Work, then Contractor shall be responsible for notifying the PMF Project Manager and utilizing DISD's Vendor (if the system is under warranty) to disconnect, remove, secure, protect, reinstall, re-test and re-certify said equipment or system. If no vendor is indicated (or it is not under warranty), then the Contractor may select a qualified fire alarm vendor of his choosing. The Contractor is responsible for all costs and coordination of any disconnection, removal, shunting, reconnection, testing, and re-certification of the fire alarm system required to accomplish the Work and to receive the requisite green tag or certificates from the applicable Fire Department.

Anytime an existing fire alarm system or security system is disabled, prior to leaving the site for the day, the Contractor must contact Dallas ISD's Safety and Security Central Control at 214.932.5627. The Contractor will be required to provide his name, company, cell phone number, the reason for placing the system in trouble and how long the system will be disabled. The fire alarm and or the security system will not be left disabled overnight. **At the end of the workday, the Contractor must audit the campus life safety systems and call Central Control at 214.932.5627, to confirm that he has place the fire alarm system and security systems back on normal operations.** The Contractor will not rely on DISD ("the Owner") staff or school security personnel to perform this duty.

Contractor shall comply with the following time restrictions, when scheduling Fire Alarm inspections, and placing the life safety systems on TEST, **that require contact with DISD Central Control**. The Contractor will be responsible for any and all costs associated with said inspections (including but not limited to scheduling the Fire Marshal, City or any other personnel needed for this inspection).

- 7:00 AM - 9:00 AM (Arrival): Fire Inspections can occur before 7:00 AM or after 9:00 AM
- 2:30 PM - 4:00 PM (Dismissal): Fire Inspections can occur before 2:30 PM or after 4:00 PM

13.01 **Technology/Communications**. The Contractor has the duty of care to perform the Work in a manner to NOT damage the Owner's equipment. To this end, the Contractor must provide DISD with a written Power Shutdown Safe Plan of Action ("Power Shutdown SPA") notification of power or other utility shutdown no less than 10 calendar days in advance of the shutdown.

Contractor is responsible for any damages or changes to the existing technology/communication system throughout the duration of the construction and must make any appropriate repairs. If the Contractor requires the temporary or permanent relocation of technology in order to complete his work, then the Contractor is responsible for notifying Dallas ISD and completing all disconnections, removals, temporary facilities, security, protection, re-installation, re-testing and re-certification, etc. to maintain the system. The original warranty will need to be maintained / restored. Contractor is responsible for all costs and coordination.

14.01 **Water and Electrical Utilities.** On new construction projects, the Contractor shall provide and pay for all temporary and permanent utility services necessary for the execution and completion of the Work. On new construction projects, where new utility services are being installed, the Contractor shall establish temporary utility accounts and pay for said temporary utility costs for the duration of the project (until Substantial Completion). Utility costs paid by the Contractor after Substantial Completion shall be reimbursed by the District.

On renovation projects, the contractor is allowed to use temporary power and water from the existing school for the Work inside the building.

15.01 **Off-Limit School Areas**. The Contractor shall provide for hard barriers between his work and the campus occupants. When working in the existing building, the Contractor shall not use the school's cafeteria, telephones, restrooms, vending machines, staff parking lots or any other school facility. The Contractor shall include in his bid, the cost for temporary worker restrooms and the costs for offsite parking.

16.01 **No Overhead Lifting and No Trenching During Normal School Hours**. The Contractor shall NOT perform overhead lifting activities over areas occupied by students, school personnel, or visitors. The Contractor recognizes the critical need for the safety of all persons involved with the construction project, most specifically the students and the campus staff, and the need to conduct any and all construction operations in such a way as to NOT endanger the students and to NOT DISRUPT THE SCHOOL OPERATIONS. **Any Work that would require lifting over an occupied area or excavating MUST be accomplished during after hours, weekends, non-working days, holidays, and other times when the school is NOT in operation.** Roofing kettle operations will not be allowed to commence while the campus is occupied.

The Contractor shall NOT perform any trenching or excavating activities during regular school hours. Prior to digging, the Contractor shall perform a GPR and overlay the utilities finding over the Work areas. One week prior to any planned excavation or trenching, the Contractor shall conduct a Pre-Dig meeting (on site) with all the subs involved. Agenda will include a discussion about the GPR findings, the scope and review of the existing underground utilities as it relates to the planned trenching / excavation. At the pre-dig meeting, Contractor shall present a contingency plan if any utility is struck during execution of such work. The GPR findings overlay will be shared with all subcontractors and will be posted for worker ready reference at the jobsite trailer.

All utilities must first be hand dug, to field verify the depth and location of said line. Only after field verifying the depth and location, may the Contractor use mechanical equipment to excavate.

17.01 **Delivery of Materials and Equipment.** The Contractor shall issue a directive to all of his subcontractors that deliveries for this project shall be made to the Contractor and not to the campus office or to DISD personnel. It will be the Contractor's responsibility to replace, at his own cost, equipment or deliveries that are lost because of noncompliance with said delivery requirements.

The Contractor will also direct his subcontractors to NOT make deliveries during student arrival, student departure and on student testing days.

18.01 **Owner's Right to Salvaged Items**. Dallas ISD reserves the right to salvage any and all materials. The Contractor shall notify the Owner at least 4 weeks prior to the start of demolition (in each area where demolition will be performed). During said 4 weeks, the Owner may furnish a list of items to be salvaged, labeled, logged, and delivered to a place of DISD's choosing. Upon request, the Contractor will provide a receptacle acceptable to DISD for said salvageable items.

19.01 **Equipment Access**. During installation of new chilled water, hot water lines, new VAVs, AHUs, RTUs, Boilers, etc. the Contractor will install the new work in a way where he provides the requisite equipment access at each service side panel in accordance with the manufacturer's recommendation. The Contractor will account for insulation thickness, all existing and new above ceiling MEP and will coordinate his work prior to installation of new equipment. Please refer to the Contract Documents for specific details and preinstall meetings.

20.01 **Removal of Fixed Furnishings, Fixtures or Equipment.** The Contractor is responsible for the cost of removal, cataloguing, protection and the re-installation of fixed furnishings, fixtures or equipment required by the Contractor for the execution of his Work. The Contractor will include in his base bid, the costs to relocate and protect from damage said furniture, equipment, and property within any given room.

21.01 **Moveable Furnishings or Equipment.** This is a phased project. The Contractor will be responsible for any relocation of furniture or school property within any given room as necessary to perform the Work. The Contractor will include in his base bid, the costs to relocate and protect from damage said furniture, equipment, and property within any given room. The Contractor must obtain written approval to relocate furnishings or equipment within the room from the Owner via the PMF PM.

22.01 **I.T. Equipment and Safety/Security Equipment**. The Contractor SHALL coordinate a preinstallation meeting between DISD IT, the Contractor and the PMF PM. The Owner will be responsible for moving I.T. equipment and chemicals from science labs, when necessary. A pre-move meeting will be held at least five (5) days prior to any move requiring the Owner's involvement. If required, to accommodate significant demolition and construction activities, DISD will provide and the PMF will manage a moving services vendor to relocate movable furnishings and equipment out of each phased classroom area and into temporary facilities. The Contractor shall be responsible for coordinating the phasing of the Work with the Owner's moving vendor. Contractor will be responsible for the protection of any furnishing or equipment remaining in the Work areas.

23.01 **Tobacco and Alcohol Products Prohibited.** Use of all tobacco, alcohol and illegal uncontrolled substances is prohibited on Dallas ISD property. The Contractor will take daily action to enforce compliance.

24.01 **The Contractor Will Not Interact with Students/Campus Staff.** This is a phased project. The Contractor will install hard barriers between his Work and the campus occupants. As the Work progresses, the Contractor will move or relocate the hard barriers are required to prevent worker/student/staff interaction. The Contractor shall issue daily instructions to all of his subcontractors to refrain from interactions with students and campus staff.

25.01 **The Contractor Will Not Use Existing School Facilities.** Construction crews MUST stay away from all areas existing school facilities that are not within the limit of the designated work area. When working in the existing building, the Contractor shall not use the school's cafeteria, telephones, restrooms, vending machines, staff parking lots or any other school facility. The Contractor shall include in his bid, the cost for temporary worker restrooms and the costs for offsite parking. The Contractor shall issue instructions to all of his subcontractors to avoid interactions with students and campus staff. The Contractor will not rely on DISD ("the Owner") staff or school security personnel to perform his duties.

26.01 **Pressurized Testing.** Repressurizing of an existing system will be accomplished gradually and methodically and in a way that it does not damage the existing infrastructure. The Contractor has the duty of care to perform the Work safely and in a manner to NOT impact the campus Critical systems. Pressurized testing, on MEP systems, shall be done after hours, weekends, non-working days, holidays, and other times when the school is not in operation by Dallas ISD that occupied areas are not impacted, directly or indirectly, due to the testing.

27.01 **No Roofing Work Activities Allowed Over Occupied Areas.** On a daily basis, the Contractor will plan and execute his work with the utmost care to not endanger the students' safety or the campus operations. Activities that may cause a hazard to the below occupants is restricted. To this end, prior to the start of each work shift, daily jobsite specific Job Hazard Analysis (JHAs) will incorporate this requirement. NO roofing work or hot work is allowed, regardless of the extent, when the campus is occupied. Specifically, roof work not allowed while the campus is occupied includes, but is not limited to roof coring, roof drilling, installation of roofing electrical and plumbing pipes, no installation of roof blocking, no installation of gas lines or equipment curbs, no installation of flashing, no roof demolition activities, no placing materials on the roof, and no maintenance or warranty work that would require changing of a piece of equipment.

Minimal inspections and maintenance activity are allowed. For example, activities that would require a workman to access the roof and make minor adjustments or to change a small blower. Said activity must be coordinate in advance.

28.01 **Demolition Activities Will Be Conducted With Student Safety As Priority One.** On a daily basis, the Contractor will plan and execute his demolition work with the utmost care to not endanger the students' safety or the campus operations. Prior to the start of each work shift, daily jobsite specific Job Hazard Analysis (JHAs) will be provided, and the Asbestos report will be reviewed so as to prevent an asbestos release. And during abatement demolition and containment, the MEP chilled water lines, electrical lines, low voltage, fire suppression lines, etc. will be temporarily supported by the abatement contractor. This cost will be part of the contractor's base scope and will be included in his bid.

29.01 **Phased Project With Student Safety As Priority One.** On a daily basis, the Contractor will plan and execute his work with the utmost care to not endanger the students' safety or the campus operations. Prior to the start of each work shift, daily jobsite specific Job Hazard Analysis (JHAs) will be provided.

Since the school buildings will be in use during construction, the Work shall be conducted in phases as proposed in the Contract Documents phasing drawings. **Phasing proposed by the Contractor during procurement will be deemed proposed and not as accepted.** After the Notice to Proceed ("NTP') is issued to the Contractor, the Contractor's proposed phasing will be reviewed by the PMF Project Manager. The PMF PM will make a recommendation for DISD Contract Manager acceptance or rejection. **If proposed phasing plan is rejected by the PMF PM or DISD Contract Manager, then the phasing plan in the Contract Documents stands**.

Because the Work is a Phased project, the Contractor will include the cost of all required hard barriers and signage in his bid. The Contractor will incorporate all costs associated with demoing and or relocating hard barriers, electrical exit signs, etc. for the phased Work. The Contractor must coordinate all temporary barriers with the Fire Marshall. As the Contractor closes down a part of the school, the Contractor SHALL erect (at his own cost) a floor to ceiling barricade to completely separate his work areas from the campus occupants. Said barrier shall be made of 3/4" plywood, shall extend from floor to ceiling, shall be installed from wall to wall, shall have a door that can be locked, and shall be painted on the Owner's side. Hard barrier will remain in place and be relocated as work progresses until the Work is completely finished. The door will be kept secured to prevent students from entering construction areas.

30.01 **Project Schedule.** The Contractor will plan and execute his work with the utmost care to not endanger the students' safety or the campus operations. The Contractor will explicitly show each holiday, spring, summer, fall, winter break and each SPA on his schedule. The Contractor will plan

the construction Work to perform major work activities after hours, during holidays, and at times when the campus is NOT occupied.

Even though DISD does not operate its HVAC systems as true 4 pipe system, most DISD campuses have a 4-pipe system. Hence, the cooling scope should be performed during the heating season and the heating scope should be performed during the summer. These activities must be planned in advance and shown on the project schedule. The cooling portion of the work that is performed during the summer break must be fully operational by the time the teachers return from their summer break. The heating work that is performed during the winter holidays must be fully operational by the time the students return.

The Project Schedule must show that during the summer break, 2 weeks prior to students' arrival, the contractor will shift to working nights, weekends, DISD non-working days, and holidays. 2 weeks prior to students arrival, the teachers will occupy the campus during the day to prepare their classrooms for student use.

The Contractor must plan in advance and show on the project schedule all Dallas ISD Safety Manual high risk SPAs including but not limited to Pre Crane, Pre-Dig, Pre-Crawlspace, Pre-Dig, and Pre-Utility SPAs.

31.01 **Weekly Owner, Architect, Contractor ("OAC Meetings").** The Contractor's Project Manager and Superintendent MUST attend all weekly OACs. Missing more than 2 OACs will be grounds for replacing the Contractor's Project Manager and or Superintendent.

On a weekly basis the Contractor will organize and host an Owner, Architect, and Contractor ("OAC") progress meeting. At said meeting the Contractor will provide all attendees a hard copy of the project schedule, a copy of the 3 week look ahead, the RFI Log, the ASI Log, the PCO Log, the Submittals Log, and a hard copy of the Equipment Long Lead Items List. After the OAC meeting, the Owner, Architect, and the Contractor will walk the site to review installed work.

32.01 **DISD Monthly Safety Meeting.** For each active project (that has not reached Substantial Completion), the Contractor's Safety Manager and the Contractor's job site Superintendent MUST attend each DISD monthly Safety Committee Meeting. Noncompliance with said requirement will be grounds for replacing the Contractor's Safety Manager and or Contractor's Site Safety Person.

33.01 **Inclement Weather SPAs.** The Contractor will comply with DISD Inclement Weather SPA reporting requirements. The Contractor's Project Manager and Superintendent on a daily basis will monitor the weather to mitigate the damage to DISD property. The Contractor will take proactive action to prevent water intrusion. When HVAC or roofing work is in progress, the Contractor will temp in his Work to prevent water intrusion.

34.01 **Jobsite Trailer Postings.** On a weekly basis, the Contractor will plan and execute his work with the utmost care to not endanger the students' safety and to provide his subcontractors the most up to date project information available. To this end, the below items will be posted immediately adjacent to the job trailer entrance:

- The Project Team's Contact List w/Phone Numbers and Email.
- A Complete Copy of the Operations Parameters.
- A Colored Copy of The Most Recent GPR Report.
- A Site Map Showing the Location of each Utility Shutdown Valve.
- A Copy of the Project Baseline Schedule
- A Copy of the 3 Week Lookahead Schedule.
- A Copy of the Project's Phasing Plan.
- A hard copy of the last OAC Hand Outs.

On a daily basis, the Contractor will plan and execute his work (in coordination with the campus Principal, but under DISD Construction Services direction) with the utmost care to not endanger the students' safety or the campus operations.

Prior to the start of each work shift, daily jobsite specific Job Hazard Analysis (JHAs) will be provided. And, prior to the end of each work shift, the Contractor's Superintendent will walk the site, and take the requisite action, to make the campus safe for student occupancy (the following day), to protect the Work, materials and equipment from vandalism and theft. And at the end of the workday, the Contractor's Superintend will check all the life safety systems and then call Central Control at 214.932.5627, to confirm that the fire alarm and security systems are operational. The Contractor will not rely on DISD ("the Owner") staff or school security personnel to perform his duties.

35.01 **Lessons Learned.** For each active project, the Contractor must incorporate the below lessons learned into the planning and execution of the Work.

1) This is a phased project. The roof, windows, floors, and ceiling demolition and abatement scope will be phased by wing. Demo of the entire campus roof, windows, floors, and ceiling demolition and abatement scope will NOT be allowed at once.

2) The Contractor's Superintendent will plan his work with the students' safety as priority one. If the work endangers campus operations, it must be performed after hours, on weekends, holidays or times when the campus is not occupied.

3) **During the Summer Break, the Contractor PM and Superintendent are not allowed to take vacation. Noncompliance with said requirement will be grounds for replacing the PM and or Superintendent.**

4) All long lead item submittals must be driven to conclusion within 90 days of the Notice to Proceed. The project submittals must be driven to conclusion within 120 days of the notice to proceed.

5) Immediately after mobilizing, the Contractor will audit all of the school's life safety systems (Fire Alarm and Security Panels) and the Contractor will provide DISD will a video of any deficiencies. It will be assumed that all the systems are in perfect condition if the Contractor does not provide said video within 30 days from mobilization. At this point the Contractor will be responsible for any and all costs to repair the life safety systems.

6) For new building additions and or new building construction work any utilities work that would require a shutdown of a critical system or impact an area of operation MUST be accomplished after hours, weekends, non-working days, holidays and other times when the school is not in operation. All utilities must first be hand dug, to field verify the depth and location of said line. Only after field verifying the depth and location, may the Contractor use mechanical equipment to excavate.

7) Jurisdictional inspections shall be coordinated with the campus to not impact campus operations. The Contractor is required to include the costs of all inspection whether during normal of after-hours in his bid.

REIMBURSABLE **Fund Code:** ____

Dallas Independent School District
Construction Services
After Hours-Work, Holidays and/or Holidays Authorization Form: General Contractor(s)

SECTION A. GENERAL INFORMATION

Contract P.O.#: _____ TEA/ORG. #:_____ School Name:_____

Contractor Name: _____ Contractor Person In-Charge: _____

Scope: _____

Name of Dallas ISD Operations Employee: _____ Biometric Code:_____
Cellular Number for Dallas ISD Operations Employee_____

SECTION B. PRE-WORK NOTIFICATION:

Date of **Scheduled** Work: _____Hours of **Scheduled** Work: _____

Time **Scheduled** From _____ To _____

Contractor Person-In-Charge Signature: _____ **Date:** _____

Dallas ISD Program Administrator Approval : _____ **Date:** _____

SECTION C. POST-WORK CERTIFICATION:

Date of **Actual** Work _____

Time **Actually** worked From _____ To _____ Biometric Clock Used – Check 'X' if Yes
If Not Used – See Step 3 below

Hours of **Actual** Work _____

Contractor Person-In-Charge Signature: _____ **Date:** _____

Dallas ISD Operations Employee Signature: _____ **Date:** _____

PROCESS FOR PRE-WORK NOTIFICATION AND POST-WORK CERTIFICATION:

Step 1. At least two (2) working days prior to scheduled access, Contractor shall fill out Sections A & B, sign Section B, and email the form to Program Management Firm who will obtain Dallas ISD Program Administrator Approval. Contractor will be provided name of the Operations employee by the Program Management Firm.

Step 2. Contractor and Operations employee from Dallas ISD will meet at main entry of building at the scheduled start time.
- Contractor must notify Program Management Firm within 24 hours or pre-arranged date if contractor is unable to work.
- In case of work being cancelled for some reason, Contractor shall fill out the actual hours in Section C as "0" and email the form to the Program Management Firm.

Step 3. Upon completion of the scheduled day(s)'s work, Contractor shall complete Section C on the same form; Contractor and the Operations employee shall sign Section C; and Contractor shall send the completed form, no later than one (1) business day after execution of work, (all sections completed and signed off) to Program Management Firm. Please use a cover sheet for this step, which shows your name and contact number.
- Section C – Contractor to verify with Operations employee if Biometric Clock was used. If not used, Operations employee must complete and provide District's Non-Exempt Attendance Report with an explanation why Biometric Clock was not used.

Step 4. Contractor shall submit copies of completed and fully executed form(s) for a given month, with the respective application for payment on a monthly basis.

Step 5. **Dallas ISD shall make payment to the Operations employee(s)** based on the standard compensation procedures for Dallas ISD in accordance with the "Fair Labor Standards" Act. **Final Payment to the Contractor will be reduced by the reimbursement amount.**

Failure to follow all these steps listed above will result in:

- **Pre-Work Notification**: If the Contractor does not obtain the Dallas ISD Program Administrator approval at least two (2) working days prior to the requested scheduled access, overtime will not be worked for the day or days expected.
- **Post-Work Notification:** After the work has been completed the signed off form must be submitted the next day. If the completed form is not submitted timely the District may consider the removal of the Contractor's Person-In-Charge from the project.
- Failure to comply with the District's requirements may have a negative impact on the Contractor's ability to be assigned future work for the District.

Dallas Independent School District
Bond Program
Scheduled Utility Shutdown Authorization Form: General Contractor(s)

SECTION A. GENERAL INFORMATION: ☐ ***Permanent** ☐ **Temporary**

School Name and Org. #: _____

Bond Program Manager (PM) Name: _____

General Contractor (GC) Person In-Charge: _____ _____

Sub-Contractor (SUB) Person In-Charge: (Name) _____ (Contact No.) _____

SECTION B. PRE-WORK NOTIFICATION:

Utility System(s) to Be Shut down: _____

Utility Meter number _____

Description of Work Performed: _____

Describe Procedure for Shutdown: _____

Safety Measures/ Precautions for Shutdown: _____

Date/ Time **Requested** for Shutdown: _____ Shutdown Date _____ Shutdown Time _____ Restart Date _____ Restart Time

It is requested that the noted** building system(s) be allowed for "shutdown" **by the General Contractor to allow for our tie-in of services for the Project as enumerated below. We note that** five (5) days advance notice **is required as a minimum. I hereby certify that the required work has been coordinated and scheduled to achieve completion within the requested time-period.

SUB Person-In-Charge: **(Sign)** _____ **(Date)** _____

GC Person-In-Charge: (Sign) _____ (Date) _____

Bond Program Manager (PM) Approval: (Sign) _____ (Date) _____

DISD Project Manager Approval: (Sign) _____ (Date) _____

SECTION C. POST-WORK CERTIFICATION:

Actual Date/ Time for Shutdown: _____ Shutdown Date _____ Shutdown Time _____ Restart Date _____ Restart Time

GC Person-In-Charge Certification: (Sign) _____ (Date) _____

Bond Program Manager (PM) Certification: (Sign) _____ (Date) _____

DISD Project Manager Certification: (Sign) _____ (Date) _____

(Sign)

DISD Sustainability Certification: _____ _____

SECTION D. PROCESS FOR SCHEDULED UTILITY SHUTDOWN AUTHORIZATION

A. The General Contractor is to complete the *Utility Shutdown Request Form*, at least **5 working days** prior to the scheduled utility shutdown, and submit it to the respective Bond Program Manager for approval.

B. The Bond Program Manager (PM) will review and approve submitted *Utility Shutdown Request Form* and forward to the respective Dallas ISD Project Manager for approval.

C. The Dallas ISD Project Manager will review and approve form and return to the PM.

D. PM forwards approved form to Director/Maintenance Solutions and notifies Deputy Chief Director, Emergency Operations and Bond Program Safety Manager.

Note: All scheduled shutdown requests will require a jobsite meeting with the Program Manager and the School staff 48 hours in advance to discuss the outage procedures and status of all District departments involved on the shutdown request.

Note: For electrical shutdowns (Scheduled/ involuntary), when required for building operations, the General contractor must supply a power generator to keep the telephones, data and alarms working at all times.

***Permanent shutdowns are facilities or specific meters that will not require power/ utility to be restored.**

SECTION 00 41 10 – OVERALL PROPOSAL PACKAGING CHECKLIST

1.01 Proposers are to package all submittal information as follows. Documents should be bound in 3 ring binders with tabs for each section of the proposal form. Do not spiral or GBC bind the documents.

2.01 Both Parts of the Proposal response shall be labeled as follows:

Proposal for CSP 207777
274 – MARY MCLEOD BETHUNE ELEMENTARY SCHOOL - RENOVATION

Due: February 04, 2025
Time Due: 2:00pm
Part 1-A, 1-B, 1-C
<<Name of Proposer>>

Please Note: Part 1-C Proposal Form- Alternates & Unit Pricing (Section Div 00 41 12) - Should the solicitation contain an opportunity for alternate pricing, please ensure that the Section Part 1-C Proposal Form – Alternates & Unit Pricing Section 00 41 12 is submitted in an individually sealed envelope labeled accordingly with the specified CSP number, CSP title and Part 1-C Proposal Form – Alternates & Unit Pricing. ***Alternates Pricing will not be opened by the District unless the District engages in negotiations with the vendor submitting the alternate pricing package.***

Due: February 05, 2025
Time Due: 3:00pm
Part 2
<<Name of Proposer>>

Proposals will be read at 3:00pm following the receipt of Part 2

3.01 Part 1-A of the Proposal shall contain completed Specification Sections
00 41 11 Proposal Form – Base Bid (with all addenda acknowledged)
00 43 13 Proposal Guarantee Bond Form
00 45 00 Dallas Independent School District Required Forms Package
00 45 20 Certificate of Non-Discrimination
00 45 22 Notification of Hazardous Materials Affidavit Form
00 45 23 Family Conflict of Interest Questionnaire (CIQ)
Submit one (1) original of each Section for Part 1-A.

4.01 Part 1-B of the Proposal shall contain completed Specification Section
00 41 13 Technical Proposal Form
Submit one (1) original, and one (1) copy of each Section for Part 1-B and one (1) soft copy (electronic) via flash drive or USB of each Section for Part 1-B, Section 00 41 13 Technical Proposal Form section.

5.01 Part 1-C of the Proposal shall contain completed Specification Sections
00 41 12 Proposal Form – Alternates and Unit Pricing
Submit one (1) original of each Section for Part 1-C in a separate, sealed envelope marked according to the specifics noted in Section 2.01 on this page.

6.01 Part 2 of the Proposal shall contain completed Specification Sections
00 45 39 M/WBE Program Compliance Guidelines and Forms
Submit one (1) original, one (1) copy, and one (1) soft copy (electronic) in either CD Rom or flash drive of each Section for Part 2.

DALLAS INDEPENDENT SCHOOL DISTRICT

Materials Escalation Price Reconciliation Form

The intent of this document is to establish guidelines to reasonably reconcile ONLY the Project's materials cost escalation. No overhead, profit, or insurance costs are to be included. The Contractor has a duty to mitigate Materials Cost Escalation. Therefore,as a condition precedent to any cost adjustments, the Contractor must comply with establishing the Project Baseline Schedule as required under Division 1 of the Project's Contract Documents. All terms shall have the same meaning as defined in the executed AIA Agreement for this project.

1. **DELIVERY METHODS:**
   - Competitively Sealed Proposal (CSP)
   - Construction Manager at Risk (CMAR, CMaR, CM@Risk)

2. **PARTIES**
   - DISD (Owner)
   - Program Management Firm (PMF, Program Manager, PM)
   - Architect or Engineer of Record (A/E)
   - Contractor (GC)

3. **PROJECT**
   a. ORG# _____ PROJECT NAME : _____

   b. Notice to Proceed (NTP) Date: _____

   c. Date City Permits Ready for GC Pick Up: _____

   d. Date of Escalation of Materials Document Submission to Owner: _____

4. **PRICE IMPACTED MATERIALS:** It is understood that vendors providing materials to the Owner's Project may be experiencing industry wide economic fluctuations that affect the price, availability, delivery, and execution of the Project. The intent of this document is to reasonably reconcile ONLY the Project's materials cost escalation. This form will be used by the Owner to provide a good faith adjustment of market price impacted materials.

5. **PROJECT BASELINE:** Compliance with establishing the project baseline will be a condition precedent to requesting Owner approval of a materials cost escalation . The Contract Documents (Drawings, Specs, and Contract) establish the elements required to establish the project baseline. The Contractor has a duty to mitigate Materials Cost Escalation.

6. **PRICE INCREASE:** In the event of a Materials' Price INCREASE, the Contract Price shall be reasonably adjusted to reconcile the Materials' Price INCREASE.

DALLAS INDEPENDENT SCHOOL DISTRICT

Materials Escalation Price Reconciliation Form

7. **PRICE DECREASE:** In the event of a Materials' Price DECREASE, the Contract Price shall be reasonably adjusted to reconcile the Material's Price DECREASE.

8. **LIMITATION ON CONTRACT PRICE ADJUSTMENT:** Regardless of Proposed Materials' Price Increases or Decreases, the Contract Price shall not be adjusted by more than _____ % percent of the original Contract Price or any other restrictions on cost increases found in State law or the terms of the contract between Owner and Contractor.

9. **NO ADJUSTMENT FOR MATERIALS QUANTITIES:** No adjustments will be made for changes in materials quantities. The intent of this document is to reconcile ONLY materials costs.

10. **SCHEDULE OF VALUES & PAYMENT:** Payment for adjustments will be in accordance with the executed AIA Agreement, change orders, or CAEAs for this project. Similar to other Owner Cost/Credits, in accordance with Division 1 of the Specifications, the cost or the credit for materials reconciliation will be shown as a line item in the Project's Pay Application's Schedule of Values.

_____

OWNER (DISD)

_____

CONTRACTOR (GC)

_____

ARCHITECT (A/E)

DALLAS INDEPENDENT SCHOOL DISTRICT

Materials Escalation Price Reconciliation Form

EXHIBIT "MATERIALS ESCALATION" – BASELINE PRICE Matrix

The intent of this document is to establish a Baseline so that the materials escalation costs may be subsequently reconciled. To establish an objective cost baseline, the Contractor must provide the Owner a date stamped copy of the actual materials costs proposal from the materials vendor/manufacturer.

1. Price Impacted Material: _____

   Date of Price: _____

   Baseline Price: _____ (Unit)

   Pricing Method: _____

   Provide Copy of Manufacturer Docs:

2. Price Impacted Material: _____

   Baseline Price: _____ (Unit)

   Pricing Method: _____

   Provide Copy of Manufacturer Docs:

3. Price Impacted Material: _____

   Baseline Price: _____ (Unit)

   Pricing Method: _____

   Provide Copy of Manufacturer Docs:

4. Price Impacted Material: _____

   Baseline Price: _____ (Unit)

   Pricing Method: _____

   Provide Copy of Manufacturer Docs:

5. Price Impacted Material: _____

   Baseline Price: _____ (Unit)

   Pricing Method: _____

   Provide Copy of Manufacturer Docs:

DALLAS INDEPENDENT SCHOOL DISTRICT

Materials Escalation Price Reconciliation Form

6. Price Impacted Material: _____

   Baseline Price: _____ (Unit)

   Pricing Method: _____

   Provide Copy of Manufacturer Docs:

7. Price Impacted Material: _____

   Baseline Price: _____ (Unit)

   Pricing Method: _____

   Provide Copy of Manufacturer Docs:

8. Price Impacted Material: _____

   Baseline Price: _____ (Unit)

   Pricing Method: _____

   Provide Copy of Manufacturer Docs:

9. Price Impacted Material: _____

   Baseline Price: _____ (Unit)

   Pricing Method: _____

   Provide Copy of Manufacturer Docs:

10. Price Impacted Material: _____

    Baseline Price: _____ (Unit)

    Pricing Method: _____

    Provide Copy of Manufacturer Docs:

11. Price Impacted Material: _____

    Baseline Price: _____ (Unit)

    Pricing Method: _____

    Provide Copy of Manufacturer Docs:

DALLAS INDEPENDENT SCHOOL DISTRICT

Materials Escalation Price Reconciliation Form

12. Price Impacted Material: _____

    Baseline Price: _____ (Unit)

    Pricing Method: _____

    Provide Copy of Manufacturer Docs:

13. Price Impacted Material: _____

    Baseline Price: _____ (Unit)

    Pricing Method: _____

    Provide Copy of Manufacturer Docs:

14. Price Impacted Material: _____

    Baseline Price: _____ (Unit)

    Pricing Method: _____

    Provide Copy of Manufacturer Docs:

15. Price Impacted Material: _____

    Baseline Price: _____ (Unit)

    Pricing Method: _____

    Provide Copy of Manufacturer Docs:

16. Price Impacted Material: _____

    Baseline Price: _____ (Unit)

    Pricing Method: _____

    Provide Copy of Manufacturer Docs:

17. Price Impacted Material: _____

    Baseline Price: _____ (Unit)

    Pricing Method: _____

    Provide Copy of Manufacturer Docs:

DALLAS INDEPENDENT SCHOOL DISTRICT

Materials Escalation Price Reconciliation Form

1454765-v1/12396-124000

SECTION 00 41 11 – PROPOSAL FORM – BASE PROPOSAL

Name of Contractor	

COMPETITIVE SEALED PROPOSAL (Part 1A)
to
DALLAS INDEPENDENT SCHOOL DISTRICT
FOR THE FOLLOWING WORK:

PART 1. General Information

Competitive Sealed Proposal (CSP) 207777, consisting of improvements to:

ORG #	PROJECT NAME	PROJECT TYPE	ADDRESS
274	MARY MCLEOD BETHUNE ELEMENTARY SCHOOL – RENOVATION	Renovation	1665 Duncanville Rd Dallas, TX 75216

PART 2. Proposal Form

2.01 Agreement of Proposal Submittal

The undersigned, as a designated representative of the proposer, declares such firm is the only entity, as principal, with any interest in this Proposal, and the Proposal is made without collusion with any other entity.

The proposer affirms that the form of Contract, Instructions for Competitive Sealed Proposals, Supplemental Instructions for Competitive Sealed Proposal, Addenda, selection criteria, weighting/scoring system, estimated budget, Specifications, and the Drawings pertaining to this Proposal have been examined and the firm has also examined the locations, conditions, and classes of materials for the proposed Work and agrees to provide all necessary labor, materials, plant and equipment, machinery, tools, apparatus and construction means to accomplish the Work described in the Contract Documents in the manner prescribed.

The proposer agrees the quantities of Work to be performed and materials to be furnished may be increased or decreased as may be considered necessary, in the sole opinion of Dallas ISD's designated representative, to complete the Work as planned and contemplated. Adjustment for changes in Work will be in accordance with the General Conditions.

Proposal amounts must be shown in both words and figures. In case of discrepancy, the amount shown in words will govern.

2.02 Addenda

The proposer acknowledges receipt and incorporation of the following addenda into this Proposal. Proposer is to fill in the Addenda # and date and initial in the box to show receipt.

CSP 207777

Addendum No.	Addendum No.	Addendum No.	Addendum No.

Name of Contractor	

2.03 Withdrawal of Proposals

A Proposal may be withdrawn only upon written request by the proposer or his duly authorized representative, provided such request is received by the Owner at the place designated for receipt of Proposals and prior to the time fixed for the opening of Proposals.

No Proposal may be withdrawn after the time fixed for the opening of Proposals for a period of 90 days.

2.04 Award of Contract

The proposer to whom the award of a Contract is made will be promptly notified following Board action. If a proposer, (a) withdraws his Proposal within 90 days after the date and time fixed for the opening of Proposals in the Advertisement for Proposals, or, (b) fails or refuses to execute the Agreement, or other required forms within ten (10) days after the same are presented to him for signature, or (c) fails or refuses to furnish properly executed Performance and Payment Bonds, and certification of required insurance upon the execution of the Agreement, the Owner may award the Work to another proposer or may re-solicit the contract. The Proposal Bond is forfeited if Proposal is withdrawn after the Proposal opening, or Contract Documents are not executed in accordance with the above requirements.

The Owner reserves the right to reject any or all Proposals and to waive any irregularities in any Proposal received. The Owner further reserves the right to limit the number of contracts awarded and/or to be performed concurrently to any one Contractor if such appears to be in the best interest of the District. Awards will be per published criteria and weights. Price is only 40% of the evaluation criteria, and awards may be made to other than the low dollar proposer.

2.05 Notice To Proceed (NTP) and Notice of Intent to Award (NIA)

The Contractor shall not commence the Work under this Contract until execution of the Notice to Proceed (NTP) duly signed by Dallas ISD's designated representative.

The Contractor shall acknowledge that a Notice of Intent to Award (NIA) may be issued at the Owner's discretion. The purpose of the NIA is to expedite pre-construction activities. Upon receipt of the duly signed NIA, the Contractor shall promptly proceed with the activities listed and authorized by the NIA.

2.06 Collusion, Litigation, Default, Competency

By completing and submitting a Proposal, the proposer agrees to comply with the requirements of the following paragraph. A proposer who subsequently does not agree to comply with these requirements may be disqualified. The responses to the items of the Contractor's Qualification Statement will be used in evaluation of the Proposals on the project.

Proposers may be disqualified, and their proposals not considered for any of the following specific reasons:

1. Reason for believing collusion exists among proposers.
2. Reasonable grounds for believing that any proposer is interested in more than one proposal for the work contemplated.
3. The proposer is involved in any litigation against the Board.
4. The proposer is in arrears on any existing contract with Dallas ISD or has defaulted on a previous contract with Dallas ISD.

Name of Contractor	

5. Lack of competency as revealed by the financial statement, experience and equipment questionnaires, or omission of required proposal submittals.
6. Uncompleted work which, in the judgment of the Board, will prevent or hinder the prompt completion of this Work, if awarded.
7. Inaccurate information or circumstances that establish reasonable grounds for belief that the proposer is not a "responsible proposer" include, but are not limited to the below examples:
    a. Incomplete Bid Submittal – e.g., Missing Base Bid proposal number.
    b. Incorrectly Calculated Total Base Bid - Proposal plus Owner's Controlled Contingency MUST add up to Total Base Bid. Please double check to confirm compliance.

By entering into a contract with Dallas ISD, the proposer agrees that (1) Work on the project will begin upon receipt of the Notice to Proceed, (2) Contractor will participate as a team member in cooperation with the Architect/Engineer (A/E) and Owner, (3) The Work will not interfere with normal instructional and learning programs of the school, (4) The Contractor will assign a full time competent superintendent for each school in the CSP and that same superintendent(s) shall remain for the duration of the contract, contingent upon that person's continued employment with the Contractor, (5)The Contractor will furnish and pay for the Bid, Performance, and Payment Bonds.

- Projects of $25,000 and under: Bid bond is required
- Projects over $25,000 and up to and including $100,000: Bid and Payment Bond is required
- Projects over $100,000: Bid, Performance and Payment Bonds are required

2.07 Ultimate Corporate Ownership

Is proposer a corporation? Check One, Yes ____ No____

Proposer's legal name and address of principal place of business:

_____

_____

Ultimate parent company or majority owner's name and address of principal place of business:

_____

_____

Name of Contractor	

2.08 Contractor's Price (40 Points out of 100 Possible Points in the Selective Criteria)

The Proposer's Price is defined as the total amount, including Cost of the Work and allowances, for the performing or causing to be performed all Work including labor and materials, necessary to build, construct, erect and equip in accordance with the Contract Documents, Drawings, and Specifications.

Contractor agrees to base its price on the proposed completion schedule and the phasing plan presented in the contract documents. The Contractor may, at their option, propose a project duration that is of less duration and indicate this duration in the box below (See **Proposer's Proposed Substantial Completion Date** box below). However, the duration proposed by the Contractor must be based upon the number of phases identified in the contract documents and must not be predicated upon the use of additional temporary swing space other than the swing space identified in the contract documents. Contract documents identify the number of existing classrooms or temporary portable buildings available to the contractor for swing space.

Base proposal is defined as the Cost of the Work not including allowances or alternates.

(Amount shall be shown in both words and numbers; in the event of discrepancies, the words will govern.)

A	**Proposer's Price for all schools in CSP 207777, which includes the Allowances as per item 2.09 below:** _____ **Dollars**	**$**_____

Proposer's Price Breakdown (to be completed by proposer):

Base Proposal minus Allowances:	**$**
2.09 B: Owner Controlled Contingency Allowance (5% of Base Price minus Allowances):	**$ 161,148.44**
2.09 C: Other Owner Allowances (provided by Owner, see 2.09 C below):	**$**
2.09 D: Proposer's Abatement Cost included in 2.08 A (Abatement is to be included in GC Base scope price. The intent of this section is to show the breakout of the abatement cost.)	
2.08 A: Proposer's Base Price plus (+) Allowances (should equal amount in Section 2.08 A above):	**$**

2.09 Allowance Items

The following allowances are further described in Specification Section 01 21 00.

Name of Contractor	

B	Allowance Description: In Contract Owner Controlled Contingency (IC)	Dollar Amount ($) *Proposer to Fill In (5% for renovations)
274	**MARY MCLEOD BETHUNE ELEMENTARY SCHOOL – RENOVATION**	**$ 161,148.44**

C	Allowance Description: In Contract Owner Controlled Allowances	
N/A	N/A	N/A

2.10 Alternates

This information is to be submitted with section 00 41 12 (Part 1-C of the CSP Package.)

2.11 Unit Pricing

This information is to be submitted with section 00 41 12 (Part 1-C of the CSP Package.)

2.12 Breakout or Separate Pricing

The successful Proposer shall provide a proposed preliminary schedule of values for each school within the CSP 3 days after Board award. In the chart below, the Proposer must provide the cost breakdown per school of the base price provided by the Proposer in paragraph 2.08A of this section

The following information is requested for information and budget verification only and it is not the basis for the quantitative evaluation of this proposal.

School Org #	School Name and Project Type	Estimated Construction Budget	Proposer's Base Bid Proposal Breakdown per School
274	MARY MCLEOD BETHUNE ELEMENTARY SCHOOL – RENOVATION	$ 3,384,117.28	
NOTE: If a project has more than one school, then the proposal MUST be itemized by campus. An Addition/Renovation project MUST have 2 lines (one line for the addition and one line for the renovation scope). The Total Project bid must add up to the sum of all the itemized components.			

Org #	School Name	Owner's Expected Substantial Completion Date	Proposer's Proposed Substantial Completion Date
274	**MARY MCLEOD BETHUNE ELEMENTARY SCHOOL - RENOVATION**	January 01, 2026	

Name of Contractor	

2.13 Liquidated Damages

Time is of the essence in all Phases of the Work. It is specifically understood and agreed by and between Dallas ISD and Contractor that time is of the essence in the substantial completion of the Project.

The Contractor acknowledges and recognizes that Dallas ISD is entitled to full and beneficial occupancy and use of the completed work immediately following expiration of the Contract time. The Contractor further acknowledges and agrees that, if the Contractor fails to substantially, or cause the Substantial Completion of any portion of the Work within the Contract Time, the Owner will sustain actual damages as a result of such failure. The exact amount of such damages will be difficult to ascertain. Therefore, Dallas ISD and Contractor agree that, if the Contractor shall neglect, fail, or refuse to achieve substantial completion of the Work by the Substantial Completion date, subject to any proper extension granted by Dallas ISD, then Contractor agrees to pay to Dallas ISD the following sum(s) for each day in which such Work is not substantially completed, not as a penalty, but as liquidated damages, for the damages ("Liquidated Damages") that would be suffered by Dallas ISD as a result of delay for each and every calendar day that the Contractor shall have failed to have substantially completed the Work as required herein.

	Liquidated Damages	* Dollars Per Calendar Day		
		Addition	**Renovation**	**New**
274	**MARY MCLEOD BETHUNE ELEMENTARY SCHOOL - RENOVATION**	0.025% of Construction Budget	0.025% of Construction Budget	0.025% of Construction Budget

*** The Dallas ISD's liquidated damages cost formula is 0.025% of the construction budget for the project, up to a maximum of $1,500.00 per calendar day.**

Name of Contractor	

PART 3. Execution

3.01 Proposal Form Execution

Contractor's Firm Name (legal name)	
Federal Tax I. D. Number	
Contractor's Street Address	
Contractor's Phone Number	
Contractor's Fax Number	
Contractor's Email Address	

SUBMITTED BY:

(Corporation, Partnership, Individual, etc.)

Name of President of Corporation *or*
Name of Principal Owner

Name of Secretary of Corporation
(if applicable)

(Corporation, Partnership, etc.,) is organized under the laws of the State of _____.

Firm: _____

By: _____
Printed Name

Title: _____

Signature: _____

Legal Address: _____

_____

Date: _____
Affix Corporation Seal here (if applicable)

SECTION 00 41 12 – PROPOSAL FORM – ALTERNATES AND UNIT PRICING

Name of Contractor	

COMPETITIVE SEALED PROPOSAL (Part 1C)
to
DALLAS INDEPENDENT SCHOOL DISTRICT
FOR THE FOLLOWING WORK:

PART 1. General Information

CSP PACKAGE 207777, consisting of improvements to:

Org #	PROJECT NAME	PROJECT TYPE	ADDRESS
274	MARY MCLEOD BETHUNE ELEMENTARY SCHOOL – RENOVATION	Renovation	1665 Duncanville Road Dallas, TX 75211

PART 2. Proposal Form

2.01 through 2.09

Refer to Specification Section 00 41 11.

2.10 Alternate Price Items

The Contractor proposes the following sums as **additions to** or **deductions from** the Base Price amount for alternates. Failure to quote every item may cause the entire Proposal to be considered non-responsive. If there is no cost change in the alternate(s) pricing, the Contractor should enter "$0.00" as the price for the alternate. Do not make an entry of N/A.
All Alternates must be priced. Alternates are not listed in the order of preference.

ORG 274 MARY MCLEOD BETHUNE ELEMENTARY SCHOOL

No.	Alternate Description	Proposer's Add Price	Proposer's Deduct Price
001	ALTERNATE 1: Remove and replace all ceilings not replaced under other work items		
002	ALTERNATE 2: Replace Fire Alarm		
003	ALTERNATE 3: Replace Exterior Windows		
004	ALTERNATE 4: Replace Interior Lighting Controls		
005	ALTERNATE 5: Replace Interior Lighting (other than corridor) with LED Fixtures		
006	ALTERNATE 6: Replace Sound System		
007	ALTERNATE 7: Security System upgrade wiring and devices (Card access readers, cameras, door contacts, etc.)		

2.11 Unit Prices

The Contractor proposes the following all-inclusive unit prices for the items/tasks. Failure to provide unit pricing for each item may result in the Proposal being deemed as non-responsive. Do not make an entry of N/A. All unit prices must be priced. Unit prices are not listed in order of preference.

ORG 274 MARY MCLEOD BETHUNE ELEMENTARY SCHOOL

No.	Unit Price Item	Unit of measure	Proposer's Unit Price
	N/A	N/A	N/A

2.12 through 2.14
Refer to Specification Section 00 41 11.

Name of Contractor	

PART 3. Execution

3.01 Proposal Form Execution (Part 1A)

Contractor's Firm Name (legal name)	
Federal Tax I. D. Number	
Contractor's Street Address	
Contractor's Phone Number	
Contractor's Fax Number	
Contractor's Email Address	

SUBMITTED BY:

_____

(Corporation, Partnership, Individual, etc.)

Name of President of Corporation *or*
Name of Principal Owner

_____

Name of Secretary of Corporation
(if applicable)

_____

(Corporation, Partnership, etc.,) is organized under the laws of the State of _____.

Firm: _____

By: _____

Title: _____

Legal Address: _____

_____

Date: _____
Affix Corporation Seal here (if applicable)

SECTION 00 41 13 – TECHNICAL PROPOSAL FORM

Name of Contractor	

COMPETITIVE SEALED PROPOSAL (Part 1-B)
to
DALLAS INDEPENDENT SCHOOL DISTRICT

PART 1. GENERAL

1.01 Contractor Firm Information

Contractor's Firm Name (Legal Name)	
Contractor's Point of Contact with Signature Authority	
Street Address	
Phone Number	
Point of Contact Email Address	
Type of Business: _____ Corporation, _____ Partnership, _____ Sole proprietorship, _____ Joint Venture	
State of Incorporation	
In continuous business since (Date of Incorporation/ Years in Business):	
List other fully staffed offices or fully staffed branch offices of your organization: Name Branch Manager Telephone Number	
Corporate Officers, Partners, or Owners of Organization: Name Title Construction Experience (Years)	
Check box(es) corresponding to the nature of your business: ___Large Business (100 or more employees) ____Small Business (fewer than 100 employees) ___Minority Owned Business; Certified with _____ ___Women Owned Business; Certified with _____ ___Other (Define) _____	
Has your organization ever defaulted or failed to complete any work awarded? _____Yes _____ No If yes, stipulate where and why:	
Has your organization ever paid liquidated damages or a penalty for failure to complete a contract on time? ___Yes ___No If yes, stipulate where and why:	

Name of Contractor	

PART 2. TECHNICAL PROPOSAL

The Contractor is requested to submit a complete response to each of the items listed in this technical proposal form. If the question is not applicable, please provide a response after each question or section with the words: NOT APPLICABLE TO THIS PROJECT. Responses requiring additional space should be brief and submitted as an attachment to this section.

2. Reputation of Vendors and of the Vendor's Goods or Services (5 Points out of 100 Possible Points in the Selective Criteria)

2 a. References (5 Points of the 5 points Possible under Reputation of Vendors and of the Vendor's Goods or Services)

Provide five projects, from five separate organizations, with appropriate references using the attached form. Answer the questions for each relevant project, with emphasis on school, educational, and/or renovation experience, that your organization has in-progress or completed in the last four years, using the format below:

A member of the Evaluation Committee will verify the information with the references provided and may ask additional questions of the references. Contractor should ensure availability of the references after bid opening.

Name of Contractor	

Project No. _____:

Owner / Name and Location of Project:	
Type of Project: (Renovation, Remodeling, Addition, New Construction?)	
Procurement Method: (Competitive Bidding, CSP, CM at Risk, Other)	
Type of Contract: (Lump Sum, Cost Plus, T&M, other)	
Contract Amount: (at time of award)	
Final Contract Amount: (If in progress, contract amount to date)	
Contract Time: (at time of award)	
Percent Complete:	
Projected/Actual Completion Date:	
If completed, was the project completed on time? If in progress, is the project on schedule?	
What kind of delays occurred?	
Did Contractor operate in a safe manner? Was safety a priority to the Contractor?	
Reporting Tools used: (Daily reports, weekly reports, monthly reports)	
Superintendent's Name: Project Manager's Name:	
Owner* or Appropriate Owner's Representative** Reference Contact Name/Telephone/Email/Address: *If reference iPros no longer employed by the Owner indicate current Employer and Title. **Program Managers cannot be used as a reference from a past projects on one of their own current projects.	

Name of Contractor	

Proposer should copy this form for use on 5 past projects.

3. The Quality of the Vendor's Goods or Service (17 Points out of 100 Possible Points in the Selective Criteria)

3 a. Safety Plan and Insurance Rate Modifier (IRM): (5 Points of the 17 points Possible under Criteria 3)

A. List your organization's Insurance Rate Modifier (IRM) for the current year as obtained from your insurance agent. Copy of IRM from insurance agent to be attached as confirmation.

_____current year IRM

B. Complete the matrix for the five past years, as obtained from OSHA No. 300 Log:

	Year _____	Year _____	Year _____	Year _____	Current Year _____
Number of injuries and illnesses					
Number of lost time accidents					
Number of recordable cases					
Number of fatalities					
Number of employee direct hire fixed hours worked (round to 1,000's)					

C. Are regular project safety meetings held by Field Supervisor(s)? _____Yes _____No

If yes, frequency: ___Weekly ___Bi-Weekly ___Monthly ___As Needed

D. Are project safety inspections conducted? _____Yes _____ No

If yes, who performs inspection? _____

How often? ___Weekly ___Bi-Weekly ___ Monthly ___As Needed

E. Does your organization have a written safety program? _____Yes _____No

If yes, two copies of the full safety manual must be provided. Two CD-ROMs, each containing the safety manual in PDF format clearly marked as “Safety Manual” is preferred.

If no, then the contractor may adopt the Dallas ISD Safety manual. Will your organization adopt the DALLAS ISD Safety Manual? _____Yes _____No

Name of Contractor	

F a. Does your organization have a safety orientation program for new employees?

____Yes ____No

For employees promoted to Field Supervisor. ____Yes ____No

If yes, does your Supervisor Safety Program include instructions on the following topics?

	Yes	No
Safety work practices		
Toolbox safety meetings		
First aid procedures		
Accident investigation		
Fire protection		
HazCom Program		
Record keeping		
Emergency response procedures		
New worker orientation		

F b. Provide a resume of the Safety Manager.

G. Does your organization have a written Drug and Alcohol policy in place? ____Yes _____No

If yes, provide a copy of the policy as an attachment.

If no, please note when adopting the Dallas ISD safety manual, the contractor is also adopting the “Drug and Alcohol Policy” included within.

3 b. Proposed Project Team(s) and Management approach to proposed projects and Contractor’s Pending Claims and or Litigation: (12 Points of the 17 points Possible under Criteria 3)

Please note that Dallas ISD requires a full-time superintendent to be assigned to each individual job site while Work is in progress, contingent upon the continued employment of those personnel by the Contractor. Contractor’s staffing approach and organization must reflect this requirement. Contractor may not make any changes to these personnel assignments without the prior approval of the Program Manager and the Owner.

A. Provide a Staff Organization Chart depicting your staff roles, relationships, and responsibilities.

B. Identify the proposed key staff: Project Manager, Superintendent, Assistant Superintendent(s), Cost Estimator, Scheduler, Safety Manager, etc. by name and title and provide the following information for each. Include additional key staff, as necessary. Indicate which staff are assigned either on a full time or part time basis. For part time personnel, identify the percent of full-time

Name of Contractor	

participation. For example, Project Manager 50% of Full-time, Safety Manager 75% of Full-Time, Scheduler 25% of Full-Time, etc.

Staff: Project Manager

Name:	
Current Assignment: (Project name, client name and anticipated project completion date.)	
Total years of construction experience:	
Full Time or Part Time (For part time personnel, identify the percent of full-time participation. For example, Project Manager 50% of Full-time, etc.)	
Relevant experience with similar projects: (educational and/or renovations and/or additions as applicable)	
Years with the Organization:	

Staff: Superintendent 1 – School Name:_____

Name:	
Current Assignment: (Project name, client name and anticipated project completion date.)	
Total years of construction experience:	
Relevant experience with similar projects:	
Years with the Organization:	

Staff: Superintendent 2 – School Name:_____

Name:	
Current Assignment: (Project name, client name and anticipated project completion date.)	
Total years of construction experience:	
Relevant experience with similar projects:	
Years with the Organization:	

Name of Contractor	

Staff: Superintendent 3 – School Name:_____

Name:	
Current Assignment: (Project name, client name and anticipated project completion date.)	
Total years of construction experience:	
Relevant experience with similar projects:	
Years with the Organization:	

Staff: Superintendent 4 – School Name:_____

Name:	
Current Assignment: (Project name, client name and anticipated project completion date.)	
Total years of construction experience:	
Relevant experience with similar projects:	
Years with the Organization:	

Staff: Superintendent 5 – School Name:_____

Name:	
Current Assignment: (Project name, client name and anticipated project completion date.)	
Total years of construction experience:	
Relevant experience with similar projects:	
Years with the Organization:	

Proposer should copy this form as needed to present information for all proposed staff.

C. CONTRACTOR'S PENDING CLAIMS AND/OR LITIGATION

Attach a list of pending claims and/or litigation at time of submitting Proposal. (Show project name, owner, and summary explanation.)

Name of Contractor	

4 The Extent to which the Goods or Services Meet the District's needs (15 Points out of 100 Possible Points in the Selective Criteria)

4 a. General Contractor's current/past K-12 new or renovation construction experience: (10 Points of the 15 points Possible under Criteria 4)

Provide below the School District, School Name, Project Type, **Completion Date** and **Final Construction Value** for a **minimum of 5**** K-12 Projects completed by your company **as a prime contractor**.

School District	School Name	Renovation, Addition, or New Const.	Completion Date	Final Construction Contract Value

***A separate sheet may be attached with additional projects.*

4 b. Proposed Construction schedule and phasing plan: (5 Points of the 15 points Possible under Criteria 4)

The Contractor understands that Dallas ISD desires that the Project be completed on or before the duration of the contract. The Contractor shall prepare and submit a proposed construction schedule for each of the schools in the CSP and present this schedule with Section 00 41 13. **Additions and Renovations work within a school must be broken out into two separate items**. This schedule may be as detailed as the Proposer would like but must have a minimum of schedule information (major construction phases, activities, and milestones) as is necessary to facilitate negotiations.

Provide, as an attachment to the Technical Proposal form, a GANTT chart depicting how you anticipate delivering the project in the time frame outlined in this proposal. Describe the scope of work to be completed in each phase of each school.

Note: Contractors may, as a Cost Saving Recommendation, offer for Dallas ISD's consideration, an alternative plan, which may alter the duration in the contract documents. However, any such proposal must be presented as a Cost Saving Recommendation in the Technical Proposal – Part B (Section 00 41 13). The contractor must clearly identify the alternative work schedule, alternative duration, and alternative base price. The evaluation committee will evaluate alternative plans and schedule and determine if the plans may benefit Dallas ISD.

Name of Contractor	

The Contractor's proposed schedule is a vital part of the evaluation process and sufficient information should be provided for Dallas ISD to assess the Contractor's time frame, work plan and approach.

A. Describe the type of software utilized to prepare the construction schedules. **(Attach proposed project schedule)**

Name of Contractor	

5. N/A

Name of Contractor	

6. The contractor is to complete all M/WBE Compliance forms in Section 00 45 39 for selection criteria 6. (Category Total: 20 Points of the 20 Points possible under Criteria 6.)

6a. Proposer demonstrated a commitment to the district's M/WBE program by providing enhancements to the administration of the proposer's contracting process for the work to be done be M/WBE firms. Examples of this commitment may include any of the following: expedited payments, Mentor Protégé Programs, early release of retainage, expanding the pool of diverse subcontractors to firms that have not done business with the district, etc. (3 points)

6b. Proposer submitted a list of two (2) M/WBE subcontractor references. (2 points)

6c. Proposer is a certified M/WBE, or Proposer submitted a Joint Venture Agreement with a certified M/WBE OR Proposer submitted a Prime Subcontractor Teaming Agreement with a certified M/WBE. (5 points)

6d. Proposer submitted a diverse list of certified M/WE subcontractors, subconsultants or suppliers that meets or exceeds the district's M/WBE aspirational goal in meaningful and significant roles OR Proposer demonstrated outreach designed to meet the M/WBE project goals with a diverse M/WBE team of subcontractors, suppliers and subconsultants. (5 points)

6e. Proposer demonstrated a comprehensive framework and understanding of the district's M/WBE program by: providing a written and detailed M/WBE compliance plan, designating a high ranking individual who will be responsible for M/WBE contract compliance, monitoring and reporting, ensuring no unauthorized changes to M/WBE subcontractors, adhering to the M/WBE commitment and subcontractor payment terms, executing the M/WBE subcontracting schedule, complying with the district's M/WBE Program guidelines, etc. (5 points)

Name of Contractor	

7. The Total Long-Term Cost to the District to Acquire the Vendor's Goods and Services (3 Points out of 100 Possible Points in the Selective Criteria)

7 a. Financial status of the vendor (as rated by Dun & Bradstreet):
Category Total: (3 Points of the 3 points Possible under Criteria 7)

A. Provide the complete corporate or company name of your firm and the D-U-N-S Number as it is recorded with Dun & Bradstreet. This information will allow the owner to confirm that the correct reports are being used for the evaluation.

D-U-N-S Number: _____

Name of Contractor	

C8. ADDITIONAL INFORMATION:
The following information must be provided to complete the evaluation of the Contractor's technical proposal.

A. DISCLOSURE OF INTERESTED PARTIES

1. Disclosure of Interested Parties – In 2015, the Texas Legislature adopted House Bill 1295, which added section 2252.908 of the Government Code. The law states that a governmental entity or state agency may not enter into certain contracts with a business entity unless the business entity submits a disclosure of interested parties to the governmental entity or state agency at the time the business entity submits the signed contract to the governmental entity or state agency. The disclosure requirement applies to a contract entered into on or after January 1, 2016.

After Board of Trustee authorization, the successful Vendor will be required to complete an electronic Form 1295 on the Texas Ethics Commission website (https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm) prior to entering into a contract with the District in accordance with this statute. Additional information is available on the Texas Ethics Commission website at www.ethics.state.tx.us.

Submission of a response to this CSP indicates Respondent's acceptance and intended compliance with this requirement.

Name of Contractor	

PART 3. TECHNICAL PROPOSAL FORM EXECUTION

3.01 Proposal Form Execution

Contractor's Firm Name (legal name)	
Federal Tax I. D. Number	
Contractor's Street Address	
Contractor's Phone Number	
Contractor's Email Address	

SUBMITTED BY:

(Corporation, Partnership, Individual, etc.)

Name of President of Corporation *or*
Name of Principal Owner

Name of Secretary of Corporation
(if applicable)

(Corporation, Partnership, etc.,) is organized under the laws of the State of _____.

Firm: _____

By: _____

Title: _____

Legal Address: _____

_____

Date: _____
Affix Corporation Seal here (if applicable)

SECTION 00 43 13 – PROPOSAL GUARANTEE BOND

Name of Contractor	

KNOW ALL MEN BY THESE PRESENTS, THAT we _____ as Principal, and _____ as Surety, are held and firmly bound unto the Board of Trustees, Dallas Independent School District, Dallas, Dallas County, Texas, hereinafter called the Obligee, in the penal sum of _____ Dollars ($_____), lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has submitted the accompanying Competitive Sealed Proposal, dated _____, 20_____, being for the construction of _____ with appurtenances thereto, at Dallas, Dallas County, Texas, the kind and extent of work involved being set forth in detail in the proposed Contract Documents;

NOW, THEREFORE, if the Obligee shall accept the proposal of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such proposal, and give such bond or bonds as may be specified in the proposal or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said proposal and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said proposal, then this obligation shall be null and void, otherwise to remain in full force and effect.

This Proposal Guarantee Bond applies to all contracts in excess of $100,000 involving a contract for construction, alteration or repair of any public building or the completion or prosecution of any public work.

This Proposal Guarantee Bond must be payable to the awarding authority, Dallas Independent School District, as the named Obligee, and it must be approved as to form by such awarding authority.

Surety must be corporate surety duly authorized to do business in Texas.

This Proposal Guarantee Bond must be equal to 10% of the full amount of the contract which it secures.

Power of Attorney from Corporate Surety should be attached to this Proposal Guarantee Bond.

Name of Contractor	

IN WITNESS WHEREOF, the above bounded parties have executed this instrument under their several seals this _____ day of _____, 20_____, the name and Corporate Seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

(Business Address)	(Individual Principal)
(Business Address)	(Corporate Principal)
ATTEST:	
Secretary	President
Business Address	Corporate Surety
ATTEST: _____	BY: _____

PART 1 GENERAL

Schedule "A"
Building Construction Prevailing Wage Rates 2012
City of Dallas

Building Construction Projects (does not include single-family homes and apartments).

**Use Schedule B - Current Engineering (Highway/Heavy) Construction Wage Determination For Paving and Utilities Incidental to Building Construction.*

Schedule "A"

CLASSIFICATION	PREVAILING RATE	FRINGES
Acoustical Installer	$12.16	---
Backhoe Operator	$10.64	$1.41
Bricklayer	$21.06	$7.18
Brick, Tender	$8.60	$1.30
Carpenter	$23.15	$8.20
Cement Mason/Concrete Finisher	$11.38	---
Drywall Hanger	$11.71	---
Electrician	$24.50	12.25% + 4.70
Electrician, Cable Splicer	$26.41	4.50 + 12.5%
Floor Layer, Carpet	$13.13	---
Front End Loader Operator	$8.77	---
Glazier	$12.26	$1.10
Mechanical Insulator	$10.55	$1.00
Laborer, Unskilled (Excluding Landscape Laborers)	$7.58	$1.30
Painter Brush & Spray	$10.76	$2.20
Painter doing drywall finishing only	$10.42	---
Paperhanger	$11.30	$2.20
Lather	$17.38	$1.04
Hydraulic Crane (35 tons & under)	$23.70	$9.35
Hydraulic over 35 tons, Derricks, Overhead Gentry, Stiffler, Tower, etc., and Cranes with Pile driving or Caisson Attachments	$24.70	$9.35
Plasterer	$15.06	$2.94
Plasterer tender	$9.00	---
Plumber	$12.80	$1.63
Roofer	$9.45	$1.04
Sheet Metal Worker (Including HVAC Duct Work)	$12.80	$2.05
Sprinkler Fitter (Fire Sprinkler)	$25.84	$16.47
Iron Worker, Structural	$21.60	$4.40
Iron Worker, Reinforcing	$10.33	$2.94
Tile Setter	$13.75	---

Schedule "B"

CLASSIFICATION	PREVAILING RATE
Asphalt Distributor Operator	$15.32
Asphalt Paving Machine Operator	$13.99
Asphalt Raker	$12.69
Broom or Sweeper Operator	$11.74
Concrete Finisher -Paving and Structures	$14.12
Concrete Paving Finishing Machine	$16.05
Concrete Paving Saw Operator	$14.48
Crane Operator, Lattice Boom 80 Tons or Less	$17.27
Crane Operator, Lattice Boom over 80 Tons	$20.52
Crane, Hydraulic 80 Tons or Less	$18.12
Crawler Tractor	$14.07
Electrician	$19.80
Excavator, 50,000 Pounds or Less	$17.19
Excavator, over 50,000 Pounds	$16.99
Flagger	$10.06
Form Builder/Setter, Structures	$13.84
Form Setter -Paving & Curb	$13.16
Foundation Drill Operator, Crawler Mount	$17.99
Foundation Drill Operator, Truck Mount	$21.07
Front End Loader 3 CY or Less	$13.69
Front End Loader, over 3 CY	$14.72
Laborer -Common	$10.72
Laborer -Utility	$12.32
Loader / Backhoe	$15.18
Mechanic	$17.68
Milling Machine	$14.32
Motor Grader, Fine Grade	$17.19
Motor Grader, Rough	$16.02
Pavement Marking Machine	$13.63
Pipe Layer	$13.24
Reclaimer / Pulverizers	$11.01
Roller, Asphalt	$13.08
Roller, Other	$11.51
Scraper	$12.96
Servicer	$14.58
Small Slipform Machine	$15.96
Spreader Box	$14.73
Steel Worker (Reinforcing)	$16.18
Truck Driver -Lowboy -Float	$16.24
Truck Driver -Off Road Hauler	$12.25
Truck Driver -Single Axle	$12.31
Truck Driver -Single or Tandem Axle Dump Truck	$12.62
Truck Driver -Tandem Axle Tractor with Semi Trailer	$12.86
Truck Driver -Transit Mix	$14.14
Tunnel Boring Machine Operator (greater than 48")	$13.61

Tunneling Machine Operator (48" or less)	$9.16
Welder	$14.84
Work Zone Barricade Servicer	$11.68

If the construction project involves the expenditure of federal funds of $2,000 or more, the minimum wages to be paid various classes of laborers and mechanics will be based upon the wages that will be determined by the Secretary of labor to be prevailing for the corresponding classes of laborers and mechanics employed on the project of a character similar to the contract work in the City of Dallas.

Except for work on legal holidays, the "General Prevailing Rate of Per Diem Wage" for the various crafts or type of workers or mechanics is the product of (A) the number of hours worked per day, except for overtime hours, times (B) the above respective rate per hour.

For legal holidays, the "General Prevailing Rate of Per Diem Wage" for the various crafts or type of workers or mechanics is the product of (A) one and one-half times the above respective rate per hour times (B) the number of hours worked on the legal holiday.

The "General Prevailing Rate for Overtime Work" for the crafts or type of workers or mechanics is one and one-half times the above respective rate per hour.

Under the provisions of Chapter 2258 of the Government Code, the contractor shall forfeit as a penalty to the entity on whose behalf the contract is made or awarded, sixty dollars ($60.00) for each laborer, worker or mechanic employed, for each calendar day, or portion thereof, such laborer, worker or mechanic is paid less than the said stipulated rates for any work under the contract, by him, or by any subcontractor under him.

Solicitation Number: CSP 20777
Solicitation Title: ORG 274 – MARY MCLEOD BETHUNE ELEMENTARY SCHOOL - RENOVATION

REPRESENTATION AND CERTIFICATION

By submitting this Offer, the Offeror certifies that he/she is a responsible authorized officer of the company and certifies the accuracy of the following statements:

1. Represents that to the best of its knowledge it is not indebted to the District. **Indebtedness** to the District shall be basis for non-award and/or cancellation and/or termination of any award.
2. By signing this bid/proposal, vendor makes the assurance that vendor has not been debarred or suspended from conducting business with the US Government according to Executive Order 12549 entitled "**Debarment and Suspension**."
3. Pursuant to the Texas Education Code, Subchapter B, Section 44.034, "**Notification of Criminal History**", a person or business entity that enters into a contract with a school district must give advance notice to the district if the person and/or an owner or operator of the business entity has been convicted of a felony. The notice must include a general description of the conduct resulting in the conviction of a felony. Subsection (b) states "a school district may terminate a contract with a person or business entity if the district determines that the person or business entity failed to give notice as required by Subsection (a) or misrepresented the conduct resulting in the conviction. The district must compensate the person or business entity for services performed before the termination of the contract." Subsection (c) this notice is not required of a publicly held corporation.
   1.___My firm is a publicly held corporation, therefore, this reporting requirement is not applicable.
   2.___My firm is not owned nor operated by anyone who has been convicted of a felony.
   3.___My firm is owned or operated by the following individual(s) who has/have been convicted of a felony.
   Name of Felon(s):_____
   Details of Conviction(s):_____

4. "**Non-Collusion Statement**" and "**Anti-Lobbying Certification**": "The undersigned affirms that they are duly authorized to execute this Representation and Certification, Offer, and/or Contract and that this company, corporation, firm, partnership, etc., or individual has not prepared this bid in collusion (*An agreement between two or more persons to deceive the school district or defraud the school district of its rights*) with any other bidder, school board member, or school district employee, and that the contents of this bid as to prices, quality of product, terms and/or conditions, etc., have not been communicated by the undersigned nor by any other employee, agent and/or representative of the company, corporation, firm, partnership, etc., or individual to any other person engaged in this type of business prior to the official opening of this bid for the intent or purpose of collusion." In accordance with Title 31, USC Section 1352, no attempt has been or will be made by this company's officers, employees, or agents to lobby, directly or indirectly, with the District's Board of Trustees between bid/proposal submission date and award by the Board.

5. The District promotes, to the maximum extent allowed by law, participation by **economically disadvantaged business enterprises** in all District competitive procurement. Are you a qualified economically disadvantaged business enterprise, historically underutilized business, or minority/women owned business enterprise?
   (check one) _____ **Yes** _____ **No**
   Type of Certification: _____
   Issued by: _____ **Date of Issue:** _____
   Please attach proof of certification to this submittal. **Certified by:** _____

6. "**Conflict of Interest**": No officer, agent, or stockholder of the Offeror is a member of the staff, or related to any employee of the District except as noted herein: _____.
   Texas Statute enacts disclosure requirements if certain school officials or family members receive a gift (other than gifts of food, lodging, transportation, or entertainment accepted as a guest) that had an aggregate value of $250 or more over a twelve-month period that the district is considering or has awarded a contract for the sale or purchase of property, goods, or services. Has your firm, parent firm, subsidiary, and/or affiliate provided a gift (other than gifts of food, lodging, transportation, or entertainment accepted as a guest) that had an aggregate value of $250 or more over a twelve-month period to any District official, administrator, and/or Board member? [ ] Yes [ ] No
   If yes, explain (the gift, name of individual receiving gift, date gift was provided, etc.).
   _____ **(COMPLETE THE ATTACHED QUESTIONNAIRE FORM)**

7. Offeror agrees to the attached "**General Terms and Conditions**" and any "**Special Terms and Conditions**" (if applicable) of this solicitation and in case of conflict with other documents provided by Offeror, these General and/or Special Terms and Conditions take precedence and prevail unless specifically identified and changes are signed by both parties.

8. "**Insurance, Bonds**": Insurance and/or bond requirements are enumerated elsewhere in Contract documents. Submission of a certificate of insurance/bond by the undersigned (or an agent/broker on behalf of the undersigned) represents that the coverages and perils covered by the insurance/bond meet or exceed the requirements of the solicitation document and/or subsequent contract. The District may make reasonable reliance on the submitted certificate of insurance/bond. The certificate of insurance/bond must accurately reflect the policy coverages and will become a part of the Contract Documents and incorporated by reference, but the Contract terms/conditions and statement of work take precedence over any and all contents of the certificate of insurance/bond including, but not limited to, disclaimers, qualifications, etc. Failure to provide insurance/bond in accordance with Contract may be cause for termination for default and other remedies allowed by law and/or equity. Offeror must notify the District entity, in writing, by certified mail or personal delivery, within ten days after the vendor knew or should have known of any changes that materially affects the insurance/bond coverage.

9. "**Workers Compensation**": Offeror acknowledges that the District will NOT provide Workers Compensation coverage to the Offeror and Offeror represents to the District that all employees, subcontractors, agents, representatives, etc. of the Offeror who will provide products, goods, or services to the District will be covered by worker's compensation coverage for the duration of the Contract, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the commission's Division of Self-Insurance regulation. Providing false or misleading information may subject the contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.

10. "**Criminal Background Checks/Searches**": Offeror represents that criminal background checks/searches have been conducted (or will be conducted prior to start of Work if required) in accordance with the General Terms and Conditions (Criminal Background Check) and "Instructions to School District Contractors Regarding Criminal History Background Searches Under Texas Education Code (TEC) 22.0834" (attached).

11. **"No Boycott of Israel".** Offeror certifies that it (and any of its affiliates or parent company), does not, and will not, boycott Israel during the term of any contractual arrangement with DALLAS ISD. For purposes of any contractual arrangement with DALLAS ISD, "boycott Israel" means refusing to deal with, terminating business activities with, or otherwise taking any action that is intended to penalize, inflict economic harm on, or limit commercial relations specifically with Israel, or with a person or entity doing business in Israel or in an Israeli-controlled territory, but does not include an action made for ordinary business purposes.

12. **"Prohibition of Contracts Engaged in Business with Iran, Sudan, or Foreign Terrorist Organizations"**. Offeror certifies that it is not a company identified by the Texas Comptroller as a company known to have contracts with or provide supplies or services to a foreign terrorist organization.

13. **"Transactions with an Abortion Provider or Affiliate".** Offeror certifies that it is not an abortion provider nor an affiliate of such a provider as noted in Texas SB 22, codified in Texas Government Code Chapter 2273, and effective September 1, 2019. If this provision is violated by Offeror, Agreement and/or taxpayer resource transaction is voidable by Dallas ISD and Offeror agrees to defend and indemnify Dallas ISD against any action brought by the Office of the Attorney General for a violation of Section 2273.003.

I, the undersigned officer or authorized agent for the firm named below, certify that the information provided herein has been reviewed by me and is true to the best of my knowledge.

Company Name: _____ **Submitter's Name/Title:** _____

Email Address: _____

Submitter's Signature: _____ **Telephone No.** _____

Address: _____ **City, State and Zip Code:** _____

Fax No. _____ **Date:** _____

THIS SHEET MUST BE COMPLETED, SIGNED, AND RETURNED WITH FIRM'S OFFER.

Notice to Offerors
Conflict of Interest Disclosure Statements
Texas Local Government Code, Chapter 176

Offerors are required to file a Conflict of Interest Questionnaire with the District if a relationship exists between the Offeror's company and an officer of the District. Offerors are encouraged to review and become familiar with all disclosure requirements of Texas Local Government Code, Chapter 176. Conflicts of interest exist if:

1. the person has employment or other business relationship with the local government officer or a family member resulting in the officer or family member receiving taxable income; or
2. the person has given the local government officer or family member one or more gifts (excluding food, lodging, transportation, and entertainment) that have an aggregate value of more than $250 in the twelve- month period preceding
   the date the officer becomes aware of an executed contract or consideration of the person for a contract to do business with the District.

Disclosure is required from Offerors regarding each affiliation or business relationship between the Offeror and:

1. an officer of the District;
2. an officer of the District that results in the officer or family member receiving taxable income;
3. an officer of the District that results in the Offeror receiving taxable income that does not come from the District;
4. a corporation or other business entity in which an officer of the District serves as an officer or director, or holds an ownership interest of 10% or more;
5. an employee or Offeror of the District who makes recommendations to an officer of the District regarding the expenditure of money;
6. an officer of the District who appoints or employs an officer of the District that is the subject of the questionnaire; and
7. any person or entity that might cause a conflict of interest with the District.

If a conflict exists, forms must be filed:

1. No later than the seventh business day after the date that the person begins contract discussions or negotiations with the government entity, or submits to the entity an application, response to a request for qualification or bid, correspondence, or other writing related to a potential agreement with the entity.

2. The Offeror also shall file an updated questionnaire:
   a. not later than September 1 of each year in which a covered transaction is pending, and
   b. the seventh business day after the date of an event that would make a statement in the questionnaire incomplete or inaccurate.

3. A Offeror is not required to file an updated questionnaire if the person had filed an updated statement on or after June 1, but before September 1 of the year.

Officers of the Dallas Independent School District are:

Lance Currie (District 1)
Sarah Weinberg (District 2)
Dan Micciche (District 3)
Camille D. White (District 4)
Maxie Johnson (District 5)
Joyce Foreman (District 6)
Ben Mackey (District 7)
Joe Carreon (District 8)
Ed Turner (District 9)
Stephanie Elizalde, Ed.D. Superintendent of Schools

If no conflict of interest exists, you must fill out Box 1 and type N/A on Box 3 of the CIQ form, sign and date it.

If you are required to file, send the completed form to Dallas Independent School District, Procurement Services Department, 9400 North Central Expressway Suite 1510, Dallas, Texas 75231

July 2022

CONFLICT OF INTEREST QUESTIONNAIRE

FORM CIQ

For vendor doing business with local governmental entity

This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.

This questionnaire is being filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a).

By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. *See* Section 176.006(a-1), Local Government Code.

A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.

OFFICE USE ONLY

Date Received

1 **Name of vendor who has a business relationship with local governmental entity.**

2 ☐ **Check this box if you are filing an update to a previously filed questionnaire.** (The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)

3 **Name of local government officer about whom the information is being disclosed.**

_____
Name of Officer

4 **Describe each employment or other business relationship with the local government officer, or a family member of the officer, as described by Section 176.003(a)(2)(A). Also describe any family relationship with the local government officer. Complete subparts A and B for each employment or business relationship described. Attach additional pages to this Form CIQ as necessary.**

A. Is the local government officer or a family member of the officer receiving or likely to receive taxable income, other than investment income, from the vendor?

☐ Yes ☐ No

B. Is the vendor receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer or a family member of the officer AND the taxable income is not received from the local governmental entity?

☐ Yes ☐ No

5 **Describe each employment or business relationship that the vendor named in Section 1 maintains with a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership interest of one percent or more.**

6 ☐ Check this box if the vendor has given the local government officer or a family member of the officer one or more gifts as described in Section 176.003(a)(2)(B), excluding gifts described in Section 176.003(a-1).

7

_____ _____
Signature of vendor doing business with the governmental entity Date

Form provided by Texas Ethics Commission www.ethics.state.tx.us Revised 11/30/2015

CONFLICT OF INTEREST QUESTIONNAIRE
For vendor doing business with local governmental entity

A complete copy of Chapter 176 of the Local Government Code may be found at http://www.statutes.legis.state.tx.us/Docs/LG/htm/LG.176.htm. For easy reference, below are some of the sections cited on this form.

Local Government Code § 176.001(1-a): "Business relationship" means a connection between two or more parties based on commercial activity of one of the parties. The term does not include a connection based on:

(A) a transaction that is subject to rate or fee regulation by a federal, state, or local governmental entity or an agency of a federal, state, or local governmental entity;

(B) a transaction conducted at a price and subject to terms available to the public; or

(C) a purchase or lease of goods or services from a person that is chartered by a state or federal agency and that is subject to regular examination by, and reporting to, that agency.

Local Government Code § 176.003(a)(2)(A) and (B):

(a) A local government officer shall file a conflicts disclosure statement with respect to a vendor if:

***

(2) the vendor:

(A) has an employment or other business relationship with the local government officer or a family member of the officer that results in the officer or family member receiving taxable income, other than investment income, that exceeds $2,500 during the 12-month period preceding the date that the officer becomes aware that

(i) a contract between the local governmental entity and vendor has been executed; or

(ii) the local governmental entity is considering entering into a contract with the vendor;

(B) has given to the local government officer or a family member of the officer one or more gifts that have an aggregate value of more than $100 in the 12-month period preceding the date the officer becomes aware that:

(i) a contract between the local governmental entity and vendor has been executed; or

(ii) the local governmental entity is considering entering into a contract with the vendor.

Local Government Code § 176.006(a) and (a-1)

(a) A vendor shall file a completed conflict of interest questionnaire if the vendor has a business relationship with a local governmental entity and:

(1) has an employment or other business relationship with a local government officer of that local governmental entity, or a family member of the officer, described by Section 176.003(a)(2)(A);

(2) has given a local government officer of that local governmental entity, or a family member of the officer, one or more gifts with the aggregate value specified by Section 176.003(a)(2)(B), excluding any gift described by Section 176.003(a-1); or

(3) has a family relationship with a local government officer of that local governmental entity.

(a-1) The completed conflict of interest questionnaire must be filed with the appropriate records administrator not later than the seventh business day after the later of:

(1) the date that the vendor:

(A) begins discussions or negotiations to enter into a contract with the local governmental entity; or

(B) submits to the local governmental entity an application, response to a request for proposals or bids, correspondence, or another writing related to a potential contract with the local governmental entity; or

(2) the date the vendor becomes aware:

(A) of an employment or other business relationship with a local government officer, or a family member of the officer, described by Subsection (a);

(B) that the vendor has given one or more gifts described by Subsection (a); or

(C) of a family relationship with a local government officer.

Form provided by Texas Ethics Commission www.ethics.state.tx.us Revised 11/30/2015

Solicitation Number: CSP 207777
Solicitation Title: ORG 274 – MARY MCLEOD BETHUNE ELEMENTARY SCHOOL - RENOVATION

Dallas ISD, 9400 North Central Expressway, Dallas, TX 75231

FELONY CONVICTION NOTICE

Statutory citation covering notification of criminal history of contractor is found in the Texas Education Code #44.034. Following is an example of a felony conviction notice:

FELONY CONVICTION NOTIFICATION

State of Texas Legislative Senate Bill No. 1, Section 44.034, Notification of Criminal History, Subsection (a), states "a person or business entity that enters into a contract with a school district must give advance notice to the district if the person or an owner or operator of the business entity has been convicted of a felony. The notice must include a general description of the conduct resulting in the conviction of a felony."

Subsection (b) states "a school district may terminate a contract with a person or business entity if the district determines that the person or business entity failed to give notice as required by Subsection (a) or misrepresented the conduct resulting in the conviction. The district must compensate the person or business entity for services performed before the termination of the contract."

THIS NOTICE IS NOT REQUIRED OF A PUBLICLY-HELD CORPORATION

I, the undersigned agent for the firm named below, certify that the information concerning notification of felony convictions has been reviewed by me and the following information furnished is true to the best of my knowledge.

A. [ ] My firm is a publicly-held corporation, therefore, this reporting requirement is not applicable.

B. [ ] My firm is not owned nor operated by anyone who has been convicted of a felony:

C. [ ] My firm is owned or operated by the following individual(s) who has/have been convicted of a felony:

Name of Felon(s): _____

Details of Conviction(s): _____

_____

Company Name:_____ Submitter's Name/Title:_____

Address:_____City, State and Zip Code:_____

Email Address: _____

Submitter's Signature:_____Telephone No._____

Fax No._____800 # (if available)_____

Date:_____

Solicitation Number: CSP 207777
Solicitation Title: ORG 274 – MARY MCLEOD BETHUNE ELEMENTARY SCHOOL - RENOVATION

IDENTIFICATION BADGE(S)

1. Identification Badge: Offeror's employees, agents, and consultants and subcontractors, subject to the criminal history record review requirement shall be identified by a photographic identification badge.

2. If the Offeror is the person or owner or operator of the business entity, that individual may not self-certify regarding the criminal history record information and its review and must submit original evidence acceptable to the District with this Agreement showing compliance.

3. Pursuant to Dallas ISD's Board Policy CJA (LOCAL) Purchasing and Acquisition:

   All contracts must comply with the requirements for criminal background checks. All vendors must give advance notice to the District if the person or an owner or operator of the business entity has been convicted of a felony. The notice must include a general description of the conduct resulting in the conviction of a felony. The District may terminate any resulting agreement if the District determines that the person or business entity failed to provide notice as required by this paragraph or misrepresented the conduct resulting in the conviction.

4. The above requirement is required for all suppliers who will provide a service to Dallas ISD and will be on District property. The background checks and badges must be done through the supplier's company or the District's third-party provider, Field Control Analytics at www.fcbackground.com/clientsignup using project code: VENDISD15 or be issued by the supplier's company.

Company Name:_____ Submitter's Name/Title:_____

Address:_____City, State and Zip Code:_____

Email Address: _____

Submitter's Signature:_____Telephone No._____

Fax No._____800 # (if available)_____

Date:_____

Instructions to School District Contractors
Regarding Criminal History Background Searches
Under TEC 22.0835

TEC 22.0834 directs school district contractors (i.e., Company) to obtain state and national criminal history background searches on their employees who will have direct contact with students, and to receive those results through the DPS criminal history clearinghouse (Fingerprint-based Applicant Clearinghouse of Texas –FACT). In order for contractors to receive the information through FACT, they must first establish an account with the DPS for FACT clearinghouse access. The Company owner must sign a user agreement with the DPS. To obtain the user agreement and more information, Company must contact:

Access and Dissemination Bureau
Texas Department of Public Safety
Crime Records Service
P. O. Box 149322
Austin, Texas 78714-9322

Email: FACT@txdps.state.tx.us
Phone: (512) 424-2365

For fastest service, please email or call. State in the message that Company is a school district contractor and needs to have an account established for DPS FACT clearinghouse access. Please include:

Company Name
Company Address
Company Phone
Name of Company point of contact
Phone of Company point of contact
Company email to be used for notification of FACT records and messages

The information in the DPS FACT Clearinghouse is confidential, and access must be restricted to the least number of persons needed to review the records. The account must include at least one designated supervisor to make necessary changes and to monitor the site's security and the access to the criminal history data retrieved. Additional users must be limited to those who need to request, retrieve, or evaluate data regarding the individual applicants.

PLEASE NOTE: After the Company signs the DPS User Agreement for FACT, DPS will provide the Company with a revised ***FAST Fingerprint Pass*** that Company will have to provide to its employees and applicants. Company's employees and applicants will use that ***FAST Fingerprint Pass*** when scheduling their FAST fingerprinting.

Company Name:_____ Submitter's Name/Title:_____

Address:_____City, State and Zip Code:_____

Email Address: _____

Submitter's Signature:_____Telephone No._____

Fax No._____800 # (if available)_____

Date:_____

Name of Contractor	

DALLAS INDEPENDENT SCHOOL DISTRICT
CERTIFICATE OF NON-DISCRIMINATION

In connection with the execution of this Contract, the Contractor shall fully comply with the District non-discrimination requirement cited below.

"The Dallas Independent School District does not discriminate on the basis of sex, disability, race, religion, color, age, gender, sexual orientation, and/or national origin in the educational programs or activities which it operates, and it is required by Title IX, Section 504, Title VII, and the Americans With Disabilities Act not to discriminate in such a manner. This policy not to discriminate extends to employment in and admission to such programs and activities."

Submittal to District of reasonable evidence of discrimination will be grounds for Termination of the Agreement. This policy does not require the employment of unqualified persons.

By the signing of this Certificate, the Contractor signifies that it does not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. It certifies further that it will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it will not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The undersigned agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this proposed Contract. As used in this certification, the term 'segregated facilities' means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. It further agrees that (except where it obtained identical certifications from proposed consultants for specific time period) it will obtain identical certification from proposed Subcontractors prior to the award of a Contract exceeding $10,000.00 which are not exempt from the provisions of the Equal Opportunity Clause; that it will retain such certifications in its files; and that it will forward the following notice to such proposed Subcontractors (except where the proposed Subcontractors have submitted identical certifications for specific time periods): **Notice to Prospective Subcontractors of requirement for certification of non-segregated facilities.** A certification of non-segregated facilities, as required by the May 19, 1967 Order (32 FR. 7439, May 19, 1967) on elimination of segregated facilities, by the Secretary of Labor, must be submitted prior to the award of a Contract exceeding $10,000.00 which is not exempt from the provisions of the Equal Opportunity Clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

Note: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.11."

By: Signature:

_____ _____

(PRINT NAME OF PERSON SIGNING FOR CONTRACTOR) (CONTRACTOR REPRESENTATIVE SIGNATURE)

Date: Contractor:

_____

_____

SECTION 00 45 22 – NOTIFICATION OF HAZARDOUS MATERIALS

Name of Contractor	

STATE OF TEXAS

COUNTY OF DALLAS

Before me, the undersigned authority on this day personally appeared _____, known to me to be the person whose name is subscribed below, who, on oath stated:

"As the appropriate official of the company, contractor, or subcontractor submitting this affidavit in conjunction with a bid submitted to the Dallas Independent School District, I acknowledge that this company, contractor, or subcontractor has been notified that copies of the Asbestos Hazard Emergency Response Act (AHERA) for the school(s) where such company, contractor or subcontractor has contracted to perform work are available at the individual school library and at the Professional Library at the Dallas Independent School District, 9400 N. Central Expressway, Dallas, Texas 75231. I understand that it is our responsibility to familiarize ourselves with such plans and that it is our responsibility to inform every worker that we use on this project as to the availability of these plans.

We also acknowledge that we will be required to obtain written clearance from the Dallas Independent School District, Bureau of Hazardous Materials Management, prior to executing any work on this project."

_____

Name of Company

Signature _____

Name _____

Title _____

STATE OF TEXAS

COUNTY OF DALLAS

Sworn to and subscribed before me at Dallas, Texas this the _____ day of _____, 20 _____, A.D.

_____

Notary Public in and for Dallas County, Texas

FAMILY CONFLICT OF INTEREST QUESTIONNAIRE

This Questionnaire must be completed by every individual or entity that contracts or seeks to contract with the District for the sale or purchase of property, goods, or services.

The questionnaire(s) required by this policy shall be filed with the Director of Procurement Services not later than the seventh (7TH) business day after the date that the individual or entity begins contracts discussions or negotiations with the District or submits to the District an application, response to a request for proposals or bids, correspondence, or other writing related to a potential agreement with the District. If the individual or entity becomes aware of new facts or change of facts that would make the completed questionnaire(s) inaccurate, the individual or entity shall file an amended questionnaire(s) within seven (7) days of the date the individual or entity first learned of the new facts or changes in facts.

Family or family relationship means a member of an individual's immediate family, including spouse, parents, children (whether natural or adopted), aunts, uncles, and siblings.

For individuals who contract or seek to contract with the District for the sale or purchase of any property, goods, or services:

> Identify each and every family relationship between yourself (and any member of your family) and any full-time District Employee (and any member of such employee's family) (please include name and sufficient information that will allow proper identification of any named individual):
>
> _____

For entities that contract or seek to contract with the District for the sale or purchase of property, goods, or services:

> Identify each and every full-time District employee (and any member of the employee's family) who serves as an officer or director of the entity, or holds an ownership interest of 10 per cent or more in the entity (please include name and sufficient information that will allow proper identification of any named individual):
>
> _____

If more space is required please attach a second page. If the answer to any question is none, or not applicable, please write "None" or "Not Applicable" in the space reserved for that answer.

"I certify that the answers contained in this questionnaire are true and correct."

Individual:_____ Date:_____

Entity:_____

By:_____ Date:_____
Signature

Title:_____

Certified this _____ day of _____ , 20_____, by _____
Notary Public

_____
Notary Seal

M/WBE Compliance Guidelines and Forms

Date Issued:
June 17, 2020

Contact Info:
M/WBE Department
9400 N. Central Expressway
Dallas, TX 75231
972-925-4140
972-925-4141 (Fax)
Website: www.dallasisd.org
Contact: Annie Partee
972-925-7222 or 972-925-4143

Read Carefully: The M/WBE Program requirements are applicable to any bidder/proposer, including minority, women, and non-minority owned firms. These forms should be attached to any bid/proposal totaling $50,000 or more and are due at the time of bid/proposal opening.

DALLAS INDEPENDENT SCHOOL DISTRICT | Minority Women Business Enterprise

www.dallasisd.org/mwbe | 972.925.4140 | mwbe@dallasisd.org

Construction | Competitive Sealed Proposals (CSP)
M/WBE Compliance Guidelines and Forms

The Information gathered from these forms will be used as part of the Minority/Women Business Enterprise (M/WBE) evaluation. Please visit our website at www.dallasisd.org/mwbe for a fillable version of these forms.

To be completed and signed by the Prime Vendor			
Bid Title:		**Bid/RFP Number:**	
School:		**Org. Number:**	
Description of Work:			
Company Information			
Company Name:		**Tax ID#:**	
Is your company a Certified Minority or Woman Owned Business (M/WBE)?	☐ **Yes** If "**Yes**," include your current certification, ethnicity and gender information below. Dallas ISD recognized M/WBE Certification Agencies: Refer to Section 14 on Page 10. ☐ **No** If "**No**," indicate your ethnicity & gender below.		

Certification Information			
M/WBE Certification Agency	**M/WBE Certification Number**	**Ethnicity**	**Gender**

Authorized Agent's Information			
***Authorized Agent's Name:**			
Authorized Agent's Email:		**Phone:**	
Company Address:			
City:		**State:**	**Zip:**

***** *Authorized Agent is a person who has the authority to enter into a legally binding contract with Dallas ISD.*

Required Signature. The undersigned authorized agent agrees that he/she has read and understands the M/WBE Compliance Guidelines and Forms and that all information is correct to the best of his/her knowledge.

Authorized Agent's Signature (Sign below)	**Date:**
X	

Company Name:_____ **Bid/RFP No.:** _____

Section 1. M/WBE Compliance Reporting

The M/WBE Department has adopted the usage of B2G Now, a Diversity Management and Contract Compliance System, to assist with the management of the monthly compliance reporting requirement. Indicate the person who is knowledgeable about M/WBE utilization on this project below.

M/WBE Contact Person:	
Email:	
Phone:	

Section 2. Diversity Plans

Does your company have an Affirmative Action, Equal Employment Opportunity or Supplier Diversity Plan?

☐ **Yes**. If "**Yes**," attach a copy of your plan immediately following the M/WBE forms.

☐ **No.**

Section 3. Workforce Composition

Employee Category	African American		Asian		Hispanic		Native American		Non-Minority			Total Employees	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female		Male	Female
Executive & Managerial													
Technical & Skilled													
Office & Clerical													
Other													
TOTAL													

Section 4. M/WBE References

List two (2) M/WBE companies that have performed work for your company.

Company Name:	
Contact Person:	
Email:	
Phone Number:	
Project Name:	

Company Name:	
Contact Person:	
Email:	
Phone Number:	
Project Name:	

Company Name:_____ **Bid/RFP No.:** _____

Section 5. Mentor Protégé Program

Does your company currently participate in a Mentor Protégé Program as a mentor to an M/WBE company?
Refer to Section 20 on Page 13 for additional information.

☐ **Yes.** If **"Yes,"** attach a signed, dated and notarized copy of the Mentor Protégé Agreement and notarized minutes.

☐ **No.**

Section 6. Prime-Subcontractor Team

Is your company bidding as a Prime-Subcontractor Team with a certified M/WBE company?
Refer to Section 17 on Page 11 for additional information.

☐ **Yes.** If "**Yes**," identify the certified M/WBE company below. Attach a signed, dated and notarized Prime-Subcontractor Teaming Agreement.

☐ **No.**

M/WBE Company	M/WBE Certification Agency	M/WBE Certification Number	Ethnicity/Gender

Section 7. Joint Venture (JV)

Is your company bidding as a Joint Venture (JV) with a certified M/WBE company?
Refer to Section 18 on Page 12 for additional information.

☐ **Yes.** If "**Yes**," identify all partners (including your company*) below and attach a signed, dated, and notarized Dallas ISD Master JV Agreement. Each JV partner (excluding your company) must complete Sections A through D on Page 4.

☐ **No.**

Joint Venture Majority Partner*	
Company:	Contact Person:
Email:	Phone:
JV % Split:	

Joint Venture Partner		
Company:	Contact Person:	
Email:	Phone:	
M/WBE Certification Agency:		
M/WBE Certification Number:		
Ethnicity:	Gender:	JV % Split:

Company Name:_____ **Bid/RFP No.:** _____

COMPLETE SECTIONS A THROUGH D FOR EACH JOINT VENTURE PARTNER(S). USE ONE PAGE PER PARTNER

Section A. Diversity Plans

Does your company have an Affirmative Action, Equal Employment Opportunity or Supplier Diversity Plans?

☐ **Yes.** If "**Yes**," attach a copy of your plan immediately following the M/WBE Compliance Guidelines & Forms.

☐ **No.**

Section B. Workforce Composition

Employee Category	African American		Asian		Hispanic		Native American		Non-Minority			Total Employees	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female		Male	Female
Executive & Managerial													
Technical & Skilled													
Office & Clerical													
Other													
TOTAL													

Section C. M/WBE References

List two (2) M/WBE companies that have performed work for your company.

Company Name:	
Contact Person:	
Email:	
Phone Number:	
Project Name:	

Company Name:	
Contact Person:	
Email:	
Phone Number:	
Project Name:	

Section D. Mentor Protégé Program

Does your company currently participate in a Mentor Protégé Program, as a mentor to an M/WBE company?
Refer to Section 20 on Page 13 for additional information.

☐ **Yes.** If **"Yes,"** attach a signed, dated and notarized copy of the Mentor Protégé Agreement and notarized minutes.

☐ **No.**

Company Name: _____ **Bid/RFP No.:** _____

Section 8. Subcontractor and Prime Self-Performance Participation

Will you use any subcontractors, sub consultants, suppliers (M/WBE and/or Non-M/WBE) as part of this bid/proposal?

☐ **Yes**. I plan to utilize subcontractors as part of this bid/proposal. Complete Section 10 below.

☐ **No.**

Will you self-perform the entire scope of work?

☐ **Yes.** I plan to self-perform the entire scope of work with my own workforce. If you are a Certified M/WBE Prime complete Section 9 below.

☐ **No.**

Section 9. Certified M/WBE Prime Self-Performance

Certified M/WBE Prime Self-Performance

If you are a Certified M/WBE Prime and will self-perform with your own workforce the management of the project, complete the Certified M/WBE Prime Self-Performance chart below. The work should be consistent with industry standards. The M/WBE Prime's self-performance of a specialty trade or project scope of work shall be counted toward the goal, up to a maximum of 50% of the M/WBE project goal. Refer to Section 15 on Page 10 for additional information.

Certified M/WBE Prime Self-Performance			
Certified M/WBE Prime Company's Name:		Contract Amount	M/WBE %
Contact Person:			
Ethnicity:	Gender:		
Scope of Work:			

Section 10. Subcontractor Utilization

List all (minority and non-minority) subcontractors, suppliers, sub consultants, or sole proprietors that will be utilized in this bid/proposal. Only Certified M/WBE Prime Self-Performance and Certified M/WBE Subcontractors will be counted towards the M/WBE goals. If you will not utilize M/WBE subcontractors, complete Section 11 on Page 7.
For information on the change of subcontractor policy refer to Section 16 on Page 11.

Non-certified companies will not be counted towards the M/WBE goal.

Subcontractor/Supplier Information			
Subcontractor/Supplier Company's Name:		Contract Amount	M/WBE %
Address: City: State: Zip:			
Contact Person:			
Ethnicity:	Gender:		
Phone:	Email:		
M/WBE Certification Agency:	Certification #:		
Scope of Work:			

Additional Subcontractor/Supplier Information on the following page

Company Name:____ **Bid/RFP No.:** ___________________________

Subcontractor/Supplier Information Continued

Subcontractor/Supplier Company's Name:		Contract Amount	M/WBE %
Address: City: State: Zip:			
Contact Person:			
Ethnicity:	Gender:		
Phone:	Email:		
M/WBE Certification Agency:	Certification #:		
Scope of Work:			
Subcontractor/Supplier Company's Name:		Contract Amount	M/WBE %
Address: City: State: Zip:			
Contact Person:			
Ethnicity:	Gender:		
Phone:	Email:		
M/WBE Certification Agency:	Certification #:		
Scope of Work:			
Subcontractor/Supplier Company's Name:		Contract Amount	M/WBE %
Address: City: State: Zip:			
Contact Person:			
Ethnicity:	Gender:		
Phone:	Email:		
M/WBE Certification Agency:	Certification #:		
Scope of Work:			
Subcontractor/Supplier Company's Name:		Contract Amount	M/WBE %
Address: City: State: Zip:			
Contact Person:			
Ethnicity:	Gender:		
Phone:	Email:		
M/WBE Certification Agency:	Certification #:		
Scope of Work:			
Subcontractor/Supplier Company's Name:		Contract Amount	M/WBE %
Address: City: State: Zip:			
Contact Person:			
Ethnicity:	Gender:		
Phone:	Email:		
M/WBE Certification Agency:	Certification #:		
Scope of Work:			
	Total:		

If you have additional subcontractors/suppliers make copies of this form.

Office Use Only			
Contract Amount	**M/WBE Contract Total**	**M/WBE Percentage**	**M/WBE Coordinator**

Company Name:_____ **Bid/RFP No.:** _____

Certified M/WBE Subcontractor Performance. The M/WBE subcontractors, suppliers, and/or vendors must be 1st, 2nd or 3rd tier subcontractors, suppliers, and/or vendors when calculating participation. In order to prevent double counting, the district will count the M/WBE subcontractor participation for the 1st tier firm. If the 1st tier isn't a certified M/WBE, the district will count the 2nd tier M/WBE subcontractor. If the 1st and 2nd tier aren't certified M/WBEs, the district will count the 3rd tier M/WBE subcontractor. The expenditures by M/WBEs for materials or supplies toward M/WBE goals are calculated as follows:

	Type	M/WBE Percentage	Definition
A.	M/WBE Manufacturer	100%	Operates or maintains a factory or establishment that produces on the premises; the materials, supplies, articles, or equipment required under the contract.
B.	M/WBE Regular Dealer	60%	Owns, operates, or maintains a store, warehouse, in which the materials, supplies, articles or equipment are kept in stock, and regularly sold or leased to the public.
C.	M/WBE Representatives	Amount of Commission or Fees	Packagers, brokers, manufacturers' representatives

Section 11. Good Faith Effort

All district prime vendors are required to demonstrate positive and reasonable good faith efforts to subcontract with M/WBEs. ***Complete this section if only non-M/WBE subcontractors will be utilized.***

	Yes	No
1. Was contact made with M/WBEs by telephone or written correspondence at least one week before the bid was due to determine whether any M/WBEs were interested in subcontracting and/or joint ventures?		
2. Were contracts broken down to provide opportunities for subcontracting?		
3. Was your company represented at a pre-bid/proposal conference to discuss, among other matters, M/WBE participation opportunities and obtain a list (not more than two months old) of certified M/WBEs?		
4. Was information provided to M/WBEs including, but not limited to bonding, lines of credit, technical assistance, insurance, scope of work, plans/specifications?		
5. Were subcontracting opportunities advertised in general circulation, trade associations, M/WBE focused media and/or minority chambers of commerce?		
6. Did you encourage non-certified M/WBEs to pursue certification status?		
7. Were negotiations conducted in good faith with interested M/WBEs?		
8. Were the services utilized of available minority and women, community organizations, contractor groups, local, state, and federal business assistance offices, and other organizations that provide assistance in the identification of M/WBEs?		

Special Note: The good faith efforts documentation is subject to an M/WBE audit. Upon request, you will be required to provide supporting documentation for the purpose of verifying your good faith efforts.

Company Name:_____ **Bid/RFP No.:** _____

Section 12. Letter of Intent (LOI) [Not required with the initial bid/proposal]

To be submitted at the contract negotiation meeting with the district, or as requested by the M/WBE Department. Complete one LOI form for each proposed M/WBE subcontractor.

Org/School:_____

Prime vendors must submit a Letter of Intent for each M/WBE subcontractor who will be utilized to supply any services, labor or materials pursuant to the bid/proposal. If necessary, make copies.

This Letter of Intent is submitted to confirm the intent of the prime vendor and subcontractor to conduct good faith negotiations toward a subcontract agreement, with terms agreeable to both parties, for the scope of work identified herein. The parties acknowledge that any obligation of the prime vendor to enter into a subcontract agreement with subcontractor is expressly contingent upon the prime vendor entering into a contract with Dallas ISD for the work as defined in the bid/proposal.

This document must be completed in its entirety by the prime vendor and signed by both the prime vendor and the M/WBE subcontractor.

Any false statements or misrepresentations regarding information submitted on this form may be a criminal offense in violation of Section 37.10 of the Texas Penal Code.

A. M/WBE Subcontractor's Information:

The M/WBE subcontractor _____ has been certified by a Dallas ISD recognized certification agency.

Name of Certifying Agency: _____ Certification #: _____ Ethnicity/Gender: _____
Print or Type Certification Agency's Name

Pursuant to district policy (CH Local), only M/WBEs who are currently certified with one of the Dallas ISD recognized certifying agencies (see Section 14 on Page 10 for listing) may be counted towards meeting the district's M/WBE goal at the subcontracting level.

The M/WBE subcontractor is prepared to perform the following services, labor, or materials listed in connection with the project:

Scope of Work: _____

Price: $ _____

M/WBE Subcontractor Signature Required **Review the above information for accuracy prior to signing this Letter of Intent.**		
	x	
Print or Type Name and Title of M/WBE Owner, President or Authorized Agent	**Signature**	**Date**

B. Prime Vendor's Information:

Contact Person: _____ Company Name: _____

Address, City, State & Zip: _____

Declaration of prime vendor/Declarant:

I _____ HEREBY DECLARE AND AFFIRM that I am the _____
Name of Declarant (Print or Type) Title of Declarant (Print or Type)

and am duly authorized to make this declaration on behalf of _____
Company Name (Print or Type)

and that I have personally reviewed this Letter of Intent. To the best of my knowledge, information and belief, the facts and representations contained in this form are true and correct. The owner, president or authorized agent of the M/WBE firm signed this form, and no material facts have been omitted.

Prime Vendor/Declarant Signature Required **Review the above information for accuracy prior to signing this Letter of Intent.**		
	x	
Print or Type Name	**Signature**	**Date**

General Information regarding the M/WBE Compliance Guidelines and Forms

The district's aspirational M/WBE goal is **30%** for goods, services, and construction contracts. The district's aspirational M/WBE goal for bond funded professional service contracts is **35%**. The district may assign a contract specific M/WBE goal in lieu of the aspirational goal. Review your solicitation documents to determine which M/WBE goal will apply. The established M/WBE goal is applicable to any change orders, additional services, modifications or revisions to the original contract.

Section 13. During Bid/Proposal Submission

M/WBE Forms. Submit the completed, signed, and dated M/WBE Compliance Guidelines & Forms by the due date. Include all M/WBE supporting documentation including, but not limited to M/WBE Certificates, Affirmative Action, Equal Employment Opportunity or Supplier Diversity Plan, signed, dated and notarized Joint Venture Agreement, Mentor Protégé Agreement and Minutes, or Prime-Subcontractor Teaming Agreement.

M/WBE Scoring Criteria. The district's M/WBE Evaluation Scoring Criteria has been established as follows:

	M/WBE Criteria	Maximum Point Allocation
A.	Proposer demonstrated a commitment to the district's M/WBE program by providing enhancements to the administration of the proposer's contracting process for the work to be done by M/WBE firms. *Examples of this commitment may include any of the following: expedited payments, Mentor Protégé Programs, early release of retainage, expanding the pool of diverse subcontractors to firms that have not done business with the district, etc.*	3
B.	Proposer submitted a list of two (2) M/WBE subcontractor references.	2
C.	Proposer is a certified M/WBE **OR** Proposer submitted a Joint Venture Agreement with a certified M/WBE **OR** Proposer submitted a Prime Subcontractor Teaming Agreement with a certified M/WBE.	5
D.	Proposer submitted a diverse list of certified M/WBE subcontractors, subconsultants or suppliers that meets or exceeds the district's M/WBE aspirational goal in meaningful and significant roles **OR** Proposer demonstrated outreach designed to meet the M/WBE project goals with a diverse M/WBE team of subcontractors, suppliers and subconsultants.	5
E.	Proposer demonstrated a comprehensive framework and understanding of the district's M/WBE program by: providing a written and detailed M/WBE compliance plan, designating a high ranking individual who will be responsible for M/WBE contract compliance, monitoring and reporting, ensuring no unauthorized changes to M/WBE subcontractors, adhering to the M/WBE commitment and subcontractor payment terms, executing the M/WBE subcontracting schedule, complying with the district's M/WBE Program guidelines, etc.	5
	Total Points	**20**

Subcontractor Utilization. Complete Section I0 on Page 5 for the subcontractors you plan to utilize. Attach a copy of the current M/WBE certificate or proof of M/WBE certification for each M/WBE subcontractor. Contact the M/WBE Department if you would like a listing of certified M/WBE subcontractors or suppliers.

Section 14. Recognized Certifying Agencies

The district accepts M/WBE certifications issued by:

- North Central Texas Regional Certification Agency (NCTRCA)
- D/FW Minority Supplier Development Council (DFW MSDC)
- Department of Transportation (DOT)
- City of Houston
- City of Austin
- National Minority Supplier Development Council (NMSDC)
- State of Texas' Historically Underutilized Business (HUB)
- Women's Business Council Southwest (WBC SW)
- South Central Texas Regional Certification Agency (SCTRCA)
- Corpus Christi Regional Transportation Authority
- Small Business Administration (SBA 8A) or certified SDB
- National Women's Business Enterprise Certification (WBENC)

Other certifications may be considered on an individual basis. Only certified minority and women-owned companies will be counted towards the prime's M/WBE subcontracting goals. Vendors do not have to be a certified M/WBE to participate in the district's contracting and purchasing activities.

Section 15. Certified M/WBE Prime Self-Performance

- The M/WBE prime must be a bona fide business with real and continuing ownership for more than a year prior to the solicitation and was not created merely for the purpose of meeting this evaluation criteria.
- The M/WBE prime must be certified at the time of submission of the proposal.
- The M/WBE prime must be economically independent, perform commercially useful functions and perform the management of the project or the specialty trade work, consistent with industry practices, with its own workforce.
- The M/WBE's self-performance of a specialty trade or project scope of work shall be counted toward the M/WBE goal, up to a maximum of 50% of the M/WBE project goal.

  For example, an M/WBE prime elects to self-perform the interior finish out painting which equals 10% of the project's total costs and the goal for the project is 30%. The M/WBE prime's participation will count 10% toward the M/WBE project goal of 30%. The remaining M/WBE subcontracting goal after applying the MWBE prime's self-performance on the project is a 20% M/WBE subcontracting goal.

- If the M/WBE prime's self- performance exceeds the M/WBE contract goal, a maximum of 50% of the M/WBE project goal will be applied toward the goal.

  For example, the M/WBE prime self-performs the concrete work for the project and the concrete work is 30% of the total project costs. The MWBE prime's participation will count 15% toward the M/WBE project goal of 30%. The remaining M/WBE subcontracting goal after applying the M/WBE prime's self- performance on the project is a 15% MWBE subcontracting goal.

Section 16. After Bid/RFP Submission

Letter of Intent. The awarded prime vendor who will subcontract portions of the work should complete the *Letter of Intent to Perform/Contract as an M/WBE Subcontractor* form (Section 12 on Page 8) for each proposed M/WBE subcontractor. The prime vendor will be required to provide the *Letter of Intent to Perform/Contract as an M/WBE Subcontractor* form at the contract negotiation meeting with the district, or as requested by the M/WBE Department.

Changes to the List of Subcontractors. A Request for Approval of Contract Change form must be submitted to the M/WBE Department for approval **prior** to any changes to the M/WBE subcontractor utilization listing in Section 10. A written justification and supporting documentation are required from the prime requesting the change. This applies after the Bid/RFP submission and throughout the contract duration.

Subcontractor Payment. The Prime vendor shall submit an M/WBE Pay Activity Report (PAR) indicating the amounts paid (along with required proof of payments) to its subcontractors with each pay application or as requested by the district.

- Acceptable proof of payments includes: (1) Emails from the Subcontractor verifying the payment amount, date paid, school name and/or org #, and project information (2) Partial Lien Releases, (3) Cancelled Checks, or (4) Proof of Electronic Funds Transfer;
- All Prime vendors must pay all submitted invoices, including retainage to subcontractors, suppliers, or entities within **10 days** of receiving payment from the district;
- No Prime vendor shall withhold a non-disputed subcontractor payment;
- No Prime vendor may withhold retainage greater than 5% from the subcontractor.

Contract Execution between Prime Vendor and Subcontractor. Prime vendor agrees to establish a written contract with each subcontractor. At minimum, the contract should include the scope of work, payment terms, prompt payment clause and retainage clause.

Changes to the original M/WBE Commitment – After Contract Execution. The prime vendor shall notify the M/WBE Department if the percentage of M/WBE participation falls below the level of participation represented in the contract. The prime vendor shall promptly notify the M/WBE Department within seven (7) days and obtain a listing of other certified M/WBE vendors to meet the commitment amount.

Records Retention. The prime vendor will be required to maintain records showing the subcontractor/supplier awarded contracts, subcontractor payment history, efforts to identify and award contracts to M/WBEs, and copies of executed contracts with M/WBEs. The contractor must provide access to books, records and accounts to authorized district, state and federal officials for the purpose of verifying M/WBE participation and good faith efforts. District contracts are subject to an M/WBE audit.

Section 17. Prime-Subcontractor Teaming Agreement

The Prime-Subcontractor Teaming Agreement will be evaluated based upon the below referenced criteria. The designated subcontractor in this agreement must be a certified M/WBE. There is a maximum of five (5) numerical points available.

Proposer submitted a teaming arrangement and/or strategic partnership with subprime contracting with a certified MWBE firm(s). The certified MWBE firm(s) provides prime management, control and supervision of a clear and distinct portion of the specialty trade(s) or project scope of work in a meaningful and significant role(s). Proposer will establish a teaming agreement which defines the minimum M/WBE subcontractor commitment. The teaming agreement defines what trade(s) the subcontractor will perform, and the subcontractor is certified in the respective subcontracting scope.

	Teaming Agreement Scoring Analysis	Located on Page	Available Points
A.	The teaming agreement provides the certified M/WBE firm(s) with prime management, control and supervision of a clear and distinct portion of the project scope of work in meaningful and significant roles.		2.00
B.	A pre-negotiated subcontract form is an exhibit to the teaming agreement.		1.00
C.	The teaming agreement contains a dispute resolution procedure.		0.50
D.	The teaming agreement only terminates upon owner non-select or owner non-award.		0.50
E.	The teaming agreement requires subcontract award to the M/WBE partner identified in the teaming agreement.		1.00
	Total		**5.00**

Section 18. Joint Venture Program Information

The objective of the district's Joint Venture (JV) Program is to further the development, growth, and capabilities of minority and women-owned businesses that allow such businesses to offer the district the best combination of performance, cost, and delivery of service. A Joint Venture is an association of two (2) or more companies with a certified minority or woman-owned business to form a new company. The Joint Venture parties are required to utilize the Dallas ISD's Master Joint Venture Agreement. The agreement must be signed, dated and notarized by all Joint Venture parties. The Joint Venture does not replace a prime contractor's responsibility to satisfy applicable M/WBE program requirements, including M/WBE goals.

Companies seeking to participate in a Joint Venture arrangement has the burden of demonstrating to the district, by a preponderance of the evidence, that it meets the requirements of Board Policy (CH) Local with respect to being an eligible Joint Venture for counting purposes. The district will analyze whether the stated Joint Venture is realistic considering the number of employees, experience, resources, certification type, and other resources that each party provides to the Joint Venture. The Joint Venture Partnership must include a certified M/WBE Partner, based on the percentage allocated, who is able to adequately bond the project, have the experience and resource to perform the services, labor or material listed.

The Joint Venture Partner(s) may provide co-surety bond or bonds in proportionate percentage to their ownership in the Joint Venture and to other parties are applicable in a form acceptable to the owner. The Joint Venture may also provide in a form acceptable to the owner any bond or bonds in the name of the Joint Venture in lieu of the co-surety arrangement; provide an Up Front Joint Agreement (SAA Form #1), and an executed copy of the indemnity agreement signed by all of the parties associated with the SAA Form #1.

A separate bank account in the name of the Joint Venture must be established by the Joint Venture. The bank account will require the signature of an authorized representative of each party or his or her designee for withdrawal by check or documented approval of an authorized representative for withdrawal by electronic means.

Refer to the district's website at www.dallasisd.org/mwbe for the required Dallas ISD's Master Joint Venture Agreement and Joint Venture Guidelines.

Section 19. Construction M/WBE Joint Venture Scoring Analysis

The Joint Venture (JV) Agreement will be evaluated based upon the below referenced criteria. One of the JV partners must be a certified minority or woman-owned business. There is a maximum of five (5) numerical points available. Refer to Section 18 on Page 12 for additional information.

The proposer must submit an approved, signed, dated, and notarized Dallas ISD Master Joint Venture Agreement. Any modifications to the Dallas ISD Master Joint Venture Agreement and amendments must be submitted for review with the proposal and include highlighted proposed changes or modifications to the agreement for review and approval of Dallas ISD's M/WBE office.

A.	**M/WBE Joint Venture Partner**	**Points**
Does it identify the distinct, clearly defined portion of the work provided by each M/WBE joint venture partner, in significant and meaningful ways? The work must be separate, clear and distinguishable. Specify the nature of the work and what it will entail. Complete exhibit A of the Dallas ISD Master Joint Venture Agreement.		3.00
B.	**Staffing Plan**	
Does it provide a staffing plan to be determined per the established participation percentages indicating the number of employees to be provided by each M/WBE joint venture partner? This should include a project organizational chart and a resumé for each key personnel that includes length of employment, time serviced in their role(s), and experience within the industry. Complete exhibit B of the Dallas ISD Master Joint Venture Agreement.		1.00
C.	**Financial and Bonding Information**	
Does it provide a letter from a financial institution or bonding surety company, substantiating the financial strength or bonding capacity of each M/WBE joint venture partner(s)? This document should commensurate each M/WBE joint venture partner(s) percentage split. Complete exhibit C of the Dallas ISD Master Joint Venture Agreement.		1.00
Total Points		**5.00**

Section 20. Mentor Protégé Program Information

The Minority/Women Business Enterprise (M/WBE) Department's Mentor-Protégé program aims to stimulate the growth of minority and women-owned businesses through education, business development, and training. A mentor should be willing to advise and support the protégé and help identify the needs and skills of the protégé. The Mentor Protégé Agreement, meeting minutes, progress reports, and deliverables should be signed by all parties, dated, and notarized.

JOINT VENTURE AGREEMENT

BY AND BETWEEN

_____

AND

_____

AS

_____, a Joint Venture JV

FOR

Dallas Independent School District

_____

JOINT VENTURE AGREEMENT

THIS AGREEMENT is made and entered into this _____ day of _____, 20___ (the "Effective Date"), by and between _____Inc. ("NAME"), a _____ ("STATE") corporation, whose business address is _____ ,_____ ("CITY") , _____ ("STATE") _____ ("ZIP"); and _____, Inc. ("NAME"), a _____ ("STATE") corporation, whose business address is_____, _____ ("CITY") , _____ ("STATE") _____ ("ZIP"), hereinafter referred to individually as a "Party" or collectively as the "Parties". The name of the Joint Venture shall be called _____. All business of the Joint Venture shall be conducted under this name.

Recitals

A. The Parties have agreed to enter into a joint venture for the purpose of submitting a proposal, bid, solicitation or otherwise (the "Proposal") to provide owners representative services or work to the Dallas Independent School District in response to Bid/RFP/RFQ No. _____ entitled _____ (the "Solicitation"), which to the extent the Proposal is successful, will result in a contract with the Owner.

B. The Parties desire to enter into this Agreement to fix and define between themselves their respective interests and responsibilities for the purposes of providing the requisite Services, Work, or both.

C. The Parties affirm and agree that they shall participate in the preparation of the Proposal and pursue the Contract with each other, that no Party shall submit a competitive proposal or otherwise seek the award of the Contract contemplated herein either alone or with others without notice to the Parties to this Agreement and entering into a Non-Disclosure Agreement, and in reliance thereon have entered into this Agreement.

D. The Parties agree and affirm to register the Joint Venture with the State and forward the Certificate of Filing and Tax Identification Number to the Dallas Independent School District, if the Joint Venture is awarded a Project with the Owner.

E. The Parties affirm and agree the joint venture participation split represented in this Agreement and no employee or former employee [of less than one year], relative, affiliate or subsidiary company is listed or included as a joint venture partner.

F. In the event the Parties agree to pursue other DISD projects as a joint venture, they will enter into an addendum to this Agreement, subject to District approval, identifying that project and any modified terms of this Agreement, if any, in connection with the pursuit or award of same.

NOW, THEREFORE, in consideration of the mutual covenants contained herein, it is agreed as follows:

Agreement

Article 1: Definitions and Interpretation

1.1 Capitalized terms used in this Agreement shall have the meaning set forth below or as defined elsewhere in this Agreement.

1.1.1 "Agreement" means this document.

1.2

1.2.1 "Managing Business Party" the Joint venture partner designated to provide the accounting and financial services, on behalf of the Joint Venture required to reflect the conduct of the Joint Venture's affairs

1.2.2 "Owner" means Dallas Independent School District.

1.2.3 "Contract" means any contract (together with any amendments, supplements or modifications thereto) awarded to the Joint Venture by the Owner for the performance of the Services, Work, or both, for the Project

1.2.4 "Deputy Project Manager" means the individual specifically designated pursuant to Article 3 of and charged with assisting the Project manager and Senior Project manager in the overall responsibility to direct the Joint Venture's performance under the Contract.

1.2.5 "IRC" means the Internal Revenue Code of 1986 as amended as of the date of this contract.

1.2.6 "Joint Venture" means an association between _____, Inc., and _____, Inc. engaged in a solitary business enterprise for profit.

1.2.7 "Management Committee" means the group formed pursuant to Article 4 as the final authority of the Joint Venture and having the powers and duties as provided herein.

1.2.8 "Project" means the "DALLAS ISD" Construction" project the subject of the solicitation.

1.2.9 "Project Manager" or "Senior Project Manager" means the individual specifically designated pursuant to Article 3 of and charged with overall responsibility to direct the Joint Venture's performance under the Contract.

1.2.10 "Proposal" means the proposal(s) submitted by the Joint Venture to the Owner to secure the award of the Contract for the Project. The Proposal shall include, but not limited to, all pursuit efforts, including any presentation or other interview. The term "Proposal" does not include task order specific proposals.

1.2.11 "Services" or "Work" means services or work under the Contract to be performed by the Joint Venture in furtherance of the Project.

1.2.12 "Task Order Contract" means a contract for services that does not procure or specify a firm quantity of services (other than a minimum or maximum quantity) and that provides for the issuance of orders for the performance of tasks during the period of the contract. 1.2. Terms importing the singular include the plural and vice versa where the context requires.

1.3. The headings used in this Agreement are included for ease of reference only and shall not affect the construction or interpretation hereof.

Article 2: Association of the Parties

2.1 Formation. The Parties hereby agree to form the Joint Venture pursuant to the provisions hereof for the limited purpose and scope set forth in this Agreement. The Parties hereby further agree to perform the Joint Venture's responsibilities and obligations as an integrated team, providing staffing (including key

personnel) and resources generally in proportion to their respective interests in the Joint Venture as set forth in Article 5.

2.2 Purpose. This Joint Venture is entered into solely for the purpose of submitting the Proposal and, if the Contract is awarded to the Joint Venture, the performance of the Services, Work, or both, as identified in the Solicitation. The Parties agree that the Joint Venture is a temporary association and that it will not place any limitation or liability on the Parties beyond the specific undertakings contained in this Agreement.

2.3 Name. The Joint Venture shall operate under the name _____, a Joint Venture.

2.4 Duration. The Joint Venture will continue until dissolved in accordance with this Agreement. Subject to the foregoing, the Joint Venture shall:

2.4.1 dissolve automatically (i) should the Parties fail to agree as to the form, terms or conditions of the Proposal, (ii) if the Project is cancelled prior to award, or (iii) if the Contract is not awarded to the Joint Venture, but only after any challenge to the award of the Contract, by administrative protest or litigation (or appeal of a decision on such protest or litigation), is fully concluded without an award of the Contract to the Joint Venture, or

2.4.2 if awarded the Contract, be dissolved upon completion of all Services, Work, or both, required to be performed under the Contract, receipt of full payment of all sums for which the Joint Venture is entitled under the Contract, the settlement of all disputes and final accounting, and the expiration of all warranties and all other obligations arising in connection with the Contract.

2.43 if awarded the Contract, the Joint Venture shall not be dissolved, without thirty (30) days written notice and the prior written consent of the Dallas Independent School District

2.5 In the event the Contract is terminated, the Joint Venture shall conclude its affairs in an orderly manner at the earliest practicable date, subject to the requirements of Section 2.4 above. However, should the Services, Work, or both, be only suspended, the Joint Venture shall remain in effect during the period of such suspension.

2.6 The Parties agree that they shall cause the Joint Venture to sign the Contract promptly upon its being tendered for signature in a form mutually agreed upon by the Parties and the Owner.

2.7 Scope of Services or Work. The Services, Work, or both, to be performed by the Joint Venture shall generally be of the type and nature described in Exhibit A.

Article 3: Operation of the Joint Venture

3.1 If required by applicable law or regulation, the Joint Venture shall be registered and licensed as a business in the jurisdiction where the Joint Venture's principal office is located.

3.2 The principal business address of the Joint Venture shall be _____. Services may be performed in the Owner's offices, in the Joint Venture office, in the respective offices of the Parties or DALLAS ISD as authorized, at the project site or at such locations as the Parties may mutually agree upon.

3.3 All correspondence from the Owner regarding the Contract shall be sent to the Project Manager and/or _____ at the principal business address of the Joint Venture, with a copy provided to each of the Joint Venture members.

3.4 Initial Proposal Effort. Each Party will participate in preparing the Proposal required for the Contract under the direction of the Project Manager. Each Party will bear its own labor and travel costs associated

with this effort. Third party direct costs for expenses and other services such as video imaging, photography, document development, technical writing and editing, graphics, printing, and reproduction, as well as any specialty sub-consultant services, shall be shared between the Parties in proportion to each Party's Agreed Percentage of Participation as specified in Article 5; provided, however, that all Parties must pre-authorize any such expenditure.

3.5 Integrated Services. During the construction and pre-construction phase of the project, the Parties intend to perform the Services as an integrated organization with each Party providing competent personnel to the Joint Venture consistent with the staffing resource plan set forth in Exhibit B and as necessary to enable the Joint Venture to successfully perform the Services, Work, or both, in accordance with the terms of the Contract. In addition, and at the direction of the Management Committee, Services may be performed, in whole or in part, by consultants retained by the Joint Venture, one or more of the Parties, or both, and Work may be performed, in whole or in part, by subcontractors retained by the Joint Venture, one or more of the Parties, or both. Notwithstanding the foregoing, personnel assigned to the Joint Venture shall remain on the payroll of the assigning Party. The staffing resource plan may be amended from time to time as may be deemed necessary by the Management Committee. A Party may not remove from the Project or reassign to another project any "key personnel" listed on Exhibit B without the prior consent of the Management Committee and notice to the Director of the MWBE Department or his/her designee within five (5) business days from the date of removal or reassignment.

3.6 Subject to the limitation noted above with respect to key personnel, in the event that an individual assigned to the Project is unable or unwilling to perform the Services, the Work, or both, in a professional and timely manner, or if the Owner directs the Joint Venture to remove a particular individual from the Project, or if the Project Manager, in the good faith exercise of his/her discretion, determines that an individual should be removed from the Project, then the assigning Party shall replace such individual with a qualified employee reasonably acceptable to the Management Committee and, if applicable, the Owner. If the assigning Party cannot furnish a qualified substitute candidate within a reasonable period of time after the vacancy arises, then the vacancy shall be filled by an individual employed by the other Party.

3.7 Project Manager. Subject to the authority of the Management Committee and any limitations set forth herein, the Project Manager is the individual charged with responsibility to direct the Joint Venture's performance under the Contract. Subject to Owner approval (if required), _____ shall serve as the Project Manager during the term of the Contract, subject to the continuing approval of the Management Committee. If this individual, as determined by the Owner or the unanimous consent of the Management Committee, is unable to satisfactorily perform his duties as Project Manager, the Management Committee will nominate an employee of _____- to serve as the successor Project Manager. In performing his duties, the Project Manager shall treat both Parties fairly and shall not discriminate in favor of either Party.

3.8 In addition to the other duties set forth herein, the Project Manager is to:

3.8.1 Serve as the primary interface between the Joint Venture and the Owner;

3.8.2 Ensure compliance with the DALLAS ISD MWBE Program requirements

3.8.3 Submit Change Orders to the Owner;

3.8.4 Report monthly, or as requested, to the Management Committee;

3.8.5 Oversee the Services, Work, or both, of the Joint Venture;

3.8.6 Prepare and maintain Project schedules;

3.8.7 Consult and confer with the Deputy Project Manager; and

3.8.8 Perform such additional duties as directed by the Management Committee.

3.9 Deputy Project Manager. The Deputy Project Manager shall be designated by the MWBE partner and will support and assist the Project Manager in the performance of his/her duties as set forth above. Subject to Owner approval (if required), _____ shall serve as the Deputy Project Manager during the term of the Contract, subject to the continuing approval of the Management Committee. If this individual, as determined by the Owner or the unanimous consent of the Management Committee, is unable to satisfactorily perform his duties as Deputy Project

3.10 Manager, the Management Committee will nominate an employee of _____ MWBE Joint Venture Partner to serve as the successor Deputy Project Manager.

Article 4: Joint Venture Organization

4.1 _____ shall be responsible for the fiscal and administrative tasks of managing the business operations of the Joint Venture (the "Managing Business Party") and shall appoint an individual responsible for these tasks. As the Managing Business Party, _____will appoint one of its Management Committee Members to act in the role of Chairperson of the Management Committee commencing on the effective date of this Agreement.

4.2 The Project Management Committee ("Management Committee") will be comprised of two or three (___) representative from _____, and one (_) representative from _____. The Parties individual representatives designated to comprise the Management Committee are referred to herein as the primary representative(s). The Managing Business Party shall designate an individual on the Committee as the Chairperson to manage the administrative and management functions of the Committee. In addition to its primary representatives or representative, each Party shall also name an alternative representative for its primary representatives or representative. A Party's alternative representative shall act in the capacity of its primary representative should its primary representative be unable to fulfill his or her duties as described herein. If not identified below, representatives shall be designated within thirty (30) days of the date of this Agreement by written notice to the other Party. A Party may change its designated representative(s) or alternate representative upon ten (10) days written notice to the other Party. No proxies shall be permitted. Each Party's designated primary and alternate representative(s) shall have full power and authority to act for and on behalf of the Party so appointing them with respects to all matters coming before the Management Committee.

4.3 Meetings of the Management Committee shall not be held unless each Party is represented. If the Parties representatives are not all available, the meeting shall stand adjourned and will be re-scheduled to the next earliest date acceptable to all Parties. While the Management Committee will always attempt to meet in person, telephonic or online meetings shall be allowed. The Parties shall endeavor to provide five (5) days written notice to each Party of scheduled meetings (in person, online or by telephone), except in the event of an emergency or immediate need. A Party's refusal or repeated failure to attend any scheduled Management Committee meeting shall at the other Party's sole discretion, constitute of default under this Agreement subject to the review and approval of the MWBE Director or his/her designee.

4.4 _____ representative(s) shall each have one (1) vote on matters coming before the Management Committee. The primary representative(s) from _____shall each have one (1) vote each on matters coming before the Management Committee. A vote shall not be taken until each representative of a Party has communicated its position and expressed its questions, concerns, approval or disapproval of a matter. Each party agrees to work collaboratively to make decisions and solve problems in the best interest of the Joint Venture. In the event the Management Committee members cannot reach a unanimous decision on the business and operational matter(s) at hand requiring a Management Committee vote or resolution, the Chairperson will make the decision as majority partner, taking into account the risks and financial impacts to all parties and the Joint Venture. The final decision is applicable for all matters except for scope changes made by the Owner or settlement of claims and disputes. In these cases, if the Management Committee cannot develop a mutually agreeable solution, they shall submit any dispute to the Chief Executive Officer of the Joint Venture partners as provided for in Article 16. If, in the Project Manager's good faith judgment, immediate action is required in order to meet the Joint Venture's obligations under the Contract, the Project Manager may act without waiting for the resolution of the dispute,

subject to written notice and each Party's reservation of their respective right to seek recovery for the financial consequences arising from such action pending final resolution of the dispute. If any Party is in default (as defined in Article 12) under this Agreement, during the time of such default, its representative(s) shall not vote upon any issue, and such representative(s) shall not be included in the computation of eligible votes. Within one week of the Management Committee meeting, written meeting minutes regarding items discussed and actions taken at the meeting shall be prepared and distributed by the Chairperson of the Management Committee.

4.5 The Project Management Committee shall meet with the Project Manager or Senior Project Manager) and the Deputy Project Manager or Assistant Project Manager (and other project staff as mutually agreed upon by the Management Committee) quarterly or more frequently if deemed necessary.

4.6 The Project Manager shall have authority to conduct the business of the Joint Venture in accordance with the terms of this Agreement, but shall not have authority to, and shall not directly or indirectly without the unanimous consent and prior written approval of the Management Committee:

4.6.1. Enter into on behalf of the Joint Venture any third-party contractual arrangements or cause the Joint Venture to assume, incur, or become liable for any other obligations;

4.6.2. Make any investment in any other person or entity; make loans or guarantees, or otherwise extend or pledge credit to others;

4.6.3. Confess any judgment against the Joint Venture or compromise any debt due the Joint Venture except upon receipt of full payment;

4.6.4. Make any election for the Joint Venture under the then-current Internal Revenue Code, as amended, or any other applicable income tax legislation from time to time in force;

4.6.5 Commence any claim against the Owner with respect to amounts due under the Contract;

4.6.6 Commence any litigation; defend any action or claim against the Joint Venture by a third party; appeal any judgment or decision; or settle any litigation, action or claim to which the Joint Venture is a party;

4.6.7 Cause to be organized or acquired in whole or in part by the Joint Venture any corporation to carry out any activities of the Joint Venture; or

4.6.8 Exercise any of the authority vested in the Management Committee pursuant to Section 4.9 below.

4.7 In case it is necessary to settle a matter prior to the next scheduled or specially called meeting, the representatives may agree on a decision by notice to each other in accordance with the provisions of Article 23. Such decision will be included in the minutes of the next meeting of the Management Committee.

4.8 The representatives shall be deemed to be acting on behalf of his or her respective Party and no representative shall be liable to the Parties by reason of his or her actions as a member of the Management Committee, except where such representative's action constitutes gross negligence or actual fraudulent or dishonest conduct.

4.9 The Management Committee may delegate, in writing, such of its responsibilities and duties as it deems appropriate to the Project Manager, Senior Project Manager or the Managing Business Party, except that the Management Committee must act, *inter alia*, on the following matters of major consequence:

4.9.1 Timing and amount of distribution of Joint Venture profits and the Management Committee's right to demand additional cash reserves to cover potential losses;

4.9.2 Amount of revenue reserves, cash reserves, and contingent cost reserves to be retained by the Joint Venture;

4.9.3 Voluntary liquidation of the Joint Venture;

4.9.4 Third Party contractual arrangements or the incurring of other obligations in excess of $10,000 by or on behalf of the Joint Venture;

4.9.5 Designation of a successor Project Manager or Deputy Project Manager;

4.9.6 Resolution of a dispute first referred to the Management Committee pursuant to the provisions of Article 16;

4.9.7 Review and approve all contractual transactions between the Parties (and their affiliates) and the Joint Venture; and

4.9.8 Take such other action and exercise such other authority as the Management Committee deems necessary to cause the Joint Venture to achieve its purposes consistent with good business practices and in compliance with all applicable laws and regulations.

4.10 The Joint Venture shall not have employees. The Parties shall provide all necessary personnel. A Party, at its own cost and expense, may retain necessary staff on an independent consultant basis to meet its personnel needs.

Article 5: Interests of the Parties

5.1 Except to the extent that this Agreement expressly provides to the contrary, the interests of the Parties in (i) any and all gains, losses, and liabilities that may result from the performance of the Contract or the Agreement, or both, (ii) any and all property, equipment, and other assets acquired by the Joint Venture, and (iii) any and all monies received in connection with the Contract, shall be determined proportionately in accordance with the Party's Agreed Percentage of Participation as set forth below.

Agreed Percentage of Participation

_____	____ _%
_____	_____ %
_____	_____ %

5.2 The Parties acknowledge and agree that all liabilities and risks associated with the Project shall be shared pro rata according to the Agreed Percentage of Participation unless otherwise provided for herein. The MWBE Joint Venture partners proportionate share in the ownership shall be commensurate with their capital contribution, control, management, risks and ownership interest. For the avoidance of doubt, a Party's profits and losses arising out of the performance of self-performed subcontracting services, work, or both, for which it is responsible under this Agreement shall not be considered profits and losses of the Joint Venture.

5.3 The Parties shall appoint a Project Manager or Senior Project Manager to maintain and oversee the day to day work under the Contract. The Parties shall jointly select any necessary additional Project Managers, the Assistant Project Manager (the "APM") and/or Superintendents. The selected Project Managers and Superintendents shall be available at the Project site daily to supervise the work under the Contract. The MWBE Joint Venture Partner shall be assigned staff under the Contract in proportionate share of their respective ownership interest in the Joint venture. The Project manager shall submit the final staffing matrix confirming compliance with this section including all Project managers, Assistant Project managers and Superintendents to DALLAS ISD's MWBE office within 30 days of the Notice to Proceed.

5.4 The clear and distinct portion of the Scope of Work to be performed by _____, the MWBE Joint Venture partner and the estimated value of those services commensurate with the percentage ownership interest is as follows:

A detailed delineation of the Joint Ventures duties is outlined in Exhibit "A".

[Please note that if the MWBE's scope of work is described as "participate in", "advise about", "assist in" or "consult", the work shall not be considered distinct or clearly defined for the purpose of analyzing the joint venture participation]

Article 6: Execution of Bonding and/or Guarantees

6.1 Each of the Parties agrees to execute all applications and indemnity agreements required by its sureties upon any bond or bonds required in connection with the Proposal and/or the Contract. Failure of a Party to execute any documentation necessary to effectuate the intent of this Article 6 shall constitute a default in accordance with Article 12 and entitle the non-Defaulting Party(ies) to appropriate relief as provided therein.

6.2 The Joint Venture partner(s) may provide co-surety bond or bonds in proportionate percentage to their ownership in the Joint Venture and to other Parties are applicable in a form acceptable to the Owner. The Joint Venture may also provide in a form acceptable to the Owner any bond or bonds in the name of the Joint Venture in lieu of the co-surety arrangement; provide an Up Front Joint Agreement (SAA Form #1), and an executed copy of the indemnity agreement signed by all of the Parties associated with the SAA Form #1.

Article 7: Working Capital

7.1 All necessary working capital, when and as required for the performance and prosecution of the Contract or operation of the Joint Venture as determined by the Project Manager and approved by the Management Committee, shall be furnished by the Parties in a timely manner and proportionately in accordance with their respective interests as set forth in Article 5. Each of the Parties recognizes that the failure of any Party to contribute its full proportionate share of working capital will have serious adverse consequences for the Joint Venture and imposes an unfair burden upon the other Party(ies). As to such working capital contribution, each of the Parties waives any rights of set-off it might otherwise possess and agrees to make the working capital contributions without set-off or deduction of any type. If any Party borrows funds to meet its obligation hereunder, such borrowing shall be the sole and separate obligation of the Party and shall not be the debt or obligation of the Joint Venture. No Party or its representatives shall have the power to pledge the credit of any other Party.

7.2 Any capital contributions requested by the Project Manager from the Parties shall be subject to the approval of the Management Committee. If such request is approved, the Management Committee shall give written approval thereof, with the manner of computation, to each Party. If, within thirty (30) days of receipt of such notice, either Party fails or is unable to provide its proportionate share of the funds required by the Joint Venture, such non-contributing Party shall be in default of this Agreement. In the event the non-contributing Party fails to cure its default within seven (7) days of the date of receipt of notice, the contributing Party shall be reimbursed from any profit due the non-contributing Party for the total amount of the funds contributed, but the ownership interest of the Joint Venture shall not be adjusted or changed unless the non-contributing Party is determined to be in default and fails to cure. The Management Committee has the discretion to waive a default under this Section.

Article 8: Books and Records, Accounting and Bank Accounts

8.1 Books and Records. The Parties acknowledge and agree that _____ will be the Managing Business Party and will provide at no additional costs the accounting and financial services required of the Joint Venture as approved and determined by the Management Committee. The Managing

Business Party, on behalf of the Joint Venture, shall keep proper books, records and accounts in which full, true and correct entries will be made of its transactions, on an accrual basis, in accordance with generally accepted accounting principles, showing all costs, expenditures, sales, receipts, assets and liabilities, and profits and losses of the Joint Venture, and all other records required appropriately to reflect the conduct of the Joint Venture's affairs and the distributions provided for in Article 5. Each of the Parties shall be entitled to have its representatives examine and make copies (at its own expense) of any of the books or records of the Joint Venture at any reasonable time and without notice. The Joint Venture shall permit the use of electronic copies of its books and records. The books and records of the Joint Venture are to be retained after dissolution of the Joint Venture for such period or periods as may be required by law or the Contract, whichever is greater. The costs associated with accounting and record keeping for the Joint Venture (including federal reporting under Section 9.2 and tax matters under Section 17.6) shall be a Joint Venture cost.

8.2 Fiscal Year. The fiscal year of the Joint Venture shall commence on _____ and end on _____.

8.3 Audit. If required by the Management Committee or the Owner, the Managing Business Party shall employ, at the expense of the Joint Venture, an independent auditor acceptable to the Management Committee to conduct an audit of the financial statements, including the balance sheet and statements of income and cash flows and disclosures required under generally accepted accounting principles, of the Joint Venture each year and report to the Parties within ninety (90) days after the expiration of the fiscal year its opinion on such financial statements. Further, each Party may at its option and sole expense perform an annual audit of the Joint Venture books and records.

8.4 Reports. The Managing Business Party shall deliver to each Party:

8.4.1 Within thirty (30) days after each month period, a balance sheet and statement of income of the Joint Venture for the month;

8.4.2 Within thirty (30) days after the end of each fiscal quarter, a statement of cash flow for the Joint Venture;

8.4.3 At least two (2) weeks prior to each quarterly Management Committee meeting, a summary of the monthly financial information for the most recent completed months, and projections for the next three (3) quarters; and

8.4.4 With reasonable promptness, all such other information, reports, and projections as from time to time may reasonably be requested by either Party.

8.5 Bank Accounts. A separate bank account in the name of the Joint Venture will be established by the Joint Venture. The bank account will require the signature of an authorized representative of each Party or his or her designee for withdrawal by check or documented approval of an authorized representative of each Party or his or her designee for withdrawal by electronic means. All payments due the Joint Venture for performance of the Contract will be deposited in the account and all expenses incurred under the Contract will be paid from the account. All capital contributions made in cash and all of the Parties' other cash receipts shall be deposited in such account under such terms as directed by the Management Committee. No petty cash accounts for the Joint Venture are authorized. The Managing Business Party shall reconcile the bank account monthly and deliver a report to the Management Committee.

8.6 Disbursements from Bank Accounts. All withdrawals from the Joint Venture account will require written invoices, receipts, vouchers, or other acceptable documentation. All checks, drafts, or other orders of the payment of money, and all notes or other evidence of indebtedness issued in the name of the Joint Venture shall be signed by two (2) persons, each representing one of the Parties. Each Party shall designate an individual or individuals authorized on its behalf to provide such signatures.

8.7 Closing of Bank Account in Event of Default. In case of a material default by one of the Parties

under Article 12 of this Agreement, the then-existing Joint Venture account may be closed by the non-Defaulting Party(ies) and a new account opened in the name of the Joint Venture, but under the sole direction and control of the non-Defaulting Party(ies). Funds from the closed account shall be transferred to the new account and the then-existing account shall be closed. In such an event, the defaulting Party(ies) will no longer have any rights to the operation of the new bank account, unless and until it cures its default to the satisfaction of the non-Defaulting Party(ies).

8.8 Loans. Without the prior written consent of all Parties, the Joint Venture, the Management Committee, or any Party shall not:

8.8.1 directly or indirectly, borrow money or become otherwise obligated upon, or liable for, any monies borrowed in the name of the Joint Venture or the other Party(ies);

8.8.2 guarantee or act as surety for any obligation or liability (whether for borrowed money or otherwise), for any other person, firm or corporation.

8.9 Accounting Decisions. Subject to Section 8.1 above, all decisions for the Joint Venture as to accounting principles shall be made by the Management Committee consistent with Generally Accepted Accounting Principles ("GAAP") with the concurrence of accounting or tax experts from each Party.

8.10 Final Accounting. Upon completion of the Project, payment of all sums due under any contract pertaining to the Project, and settlement of all outstanding obligations and liabilities on the part of the Joint Venture and their respective affiliated subcontractors, the Management Committee shall arrange for a final account to be prepared showing the total net profit earned, or loss incurred, by the Joint Venture. Unless otherwise agreed by the Parties, such final account shall be audited by a firm of accountants and agreed to by the Management Committee.

Article 9: Additional Obligations of the Parties

9.1 The Joint Venture shall, in good faith, commit to achieve the minority and women owned business subcontracting goals as set forth within the Contract. The Joint Venture also agrees to comply with the MWBE Program guidance, rules and regulations.

9.2 Each Party shall use good faith efforts to provide and make available its expertise, technical resources, and information to the Joint Venture to effectuate the intent herein and in furtherance of satisfying the Joint Venture's obligations to the Owner.

9.3 Contracting and Procurement. The Management Committee or its designee shall administer and manage all contracting, procurement, and financial activities for the Joint Venture and periodically update the Parties on the status of such activities. For the avoidance of doubt, the foregoing activities relate solely to the contracting, procurement, and financial activities of the Joint Venture and not such activities as undertaken by the Parties in furtherance of the Services, Work, or both, for which they are responsible under a Task Order Agreement.

9.4 Ownership Interest. Subject to the prior written approval of the District's M/WBE Department, each Party's Ownership interest may be adjusted from time to time as provided in this Agreement. For purposes of this Agreement, the term "Pro Rata" means the ratio determined by dividing the Ownership interest of a Party to whom a particular provision of this Agreement is stated to apply by the aggregate Ownership interest of all the Parties.

9.5 Reporting Requirements. The Management Committee or its designee shall administer and manage all required state, local, and federal reporting activities for the Joint Venture, including MWBE goals, all in accordance with applicable DALLAS ISD regulations and guidelines. Each Party will be responsible for providing any required reporting information to the Managing Business Party in a timely manner to allow the timely submission of the combined data from each Party to the appropriate federal agency and/or electronic reporting system.

9.6 The Parties agree that, during the term of this Contract and for a period of one year thereafter, no Party to this Contract shall in any way intentionally induce or persuade an employee of another Party to this Contract to become an employee or agent of such Party.

Article 10: Provision of Materials, Equipment, Supplies and Services

10.1 The Parties intend that all materials, equipment, supplies, and services required in connection with the Contract will be provided by the Parties and that the Joint Venture will not acquire any materials, equipment, supplies, or services directly. In the event the Joint Venture shall procure any such materials, equipment, supplies, or services, such procurement shall be in accordance with any procurement guidelines, directives, and procedures issued or approved by the Management Committee. In addition, and to the extent applicable, any procurement activities by the Parties, Joint Venture, or both shall be conducted in accordance with applicable laws and regulations, as implemented through the Contract.

10.2 If any Party provides equipment or temporary facilities to the Joint Venture, the Party shall insure or self-insure such equipment or temporary facilities and the cost of such insurance or self-insurance shall be included in the equipment or facilities rate quoted to the Joint Venture. The Joint Venture and the other Parties will be identified as an additional insured on any such insurance when appropriate, as determined by the Management Committee.

Article 11: Compensation

11.1 In accordance with the billing period provided in the Contract, unless otherwise approved by the Management Committee, each Party shall prepare and submit by the tenth (10th) of each month, for Work performed during the prior month, invoices to the Joint Venture.

11.2 Each Party shall submit invoices in the manner required under the Contract. Each invoice shall be subject to the terms of the Contract.

11.3 The Project Manager, on behalf of the Joint Venture, will in turn prepare and submit invoices to the Owner in accordance with the provisions of the Contract and any applicable task order. Unless expressly agreed to by the Parties and permitted pursuant to the terms of the Contract, the Joint Venture shall not add any profit, fee, or other amounts to the invoices submitted by the Parties. The Parties may invoice the monthly staff costs for personnel incurred directly in the management and administration of the project subject to any restrictions in the terms of the Contract.

11.4 Subject to the provisions of Section 4.6, the Joint Venture will, upon receipt of payment from the Owner, deposit same in the Joint Venture bank account and within five (5) business days issue payments against such account to each Party for the amount(s) invoiced by each Party to the Joint Venture and allowed by the Owner, less any withholdings authorized by this Agreement and directed by the Management Committee. In the event the Owner pays less than the full amount due with respect to any invoice, such shortfall shall be allocated to the Party responsible for performing the specific Services, Work, or both, for which payment was withheld or, in the absence of information reasonably sufficient to determine the basis for such short payment, any shortfall shall be allocated between the Parties in proportion to their respective shares of the applicable invoice. No Party will unreasonably restrain or refuse to authorize withdrawal of funds for payment of proper invoices relating to performance of the Services, Work, or both.

11.6 Expenses incurred by the Parties in self performing Work under a Subcontract or Task Order Agreement shall not be considered Joint Venture expenses and, to the extent allowed under the Contract, may be included by the Parties in their respective invoices to the Joint Venture for Services provided, Work performed, or both. Unless stated otherwise in this Agreement or authorized in writing by the Management Committee, personnel expenses not directly related to the performance of the Project including but not limited to back office functions such as human resources, legal counseling and tax compliance of the Parties shall not be considered a Joint Venture expense.

11.7 Each Party shall have full and sole responsibility for the payment of any taxes, duties, fees, or assessments of any nature whatsoever levied upon it individually in connection with its Services, Work, or both, under a Task Order Agreement, including any personal income taxes levied or imposed on any of its employees or personnel or any of its subcontractor's employees or personnel.

11.8 All personnel involved in the performance of the Services, Work, or both, shall be employed by the Parties and shall remain in the employ of the respective Party. Each Party shall advance and pay all payroll costs and expenses incurred by reason of their respective personnel working in connection with the performance of the Services, Work, or both, and each Party agrees to indemnify and hold the Joint Venture and each other Party harmless from any claims and liabilities arising out of the responsibilities of that Party toward its employees, any of its related companies, and any of their personnel under all applicable laws, including labor and tax laws.

11.9 If a Party, with the prior written approval of the Management Committee, maintains a Joint Venture office dedicated exclusively for the management and administration of the DISD project independent of the Parties primary business office(s) and any of the other Party's(ies) personnel are located at the office during the duration of the project, the host Party may issue a quarterly invoice directly to the visiting Party(ies) for the pro rata cost of office space and furnishings utilized by visiting Party's(ies) personnel during the time they are engaged in the performance of Services, Work, or both, for this Joint Venture at such Joint Venture office.

11.10 The basis for the calculations of such invoices under Section 11.9 above shall be determined by the Management Committee. Such invoices shall not constitute a billing to, or on behalf of, the Joint Venture, but rather a billing directly between the Parties. The visiting Party shall pay such invoices within thirty (30) days of receipt of such invoice.

11.11 When Joint Venture funds are in excess of the needs of working capital required for the operation of the Joint Venture (as determined by the Management Committee), such excess funds, if any, shall be first applied to the return of funds advanced until such advances shall have been entirely repaid, and the balance of such excess shall be distributed as provided in Section 11.13 below, to each Party in accordance with such Party's Agreed Percentage of Participation as reflected in Article 5.

11.12 The Management Committee shall quarterly review the progress of the Services, Work, or both, and the Joint Venture's financial condition to determine whether Joint Venture profits, if any, should be distributed. If the Management Committee determines that earned profits and reserves for contingencies, including cash contributions, are adequate to meet the Joint Venture's needs, it may direct the Managing Business Party to distribute earned Joint Venture profit to the Parties based upon their respective Agreed Percentage of Participation. For the avoidance of doubt, payments to a Party for self-performed services related to the construction project, Work performed, or both, pursuant to a Task Order Agreement shall not be considered distributions of Joint Venture capital or profits.

11.13 The Management Committee shall establish cash reserves and revenue reserve funds to be retained by the Joint Venture from time to time in order to assure adequate funding for all Joint Venture obligations as they relate to future profits, losses, liabilities, and contract performance. At the direction of the Management Committee, the Project Manager shall invoice each of the Parties for approved reserves and capital contributions.

Article 12: Default and Insolvency

12.1 If a Party shall be in default hereunder (as specified in Sections 4.3 (Management Committee meetings), 7.2 (capital contributions), 9.4 (Owner-issued notice of default), 25.8 (breach of covenants), or 25.9 (anti-bribery laws), or Article 15 (assignment and change of control)), and fail to promptly (but in no event more than seven (7) days thereafter) cure such default after written notice or demand; cease or otherwise fail to timely pay for goods or services (including labor), and fail to promptly (but in no event more than seven (7) days thereafter) cure such default after written notice or demand; cease to operate or terminate its business affairs; institute an insolvency proceeding under applicable law; permit the entry of

any order for relief under Chapter 7 of the Bankruptcy Code; or fail to cure a default hereunder after entry of an order for relief under Chapter 11 of the Bankruptcy Code, (such Party being hereinafter referred to as "Defaulting or Insolvent Party"), then from and after such date:

12.1.1 All acts, consents and decisions with respect to the performance of the Contract or the management of the Joint Venture shall thereafter be taken solely by the remaining Party without considering the Defaulting or Insolvent Party.

12.1.2 The participation of the Defaulting or Insolvent Party in the profits of the Joint Venture shall be limited to that proportion which the Defaulting or Insolvent Party's contributions to the working fund of the Joint Venture bear to the total of such contributions as same may be modified by and subject to the provisions of Section 7.2, but the Defaulting or Insolvent Party shall be charged with, and shall be liable for, any and all losses that may be suffered by the Joint Venture under the Contract, or any additions or supplements thereto or modifications thereof, to the full extent of the Defaulting or Insolvent Party's Percentage of Participation, set forth in Article 5.

12.1.3 The non-Defaulting Parties shall have the right to take over and complete the Services, Work, or both. Without limiting the generality of the foregoing, the non-Defaulting Parties may, for the purpose of completing the Work, enter upon the site and take possession of all materials, equipment, scaffolds, tools, appliances and other items thereon, which have been purchased or provided for the performance of the Work, all of which the Defaulting or Insolvent Party hereby transfers, assigns and sets over to the non-Defaulting Parties for such purpose, and to employ any person or persons to complete the Work and provide all of the required labor, services, materials, equipment and other items. The non-Defaulting Parties may complete the Services in whatever fashion it deems most efficient and shall have the right to use the existing work product for purposes of completing the Project. In such event, the non-Defaulting Parties shall receive any and all payments, including fees, which would otherwise be due for such Services, Work, or both, and apply the proceeds thereof (i) to cover all expenses incurred by the non-Defaulting Parties in taking over and completing (by use of its own forces, subcontracting or otherwise) such Services, Work, or both and (ii) to establish a contingency fund to cover any and all outstanding warranties or other obligations of the non-Defaulting Parties with respect to such Services, Work, or both, or any other uncured defect or deficiency for which the non-Defaulting Parties are responsible.

12.1.4 The non-Defaulting Party shall have the right to establish a new Joint Venture bank account in accordance with Section 8.7 of this Agreement.

12.2 If a Party is in material default of the requirements of the Contract, including (i) failure to perform or progress the Services within the timeframe specified in the Contract; (ii) serious or repeated breaches of the safety requirements; or (iii) is in breach of the requirements of the Services to be provided, the Work to be performed, or both, by that Party and fails to cure such breach within seven (7) days after written notice or demand, then from and after such date, the non-breaching Party shall have the rights afforded it under Subsections 12.1.1 through 12.1.3 above. Nothing in this Agreement shall be interpreted or construed to relieve the defaulting Party from their obligations under this Agreement or their obligations under the Contract with the Owner.

12.3 In the event of a default of this Agreement, the non-Defaulting Parties shall additionally be entitled to exercise all applicable remedies available to it, whether at law, in equity or otherwise, including an action to recover the losses sustained in excess of its proportionate share hereunder, specific performance, and the right to declare the Joint Venture dissolved and terminated without the necessity for judicial determination. Upon such dissolution, the non-Defaulting Parties shall immediately commence to wind up the Joint Venture's affairs, including completion of the aforesaid Contract, and shall liquidate the assets of the Joint Venture as promptly as reasonably possible.

Article 13: Liabilities

13.1 The liability of the Parties under this Agreement shall be joint and several. Notwithstanding the foregoing, as between the Parties, any liability (whether to the Owner or any third party) that the Joint Venture or any Party (including its parental guarantor, if any) may incur arising from or relating to the Contract or the performance of Services, Work, or both, under the Contract or this Agreement shall be allocated as between the Parties in proportion to the Agreed Percentage of Participation of each Party, except as set forth below:

13.1.1 Liability or related losses caused by the negligence, gross negligence, willful misconduct, fraud, or violation of legislation, laws, ordinances, codes or regulations of a Party (including its officers, employees, agents, representatives, and subconsultants and subcontractors at any tier), shall be assumed by such Party;

13.1.2 In the event of a default by a Party, liability or losses sustained by the Joint Venture or the non-Defaulting Parties shall be assumed solely by the defaulting Party;

13.1.3 Liability or related losses resulting from claims made by an employee of a Party against the Joint Venture or each other Party based on the employee-employer relationship, including the payment of unemployment taxes, withholding taxes, and employment benefits, will be solely assumed by the Party by whom such person is employed;

13.1.4 Liability or related losses traceable directly to and caused by a Party (including its officers, employees, agents, representatives, and subconsultants and subcontractors at any tier) shall be assumed by that Party;

13.1.5 In the event of a breach by a Party in the performance of its obligations under this Agreement, liability or losses sustained by the Joint Venture, the non-breaching Party, or both, as a result of such breach shall be assumed solely by the breaching Party; and

13.1.6 Liabilities or related losses relating to third-party claims resulting from Services provided, Work performed, or both, jointly by the Parties (including their respective officers, employees, agents, representatives, and subconsultants and subcontractors at any tier) shall be allocated to each Party in accordance with each Party's respective, relative degree of fault or responsibility, as determined by an allocation of fault pursuant to either an agreement between the Parties or a finding made by the trier-of-fact in a judicial proceeding.

13.2 With respect to the liabilities allocated in Subsections 13.1.1 through 13.1.5 above, the Party to whom such liability is allocated shall defend, indemnify, and hold harmless the Joint Venture and each other Party from any and all such claims, losses, or liabilities set forth in such subsections (including reasonable attorneys' fees). With respect to the liabilities allocated in Subsection 13.1.6 above, each Party agrees to defend, indemnify, and hold harmless the Joint Venture and each other Party from any and all such claims, losses, and liabilities (including reasonable attorneys' fees) that are in excess of such other Party's relative degree of fault or responsibility, as determined by an allocation of fault pursuant to either an agreement between the Parties or a finding made by the trier-of-fact in a judicial proceeding.

13.3 With respect to any claims, losses, and liabilities not covered by Sections 13.1.1 through 13.1.6 above, each Party agrees to defend, indemnify, and hold harmless the Joint Venture and each other Party from any and all such claims, losses, and liabilities (including reasonable attorneys' fees) arising from or related to the Contract or the performance of the Work, Services, or both, under the Contract, or this Agreement that are in excess of such other Party's Agreed Percentage of Participation, irrespective of the contributory fault, negligence, or strict liability of the indemnified Party(ies).

13.4 If a dispute arises between the Parties as to the allocation of liability and/or related losses each Party should bear, each Party shall provisionally assume a share of such liability in proportion to its Agreed

Percentage of Participation until the dispute is resolved.

13.5 For any such claims, losses, and liabilities, the indemnifying Party's obligations regarding any defense thereof include only the reimbursement of the indemnified Party's(ies) reasonable defense costs incurred to the extent of the indemnifying Party's actual indemnity obligations hereunder.

Article 14: Insurance

14.1 The Parties agree that they will acquire all necessary insurance in connection with the award and performance of a Dallas ISD Contract, including but not limited to general liability or professional liability, builder's risk, worker's compensation or any other insurance required under the Contract. [Optional provisions in the alternative, the Parties agree to provide the specific operational insurance coverage as follows:

14.1.1 Workers' Compensation for statutory limits in compliance with the applicable state and federal laws;

14.1.2 Employer's Liability with a limit of $_____;

14.1.3 Commercial General Liability, including Products and Completed Operations, Contractual Liability, and Broad Form Property and Personal Injury Liability, with a combined single limit of $_____ per occurrence and in the aggregate;

14.1.4 Automobile Liability Insurance with a combined single limit of _____ for bodily injury and property damage with respect to vehicles either owned, non-owned, and leased by a Party in the performance of Services under the Contract or this Agreement;

14.1.5 Commercial General Liability Insurance in the amount of _____ per claim and in the aggregate_____.;

14.1.6 Umbrella Liability in excess of (.2), (.3) and (.4) above, with an aggregate limit of _____ if required by the Contract. (Note: limit requirements can be satisfied by any combination of Primary and Excess coverage); and

14.17 Any insurance written on a "claims made" basis shall (a) have a retroactive date of no later than the earlier of the date of this Agreement or the earliest commencement of the Party's Services or Work in relation to the Project and (b) be maintained for at least 3 years after the latest completion of the Services or Work, or termination of the Contract, whichever is later.

14.1.8 Each Party shall endorse its Commercial General Liability, Automobile Liability, Contractor's Pollution Liability and, if applicable, Umbrella insurance policies to provide that the Joint Venture is an additional insured under its policies for that Party's interest in the Joint Venture. The other Party and, if required by the Contract, the Owner, shall also be included as an additional insured. Each Party's Professional Liability insurance policy shall, if necessary, be endorsed to include the liability of the insured arising out of the insured's interest in the Joint Venture.]

14.2 The policies and limits specified by Dallas ISD in the Contract represent the minimum coverage to be carried by each of the Parties hereunder. Notwithstanding the foregoing, if the Contract requires the Joint Venture and/or the Parties to maintain additional coverage and/or increased limits, the Parties shall be required to procure such additional insurance in accordance with the terms of the Contract.

14.3 Each Party hereby waives and shall obtain from all of its Commercial General Liability, Automobile Liability, Contractor's Pollution Liability and, if applicable, Umbrella insurance carriers a waiver of any rights of subrogation against each other Party and their directors, agents, employees, and assignees, with respect

to risks associated with the Services provided, Work performed, or both, pursuant to the Contract.

14.4 Unless noted otherwise or with the written approval of the Management Committee, the cost of any insurance required herein (including any deductibles and self-insured-retention amounts) shall be the responsibility of the Party procuring such coverage.

14.5 The Management Committee, in its discretion, shall be responsible for obtaining insurance for the Joint Venture for management risks such as Directors & Officers Liability, Fiduciary Liability, and any other insurance coverage deemed appropriate by the Management Committee, the cost of which shall be an expense of the Joint Venture.

14.6 Absent written approval from the Management Committee, all lower-tier subcontractors, whether retained directly by the Joint Venture or by a Party to the Joint Venture, shall be required to comply with the provisions of this Article 14.

Article 15: Assignment or Change in Control

15.1 Each Party is entering into this Agreement in reliance upon each other Party being and remaining a party to this Agreement. No Party to this Agreement shall, directly or indirectly, sell, assign, transfer, dispose of, pledge or hypothecate its rights, interest or obligations hereunder, or any part thereof, whether directly or by merger with or acquisition by another entity, in this Agreement, the Joint Venture, the Contract, or in any property or monies of the Joint Venture, except with the prior written consent of each other Party, and, if required by the Contract, with the prior written consent of the Owner. A "Change in Control" shall mean the sale of all or substantially all the assets of a Party; any merger, consolidation or acquisition of a Party with, by or into another corporation, entity or person; or any change in the ownership of more than fifty percent (50%) of the voting capital stock of a Party.

15.2 No Party shall, without the written consent of each other Party, assign, transfer or sublet any claims, causes of action or rights against each other Party arising from or under this Agreement; or any proceeds from claims arising from or under this Agreement or the Contract as security, collateral or the source of payment for any notes or liabilities to any third party; or any control of any claims or causes of action arising from or under this Agreement or the Contract without the written consent of each other Party.

15.3 Any such attempted sell, assignment, transfer, disposal, pledge, hypothecation, or sublet without the written consent of each other Party shall be void and confer no rights upon any third person and shall constitute a default hereunder. The provisions of this Article shall survive the completion or termination of this Agreement for any reason and shall remain enforceable between the Parties.

Article 16: Disputes

16.1 The Parties shall attempt in an amicable manner to adjust and settle any disagreement that may arise between them under or in connection with this Agreement. Any controversy or claim arising out of or relating to this Agreement will first be referred in writing to the Management Committee for its decision.

16.2 In the event any dispute between the Parties is not resolved by the Management Committee, either Party may submit such dispute to the Chief Executive Officer of each Party. Submittal of the dispute shall be in writing and summarize in detail the dispute or contested issues. Upon receipt of the dispute, the receiving Party shall designate within ten (10) days a responsible executive with authority to negotiate a settlement or resolution of any dispute. The Parties designated responsible executives for all Parties shall convene within thirty (30) days of the submittal at such location as the Parties may agree. The responsible executives shall hear such dispute at a time, place, and under such procedural rules as they may specify, and shall act only by unanimous consent. It is the intention of the Parties that the responsible parties shall mutually resolve disputes without litigation. However, nothing herein shall be deemed to require any Party to exhaust this procedure prior to exercising whatever rights it might have at law or equity and any litigation shall be stayed pending exhaustion of this dispute resolution procedure. The Parties recognize the possibility of deadlock from elevating the dispute or controversy to the Chief Executive Officer but intend

that through this mechanism, disputes may be discussed and resolved without the need of litigation.

16.3 If the dispute is not resolved in accordance with Section 16.2 above, the Parties shall submit their disputes to mediation within seven (7) days thereafter or as soon thereafter as may be arranged with the mediator. The Parties shall mutually agree to one mediator. In the event they cannot mutually agree to such a mediator, the mediator shall be selected under the Construction Industry Rules of the American Arbitration Association, unless otherwise agreed between the Parties.

16.4 If mediation is unsuccessful in resolving all disputes between the Parties or the dispute cannot be settled by mediation within sixty (60) days, then the Parties agree to consider the use of binding arbitration to resolve their dispute in the following manner or either Party may file a claim in a court of competent jurisdiction with venue in Dallas County. In the event the Parties agree to resolve their dispute by means of binding arbitration, the Parties shall mutually agree to one arbitrator. In the event they cannot mutually agree to such an arbitrator, one arbitrator shall be selected in accordance with the Construction Industry Rules of the American Arbitration Association, unless otherwise agreed between the Parties. The arbitrator thus selected shall thereafter proceed to ascertain the facts relating to such dispute and to make a determination thereof; the determination of the arbitrator shall be final, binding and conclusive upon the Parties and enforceable at law in a court having jurisdiction over the Party against whom enforcement of the arbitrator's decision is sought to be enforced. The then-current Construction Industry Rules of the American Arbitration Association will be applied.

16.5 Notwithstanding the foregoing, if and to the extent that a dispute between the Parties relates to a claim, controversy or dispute involving the Owner and/or the Contract (such that in the interest of judicial economy and to avoid the possibility of inconsistent judgments, a single dispute resolution proceeding is warranted), then the Parties agree that the dispute resolution provisions in the Contract, if any, shall apply and take precedence over the provisions of this Article 16.

16.6 The Parties shall not allow any dispute to affect or threaten the progress and completion of the Services, Work, or both. Each Party shall remain responsible for the performance of its obligations under this Agreement and the Contract and shall continue to perform and prosecute the Services, Work, or both, as directed by the Project Manager during any dispute resolution process notwithstanding any such dispute.

Article 17: Distributions and Tax Allocations

17.1 Subject to the terms and conditions of this Agreement, including Articles 11 and 12, distributions may be made to the Parties during the term of this Agreement at such times, in such amounts, and subject to such conditions as the Management Committee may from time to time determine.

17.2 Should the Joint Venture make any advances or loans to either Party, then distributions to be made pursuant to Section 17.1 above shall be applied in repayment of such advances or loans, together with interest, until repaid in full, notwithstanding the fact that such advances or loans may not then be due and payable according to the terms of any instrument evidencing such advance or loan.

17.3 No distribution shall be made pursuant to this Agreement if the making of such distribution would create an event of default under any loan agreement, any mortgage, or other security instrument to which the Joint Venture is subject, or otherwise materially adversely affect the ability of the Joint Venture to perform its obligations under any other agreement to which the Joint Venture is subject. Any distribution pursuant to this Article, to the extent not permitted by the previous sentence, shall be deferred until such time as it will not create an event of default or materially adversely affect the ability of the Joint Venture to perform its obligations. If any such distribution can at any time only be made in part, it shall be made to the Parties in proportion to the amounts that would have been paid to them but for this Article 17.

17.4 Except as provided in Section 17.1 above, and except for distributions upon termination or withdrawal as provided herein, the Joint Venture shall make no further distributions.

17.5 Tax Allocations. All gross income, gains, losses, deductions, and credits of the Joint Venture, as

determined for US federal income tax purposes, shall be allocated for such purposes among the Parties in the same proportions as the corresponding items of revenue, gains, losses, and expenses are allocated pursuant to Article 5 above.

17.6 Designation of Tax Matters Partner/Partnership Representative

17.6.1. Designation. The Management Committee shall designated an individual as the Tax Matters Partner within the meaning of IRC §6231(a)(7) as in effect for taxable years beginning on or before December 31, 2017 and the Partnership Representative within the meaning of IRC §6223(a) as in effect for taxable years beginning after December 31, 2017 and shall act in any similar capacity under applicable state, local, or foreign law (in such capacity and hereinafter, the "Tax Matters Partner").

17.6.2. Elections. Except as otherwise expressly provided to the contrary in this Agreement, all tax elections, including federal, state, local, and foreign tax elections, shall be made by the Tax Matters Partner in its sole discretion. To the extent applicable, the Tax Matters Partner will make the small partnership election as described in IRC §6221(b) as in effect for taxable years beginning after December 31, 2017.

17.6.3. Expenses of Tax Matters Partner; Indemnification. The Tax Matters Partner shall be reimbursed for all reasonable expenses, including legal and accounting fees, claims, liabilities, losses, and damages, incurred in connection with any administrative or judicial proceeding with respect to the tax liability of the Parties attributable to this Agreement. The payment of any and all such then-existing expenses shall be made before any distributions are made to each Party. Neither the Tax Matters Partner nor any Party shall have any obligation to provide funds for such purpose.

17.7 Requirement to Prepare and File Tax Return. The Tax Matters Partner shall cause the preparation and timely filing of all tax and information returns required to be filed pursuant to the Internal Revenue Code and all other tax returns deemed necessary and required in each jurisdiction in which the Joint Venture does business. Copies of the returns, or pertinent information from the returns, shall be furnished to the Parties no later than two months before the extended due date of the Joint Venture's federal income tax return. The Tax Matters Partner will direct that any tax imposed upon the partnership be paid by the partnership to federal, state, city or other municipalities as required by law.

17.8 Capital Structure of Joint Venture

Names of Party	Percentage Interests	Capital Contribution
_____	___ %	$_____
_____	___%	$_____
_____	___%	$_____

17.9 Amounts Withheld. All amounts withheld pursuant to the Internal Revenue Code or any provision of any state, local, or foreign tax law with respect to any payment, distribution, or allocation to the Parties shall be treated as amounts paid or distributed, as the case may be, to the Parties. The Joint Venture is authorized to withhold from payments and distributions, or with respect to allocations to the Parties, and to pay over to any federal, state, local, or foreign government, any amounts required to be so withheld

pursuant to the Internal Revenue Code or any provisions of any other federal, state, local, or foreign law, and shall allocate any such amounts to the Parties with respect to which such amount was withheld and shall offset amounts otherwise distributable to such Party.

Article 18: Completion of Project, Division of Profit

Upon completion of the Project, after providing for and paying all costs disbursed or incurred for its performance, and all other costs and charges required by the Contract and ordinarily and usually charged as costs in performance of such a Contract, including payment of all claims not secured by insurance, or by providing proper reserves for any such claims, which shall have either been brought against the Parties or may be reasonably anticipated, and after providing adequate reserves for any other contingency, if any, that shall be determined by the Management Committee to be reasonably necessary; and after repaying all sums advanced by the Parties for working capital, any undistributed profits thereafter remaining, resulting from the performance of the Contract, shall be distributed and divided between the Parties in accordance with their ratable proportion as determined under Articles 5, 7, and 12. Any reserves, when no longer required, or so much thereof as shall remain, shall be similarly distributed.

Article 19: Successors and Assigns

Subject to the foregoing provisions herein contained, this Agreement shall inure to the benefit of, and be binding upon the Parties, their successors, trustees, permitted assigns, receivers, and legal representatives, but shall not inure to the benefit of any other person, firm or corporation.

Article 20: Entire Agreement

20.1 This Agreement constitutes the entire understanding and Agreement between the Parties with respect to the subject matter hereof and supersedes all prior or contemporaneous representations, understandings or agreements of any kind, whether verbal or written.

20.2 This Agreement shall not be modified except by written amendment duly executed by authorized representatives of the Parties. Any such written amendments shall be forwarded to the district for review and approval. Each Party has had the opportunity to avail itself of legal advice and counsel. No Party shall be deemed to be the drafter or author of this Agreement. In the event this Agreement is subject to interpretation or construction by a court of law or panel of arbitration, such court or panel shall not construe this Agreement or any portion hereof against either Party as the drafter of this Agreement.

20.3 Failure of a Party to insist upon strict and punctual performance of any terms or conditions of this Agreement shall not be construed to constitute a waiver of, or estoppel against, any other Party later asserting the right to require such performance. Neither shall a waiver or estoppel in one instance constitute a waiver or estoppel with respect to a later default, whether similar or dissimilar in nature.

20.4 If any provision of this Agreement is held invalid or unenforceable by any court of competent jurisdiction, the other provisions of this Agreement will remain in full force and effect.

Article 21: Confidential Information

21.1 Subject to any applicable requirements of the Contract, 1) information relating to this Agreement or the Contract which is gathered, exchanged, or otherwise obtained by the Parties during the term of this Agreement shall be maintained in confidence and shall not be utilized except for purposes in furtherance of this Agreement and the exercise of rights, obligations, duties, and privileges set forth herein; and 2) such information will not be disclosed to any third parties or to a Party's own personnel except where there is good faith need to know; provided however, that no Party shall be liable for any utilization or disclosure if the information falls into any of the following categories:

21.1.1. Information which at the time of disclosure is or thereafter becomes within the public

domain other than by reason of the disclosing Party's breach of this Agreement.

21.1.2. Information that prior to disclosure hereunder was already in the recipient's possession and was not the subject of any confidentiality obligation of the disclosing Party.

21.1.3. Information which, subsequent to disclosure hereunder, is obtained by the disclosing Party from a third party lawfully in possession of such information and which information is not subject to a confidentiality obligation.

21.2 For the purposes of this Agreement, specific information disclosed shall not be deemed to be in the public domain or in the prior possession of the disclosing Party merely because it is embraced by more general information in the public domain or by more general information in the prior possession of the Party.

21.3 Nothing herein shall be construed as giving a Party any right, title, interest in, or ownership of information, or any portion thereof, that is now or is hereafter covered by any patent or license. The Parties' rights in respect thereof shall be subject to all rights of the patent owner and/or licensor.

21.4 A Party shall not be restricted in releasing information in response to a subpoena, court order, or similar legal process, but shall, if not restricted under a subpoena, court order, or similar legal process, promptly notify each other Party of the request or order for information before responding to same and provide each other Party with a copy thereof so that each other Party may take such action as it deems appropriate to protect its information.

21.5 Except as otherwise provided herein or in the Contract, engineering documents, drawings, and specifications prepared by a Party as part of the Services, Work, or both, shall be the property of the Party preparing same. A Party shall retain all right, title, and interest in its standard drawings and details, designs, specifications, databases, computer software and any other proprietary property ("Party Data"). To the extent the work product contains or requires the use of Party Data by any other Party, the owning Party hereby grants to the other Party(ies) a non-exclusive, non-transferrable and royalty free license to use such Party Data solely for the purposes for which the work product was developed under the Contract.

21.6 The confidentiality obligations provided in this Article 21 shall survive the termination or expiration of this Agreement and remain binding upon the Parties for two (2) years following the termination of this Agreement or completion of the Contract, whichever is later.

21.7 No news release, including photographs and films, public announcement, denial, or confirmation shall be made by a Party concerning the subject matter of this Agreement without first obtaining the consent of each other Party and, if applicable, the Owner.

Article 22: Applicable Law

This Agreement shall be governed and construed in accordance with the laws of the State of Texas, without reference to its conflict of laws principles.

Article 23: Miscellaneous

23.1 Records; Generally. Each Party agrees to keep accurate and complete cost, correspondence, and other records related to this Agreement. Each Party further agrees to make such records available to each other Party upon ten (10) calendar days' written notice. The joint venture parties agree to maintain records showing the subcontractor/supplier awards, subcontractor payment history, efforts to identify and award contracts to M/WBEs, and copies of executed contracts with M/WBEs. The joint venture parties agree to provide access to books, records and accounts to authorized district, state and federal officials for the purpose of verifying M/WBE participation and good faith efforts.

23.2 Financial Records.

23.2.1 All financial records and proprietary or confidential information of each Party to which the Joint Venture or the other Party(ies) has/have access shall be held and retained by the Joint Venture and such other Party(ies) in strict confidence and not be disclosed without the prior written consent of the Party to whom such records or information belong.

23.3 Other Business Activities. During the term of this Joint Venture, each of the Parties may, and shall be free to, participate and engage in any other business activities, subject to any applicable organizational and personal conflict of interest rules or regulations. Nothing in this Agreement shall restrict, or be construed as a limitation of the powers or rights of any Party hereto to pursue other unrelated opportunities or Projects at the District or enter into other joint venture arrangements for its sole benefit independent of the solicitation the subject of this Agreement.

23.4 Notice. Any notice required or permitted to be given under this Agreement shall be deemed served if sent by registered mail, personal delivery, or other means whereby receipt is acknowledged to the following addresses or such other addresses as the Parties may designate:

For _____ _____
_____
Attention: _____
Telephone: _____

For _____: _____
_____
Attention: _____
Telephone: _____

For _____: _____
_____
Attention: _____
Telephone: _____

23.5 Waiver of Consequential Damages. No Party shall be liable to the other Parties for any special, indirect, punitive, exemplary, incidental, or consequential damages of any nature, including loss of actual or anticipated profits or revenues, loss of opportunity, loss by reason of shutdown, non-operation, increased expense of manufacturing or operation, loss of use, cost of capital, damage to or loss of property or equipment, or claims of customers, regardless of whether due to or based upon contract, tort, negligence, or strict liability. The foregoing limitation of liability shall not apply to third party claims for which a Party is otherwise entitled to indemnity under this Agreement.

23.6 Nothing in this Agreement shall be deemed to create any right in anyone not a party and this Agreement shall not be construed in any respect to be a contract in whole or in part for the benefit of anyone not a party.

23.7 Counterparts. This Agreement may be executed in one or more counterparts, each of which will be deemed to be an original copy of this Agreement and all of which, when taken together, will be deemed to constitute one and the same agreement.

23.8. Recruitment of Employees. The Parties acknowledge the value of team performance and trust, both of which could be adversely impacted by movement of employees from one Party to another Party. Accordingly, the Parties agree that they will not initiate efforts aimed at hiring the other Parties personnel that are actively engaged in activities covered by this Agreement without prior consent of the other Party. Should an employee of one Party become an employee of another Party, that individual shall be barred from working on activities covered by the Agreement for a period of not less than twenty-four (24) months. The Management Committee may waive the 24-month period at its discretion. This section shall not restrict

the right of a Party to solicit generally in the media or other sources for required personnel nor prevent the hiring of an employee of one Party who independently seeks employment with another Party without personal solicitation by the other Party.

23.9 Representations, Warranties, and Covenants. Each Party represents, warrants, and covenants to each other Party, as of the Effective Date, as follows:

23.9.1 It is a duly organized and validly existing corporation in good standing under the laws of the state in which it is incorporated or formed; it is duly qualified to do business in each jurisdiction in which the nature of the business transacted by it requires such qualifications; it has all corporate powers as may be required to conduct its business and carry out the transactions contemplated hereby;

23.9.2 The execution and delivery of this Agreement and the performance by it of the transactions contemplated hereby have been duly authorized by all necessary corporate action and this Agreement constitutes a legal, valid, and binding obligation enforceable in accordance with its terms;

23.9.3 It has, and at all times during the term hereof shall maintain, all governmental authorizations necessary to perform its obligations under this Agreement and the Contract; and

23.9.4 There is no action, suit, proceeding, claim, or dispute pending or, to its knowledge, threatened against or affecting it or its assets before any governmental body that is reasonably expected to have a material adverse effect on it or its ability to perform its obligations under this Agreement or the Contract.

23.10 Marketing Efforts. The Parties acknowledge that marketing efforts related to the Contract need to be coordinated by and between the Parties. The Project Manager will be responsible for coordinating any such efforts. All marketing efforts directly associated with the Contract or this Agreement shall be coordinated through the Project Manager, who will decide whether a proposed Owner visit, or other marketing effort is necessary or appropriate.

23.11 Survival. The provisions of this Agreement which by their nature are intended to survive the termination or dissolution of the Joint Venture, including indemnities and any expressed limitations of or releases from liability, shall continue as valid and enforceable obligations of the Parties notwithstanding any such termination or dissolution.

Article 24: Compliance

24.1 Management Systems. Each Party shall use its own management systems to conduct and record its business for the Joint Venture. Such systems shall, at a minimum, include the following components: financial management, accounting, MWBE subcontractor payment tracking, procurement, property control, estimating, and contract administration. All management systems must comply with any applicable Contract requirements.

Article 25: Anti-Bribery and Anti-Corruption Laws

25.1 No Party shall, directly or indirectly, undertake nor cause nor permit to be undertaken any activity that:

25.1.1 is illegal under applicable law or regulation; or

25.1.2 would have the effect of causing the Joint Venture or the Parties or their respective subsidiaries or affiliates to be in violation of the applicable laws or regulations, including the U.S. Foreign Corrupt Practices Act or the UK Bribery Act, as applicable.

25.2 In connection with this Agreement, no Party shall give, offer, promise, or authorize, directly or indirectly, anything of value to:

25.2.1 an official, officer, employee or any other person acting in an official capacity for or on behalf of any government (including any department, agency, or instrumentality thereof), state-owned enterprise, international organization, or any subdivisions, agents or advisors thereto, whether paid or unpaid (any such person referred to collectively as "Official"), including the government(s) of the territories in which work will be performed hereunder;

25.2.2 any person(s) or party(s) while knowing or having reason to know that such thing of value is to be given, offered, or promised to an Official in order to:

25.2.2.1 influence any official act or decision, or;

25.2.2.2 induce an Official to do or omit to do any act in violation of his or her lawful duty, or;

25.2.2.3 induce an Official to use his or her influence to affect or influence a decision or act of any government, instrumentality, or international organization, or;

25.2.2.4 assist the joint venture or the Parties hereto or any other person in obtaining or retaining business for or with, or in directing business to the Parties or any other person, or;

25.2.2.5 obtain or secure an unfair or improper advantage for the joint venture or the Parties in any respect.

25.3 In connection with this Agreement, no Party shall make a contribution or give, offer, promise or authorize, directly or indirectly, anything of value to any political party, official of a political party or candidate for office on behalf of or associated with the joint venture or the Parties or in connection with the purpose of this Agreement or the contract with the Owner.

25.4 In connection with this Agreement, no Party shall engage in any acts of bribery, kickback or other improper inducement, including bribery of a person in the private sector. Without limiting the generality of the foregoing, no Party shall give, offer, promise or authorize, either directly or indirectly, a financial or other advantage to any person to induce a person to perform improperly a relevant function or activity or to reward such improper performance or where the Party knows or believes that the acceptance of the advantage in itself constitutes the improper performance of a relevant function or activity.

25.5 No Party shall subcontract any part of the Services nor retain or engage a consultant to carry out sales or marketing obligations in connection with the scope of this Agreement without obtaining the JV Management Committee's prior written consent. The Joint Venture Management Committee shall have the right, in accordance with this Agreement, to reject a request to engage or retain any such consultant.

25.6 The Parties hereby covenant that neither they nor any of their respective officers, directors, agents or representatives or employees assigned to the Project an employee of the Owner or any governing body having jurisdiction over the Project. The Parties further covenant that no Official, political party official, or candidate for political office is deriving any benefit, directly or indirectly, from this JV Agreement. The Parties agrees to notify the Joint Venture Management Committee immediately of any changes to this covenant.

25.7 In no case shall any Party be obligated to take any action or make any payment to any other Party or anyone else that would cause the Joint Venture or the Parties to suffer a penalty or contravene applicable laws or regulations, including the laws of the territories in which work will be performed and those of the United States.

25.8 Notwithstanding any other provisions of this Agreement, if any Party breaches any of the covenants contained in this section, the other Parties shall have the right to immediately terminate this Agreement without penalty. In such instance, the breaching Party shall indemnify the other Parties and the Joint Venture for any penalties, losses, and expenses resulting from such breach of the provisions of this section.

25.9 Each Party agrees to promptly notify the Management Committee and the other Parties in the event it becomes aware of or discloses any potential violation of Anti-Bribery Laws in connection with this Agreement. In addition, a Party shall be in default of this Agreement if such Party is (i) found to have violated Anti-Bribery Laws by a governmental body empowered to make such a finding, or (ii) the subject of a governmental investigation involving violations of Anti-Bribery Laws in connection with this Agreement and the other Parties (that are not a target of such investigation), in their reasonable discretion, believe that the on-going investigation materially impairs the ability of the Joint Venture to provide the Services, perform the Work, or both, and/or complete the Contract.

[SIGNATURES ON THE FOLLOWING PAGE]

NOTARY REQUIRED

IN WITNESS WHEREOF, the Parties have caused this Agreement to be signed by their duly authorized representatives, in duplicate counterparts, each having the same effect, as of the date and year first above written.

Signature: _____

Name: _____

Title: _____

Date: _____

Signature: _____

Name: _____

Title: _____

Date: _____

Signature: _____

Name: _____

Title: _____

Date: _____

EXHIBIT A

Scope of Services

Identify the distinct, clearly defined portion of the work provided by each M/WBE joint venture partner. The work must be separate, clear and distinguishable. Specify the nature of the work and what it will entail. Describe the portion of the work or elements controlled by the M/WBE joint venture partner. Provide the estimated value of those services commensurate with the percentage ownership interest.

(1) General Description of Work to be Performed by the Joint Venture:

(2) Division of Work and Allocation of Responsibilities:

EXHIBIT B

Project Management Staffing Plan

Provide a staffing plan to be determined per the established participation percentages. Provide information relating to the approximate number of employees that will be required to perform the scope of work. Specify the number of employees to be provided by the M/WBE joint venture partner(s), titles, resumes and job responsibilities.

EXHIBIT C

Letter from Financial Institution or Bonding Surety Company

6.3 Provide documentation to substantiate the financial strength or bonding capacity of each M/WBE joint venture partner(s). This document should be commensurate of each M/WBE joint venture partner(s) percentage split. *Or* Provide an Up-Front Joint Agreement (SAA Form #1), and an executed copy of the indemnity agreement signed by all Parties associated with the SAA Form #1.

STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

A101

DRAFT

AIA® Document A101™ – 2017 Exhibit A

Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the « » day of « » in the year « 2022 »
(In words, indicate day, month and year.)

for the following **PROJECT**:
(Name and location or address)

« »
« »

THE OWNER:
(Name, legal status and address)

«Dallas Independent School District, a political subdivision of the State of Texas »
«9400 North Central Expressway »
«Dallas, Texas 75231 »

THE CONTRACTOR:
(Name, legal status and address)

« »
« »
« »

The Architect:
(Name, legal status, address and other information)

« »
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TABLE OF ARTICLES

A.1 GENERAL

A.2 OWNER'S INSURANCE

A.3 CONTRACTOR'S INSURANCE AND BONDS

A.4 SPECIAL TERMS AND CONDITIONS

Version 10/27/2022

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Document A201™–2017, General Conditions of the Contract for Construction. Article 11 of A201™–2017 contains additional insurance provisions.

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ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A201™–2017, General Conditions of the Contract for Construction.

ARTICLE A.2 OWNER'S INSURANCE

§ A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

§ A.2.2 Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual general liability insurance.

§ A.2.3 Required Property Insurance

§ A.2.3.1 Contractor shall provide builder's risk insurance as required in A.3.3.2.1.

§ A.2.3.1.1 -

*(**NOT USED** Indicate below the cause of loss and any applicable sub-limit.)*

Causes of Loss	Sub-Limit
«N/A »	

§ A.2.3.1.2

*(**NOT USED** Indicate below type of coverage and any applicable sub-limit for specific required coverages.)*

Coverage	Sub-Limit
«N/A »	

§ A.2.3.1.3

§ A.2.3.1.4

§ A.2.3.2 Occupancy or Use Prior to Substantial Completion. The Owner's occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section A.3.3.2.1 have consented in writing to continuance or replacement of coverage. The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

§ A.2.3.3 Insurance for Existing Structures

If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner may purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage from the causes of loss identified in Section A.3.3.2, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

§ A.2.4

*(**NOT USED** Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. For each type of insurance selected, indicate applicable limits of coverage or other conditions in the fill point below the selected item.)*

[« »] **§ A.2.4.1**

« »

[« »] **§ A.2.4.2**

« »

[« »] **§ A.2.4.3**

« »

[« »] **§ A.2.4.4**

« »

[« »] **§ A.2.4.5**

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[« »] **§ A.2.4.6**

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[« »] **§ A.2.4.7**

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§ A.2.5 Other Optional Insurance.

The Owner may purchase and maintain the insurance selected below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance.)

[« »] **§ A.2.5.1 Cyber Security Insurance** for loss to the Owner due to data security and privacy breach, including costs of investigating a potential or actual breach of confidential or private information. *(Indicate applicable limits of coverage or other conditions in the fill point below.)*

« »

[« »] **§ A.2.5.2 Other Insurance**

(List below any other insurance coverage to be provided by the Owner and any applicable limits.)

Coverage	**Limits**
« »	

ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS

§ A.3.1 General

§ A.3.1.1 Certificates of Insurance. The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) at least five business days after execution of the Contract documents and prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner as an additional insured on all of Contractor's insurance policies, except Contractor's workers compensation insurance. These certificates and the insurance policies required by this Article shall contain a provision that coverages afforded under the policies will not be canceled, reduced, or restricted for any reason, other than nonpayment of premium, until at least 30 days' prior written notice of such cancellation, reduction, or restriction has been given to the Owner and Contractor. An additional certificate, policy, and endorsement evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 of the AIA A201-2017 General Conditions as amended for the Project, and thereafter upon renewal or replacement of such coverage. Information concerning reduction or restriction of

coverage on account of revised limits or claims paid under the General Aggregate, or cancellation or expiration of the insurance shall be furnished by written notice to the Owner from the Contractor within three business days of the date Contractor knew or should have known of the cancellation, reduction, or restriction. At least 30 calendar days prior to the date of expiration of any required insurance policy. Contractor shall provide Owner written notice of the impending expiration. In addition, Contractor shall also provide copies of all policies, declarations, and endorsements for such insurance to Owner as required by Section 11.0.2 of the 2017 AIA A201 General Conditions as amended for this Project.

§ A.3.1.2 Deductibles and Self-Insured Retentions. The Contractor shall disclose to the Owner any deductible or self-insured retentions applicable to any insurance required to be provided by the Contractor. If the insurance required by this Section A.3.1 is subject to deductibles or self-insured retentions, the Contractor shall be responsible for all loss not covered because of such deductibles or retentions. For any claim made against the Contractor's policies of insurance, the deducible shall not exceed $2,500 for Contract Sum (or Guaranteed Maximum Price, if the Project is a Construction Manager at Risk project) of less than $4 million. For a Contract Sum (or Guaranteed Maximum Price, if the Project is a Construction Manager at Risk project), of $4 million or more, the deductible shall not exceed $5,000.

§ A.3.1.3 Additional Insured Obligations. To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage and any other insurance required by the Agreement, with the exception of Workers' Compensation insurance, to be endorsed to include (1) the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, CG 20 32 07 04.

§ A.3.2 Contractor's Required Insurance Coverage

§ A.3.2.1 The Contractor and the Contractor's subcontractors shall purchase and maintain such insurance as will protect them and the Owner from claims which may arise out of, or result from, the Contractor's operations under the Contract whether such operations be by Contractor or by any Subcontractor, or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them maybe liable, in the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. *(See also the insurance requirements included in Article 11 of the AIA A201-2017 General Conditions as amended for this Project).* The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions.

*(**DO NOT USE** If the Contractor is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)*

The insurance required by this Section shall be written for not less than the limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents. The limits of liability for such insurance shall be in at least the following amounts as specified below.

*(NOTE: Amounts of insurance coverage have been left blank so that Districts can enter the appropriate amounts for their Projects. **DO NOT LEAVE ANY BLANK UNFILLED IF THAT COVERAGE IS REQUIRED OR CHOSEN FOR THE PROJECT**. If a particular coverage will not be used for the Project, delete the unused section. If the District has questions on the appropriate amounts or types of coverage, it is strongly suggested that the District contact its legal counsel and insurance agent.)*

« »

§ A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than « One Million Dollars and no/100» ($ « 1,000,000 ») each occurrence, « Two Million Dollars and no/100 » ($ « 2,000,000 ») general aggregate, and « Two Million Dollars and no/100 » ($ « 2,000,000 ») aggregate for products-completed operations hazard, providing coverage for claims including

.1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person, with a sublimit not less than $5,000 for medical expenses per person for bodily injury, included within the limits noted above;

.2 personal injury and advertising injury with a limit not less than $1,000,000, $2,000,000 aggregate;

.3 damages because of physical damage to or destruction of tangible property, including the loss of use of such property;

.4 bodily injury or property damage arising out of the Work and out of completed operations, said coverage to be maintained for two years after Final Completion (to be maintained for a period of two years after Final Payment; Contractor shall continue to provide evidence of such coverage to Owner on an annual basis during this period and Owner shall be named by endorsement as an Additional Insured for such coverage) and must include Completed Operations coverage for Contractor, its sub-contractors, and Owner;

.5 the Contractor's contractual liability, including but not limited to, indemnity obligations under Section 3.18 of the General Conditions; and

.6 General Aggregate per Project endorsement.

§ A.3.2.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

.1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.

.2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.

.3 Claims for bodily injury other than to employees of the insured.

.4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.

.5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.

.6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.

.7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.

.8 Claims related to roofing, if the Work involves roofing.

.9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.

.10 Claims related to earth subsidence or movement, where the Work involves such hazards.

.11 Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.

A.3.2.2.3 Coverage will include:

Independent Contractors
Premise operations
Defense costs in addition to the limits
X, C, and U coverage
Broad form property damage including products/completed operations.

Contractual Liability sufficient to cover indemnity requirements in Section 3.18.1, subject to, policy terms and conditions

Contractor's Professional Liability endorsement CG 22 79 or equivalent (policy shall not contain a professional liability exclusion for "means and methods")

Additional insured, primary and non-contributing

If the additional insured endorsement maintained by the Contractor does not include completed operations coverage then the Contractor must purchase this coverage using form CG-20-37 (latest edition) or an equivalent form providing additional insureds with coverage for "completed operations".

Waiver of subrogation in favor of Owner, Program Manager and Architect

A standard ISO CGL 2001 occurrence coverage form or equivalent
No modification or restriction of the standard ISO CGL coverage form Paragraph I – "damage to your work" exclusion. The "subcontractor exception" will not be removed via CG 22 94.
If there is work within fifty (50) feet of a railroad, endorse with CG 2417.

§ A.3.2.3 Automobile Liability covering vehicles owned, and non-owned, hired, or any other vehicles used, by the Contractor, with policy limits of not less than « » ($ « ») than those stated below per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage. (*Note: Texas statutory minimum for school districts is $100,000 per person, $300,000 per occurrence, and $100,000 property damage.)* Such minimum limits shall be stated as follows, or in a combined single limit policy in the amount of at least $1,000,000.

.1	Bodily Injury (per person)	$300,000
.2	Bodily Injury (per accident)	$300,000
.3	Property Damage	$300,000

Business Automobile Liability (including owned, non-owned, hired, or borrowed vehicles);

Combined single limit $300,000

Coverage will include:
Contractual Liability
Additional insured, primary and non-contributing
Waiver of subrogation in favor of Owner, Program manager, and Architect
Pollution liability which includes upset, overturn, and collision
Motor Carrier Act Endorsement (MCS 90), if applicable.

§ A.3.2.4 The Contractor may not achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance In no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

A.3.2.4.1 Umbrella Excess Liability coverages shall be in at least the following amounts:

.1	$	each occurrence
.2	$	aggregate
.3	Aggregate Per Project Endorsement	

Limits as follows:

If Contract Sum is $1,000,000 or less
$1,000,000 each occurrence and $2,000,000 annual aggregate

If Contract Sum is greater than $1,000,000 up to $5,000,000
$5,000,000 each occurrence and annual aggregate

If Contract Sum is greater than $5,000,000 up to $10,000,000
$10,000,000 each occurrence and annual aggregate

If Contract Sum is greater than $10,000,000 to $25,000,000
$25,000,000 each occurrence and annual aggregate

If Contract Sum is greater than $25,000,000
$50,000,000 each occurrence and annual aggregate

Coverage will include:
Occurrence based form

Follow form of the primary coverage (commercial general liability, employer's liability, auto liability) except for per project aggregate
Pay on behalf wording
Completed Operations
Waiver of subrogation to follow form of the primary
Additional insured to follow form of the primary
Annual aggregate limit
A drop down feature

§ A.3.2.5 Workers' Compensation .

.1	State:	Statutory Benefits
.2	Employer's Liability	$500,000 per accident $500,000 disease, policy limit $ 500,000 disease, each employee

Coverage will include:

Waiver of subrogation in favor of Owner, Program Manager and Architect
Alternate Employers Endorsement, if applicable
Voluntary Compensation endorsement
All States coverage on an "if any" basis

A.3.2.5.1 Texas Workers' Compensation Insurance. A copy of a certificate of insurance, a certificate of authority to self-insure issued by the Texas Department of Insurance (TDI), or a coverage agreement (DWC-81, DWC-82, DWC-83, or DWC-84), showing statutory worker's compensation insurance coverage for the Contractor's employees providing services on a Project is required for the duration of the Project.

A.3.2.5.1.1 Duration of the Project include the time from the beginning of the Work on the project until the Contractor's Work on the Project has been completed and accepted by the Owner.

A.3.2.5.1.2 Persons providing services on the Project ("subcontractor" in Texas Labor Code Section 406.096) include all persons or entities performing all or part of the services the Contractor has undertaken to perform on the Project, regardless of whether that person has employees. This includes, without limitation, independent contractors, subcontractors, leasing companies, motor carriers, owner-operations, employees of any such entity, or employees of any entity that furnishes persons to provide services on the Project.

A.3.2.5.1.3 Services include, without limitation, providing, hauling or delivering equipment or materials, or providing labor, transportation, or other services related to the Project. Services do not include activities unrelated to the Project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

A.3.2.5.1.4 The Contractor shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code 401.011(44) for all employees of the Contractor providing services on the Project for the duration of the Project.

A.3.2.5.1.5 The Contractor must provide a certificate of coverage to the Owner prior to being awarded the Contract.

A.3.2.5.1.6 If the coverage period shown on the Contractor's current certificate of coverage ends during the duration of the Project, the Contractor must, prior to the end of the coverage period, file a new certificate of coverage with the Owner showing that coverage has been extended.

A.3.2.5.1.7 The Contractor shall obtain from each person providing services on the Project, and provide to the Owner:

.1 A certificate of coverage, prior to that person beginning work on the Project, so the Owner will have, on file, certificates of coverage showing coverage for all persons providing services on the Project; and

.2 No later than seven days after receipt by the Contractor, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the Project.

A.3.2.5.1.8 The Contractor shall retain all required certificates of coverage for the duration of the Project and for one year thereafter.

A.3.2.5.1.9 The Contractor shall notify the Owner, in writing by certified mail or personal delivery, within ten (10) days after Contractor knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project.

A.3.2.5.1.10 The Contractor shall post on each Project site a notice, in the text form and manner prescribed by the TDI, informing all persons providing services on the Project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.

A.3.2.5.1.11 The Contractor shall contractually require each person with whom it contracts to provide services on the Project to:

.1 Provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the stator requirements of Texas Labor Code 401.011(44) for all of its employees providing services on the Project for the duration of the Project:

.2 Provide to the Contractor, prior to that person beginning work on the Project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the project for the duration of the Project;

.3 Provide the Contractor, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the Project;

.4 Obtain from each other person with who it contracts, and provide to the Contractor:

.1 A certificate of coverage, prior to the other person beginning work on the Project; and
.2 A new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the Project.

.5 Retain all required certificates of coverage on file for the duration of the Project and for one year thereafter;

.6 Notify the Owner in writing by certified mail or persona delivery, within ten (10) days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project; and

.7 Contractually require each person with whom it contracts to perform as required by items 1 - 6, with the certificates of coverage to be provided to the person for whom they are providing services.

A.3.2.5.1.12 By signing this Contract or providing or causing to be provided a certificate of coverage, the Contractor is representing to the Owner that all employees of the Contractor who will provide services on the Project will be covered by worker's compensation coverage for the duration of the Project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier, or, in the case of a self-insured, with the TDI's Division of Self-Insurance Regulation. Providing false or misleading information may subject the Contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.

A.3.2.5.1.13 The Contractor's failure to comply with any of these provisions is a breach of contract by the Contractor that entitles the Owner to declare the Contract void if the Contractor does not remedy the breach within ten (10) days after receipt of notice of breach from the Owner.

A.3.2.5.1.14 The coverage requirement recited above does not apply to sole proprietors, partners, and corporate officers who are excluded from coverage in an insurance policy or certificate of authority to self-insure that is delivered, issued or delivery, or renewed on or after January 1, 1996.

28 TAC § 110.110(i).

§ A.3.2.6 Employers' Liability with policy limits not less than « Five Hundred Thousand Dollars and no/100» ($ « 500,000 ») each accident, « Five Hundred Thousand Dollars and no/100 » ($ « 500,000 ») each employee, and « Five Hundred Thousand Dollars and no/100» ($ « 500,000») policy limit.

§ A.3.2.7

§ A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than « One Million Dollars and no/100 » ($ « 1,000,000 ») per claim and « One MIllion Dollars and no/100 » ($ « 1,000,000 ») in the aggregate. Contractor's Professional Liability, if applicable:

If the Work performed by the Contractor or its subcontractors will include some responsibility for design, the Contractor will purchase or cause to be purchased and maintained a professional liability policy. The limits of coverage will not be less than:

Coverage will include:

A waiver of subrogation in favor of Owner, Program Manager and Architect
A retroactive date that is the earlier of the start of design or the Work
Coverage for negligent acts, errors or omissions arising out of design or engineering services
An extended reporting period of 5 years after final completion

§ A.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than « Three Million Dollars and no/100 » ($ « 3,000,000 ») per claim and « Three Million Dollars and no/100 » ($ « 3,000,000 ») in the aggregate

Contractors Pollution Liability, if applicable Contractor will purchase a policy covering third-party bodily injury, property damage, and loss of use claims, including clean-up costs, as a result of pollution conditions arising from contractor's operations and completed operations. Completed operations coverage will remain in effect through annual renewal for no less than 5 years after final completion of the Work. The limits of coverage will be not less than:

Coverage will include:

Mold and other fungi and bacteria
No exclusion for EIFS, if applicable
Additional insured, primary and non-contributing
A waiver of subrogation in favor of Owner, Program Manager and Architect
A retroactive date no later than the start of the Work, if applicable.
Occurrence form, if available.

§ A.3.2.10 Coverage under Sections A.3.2.8 and A.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than « Four Million Dollars and no/100 » ($ « 4,000,000 ») per claim and « Four Million Dollars and no/100 » ($ « 4,000,000 ») in the aggregate.

§ A.3.2.11 « » ($ « ») « » ($ « »)

§ A.3.2.12 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than « Ten Million Dollars and no/100 » ($ « 10,000,000 ») per claim and « Ten Million Dollars and no/100 » ($ « 10,000,000 ») in the aggregate.

§ A.3.3 Contractor's Other Insurance Coverage

§ A.3.3.1 Insurance selected and described in this Section A.3.3 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

(If the Contractor is required to maintain any of the types of insurance selected below for a duration other than the expiration of the period for correction of Work, state the duration.)

« »

§ A.3.3.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.3.1.

(Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.)

[« X »] **§ A.3.3.2.1** Builder's Risk Property insurance in the amount of the Contract Sum which, if selected in this section A.3.3.2.1, relieves the Owner of the responsibility to purchase and maintain such insurance except insurance required by Section A.2.3.1.3 and Section A.2.3.3. The Contractor shall disclose to the Owner the amount of any deductible, and the Contractor shall be responsible for losses within the deductible. The Contractor shall provide the Owner with a copy of the property insurance policy or policies required. The Owner shall adjust and settle the loss with the insurer and be the trustee of the proceeds of the property insurance in accordance with Article 11 of the General Conditions unless otherwise set forth below:

(DO NOT USE) *Where the Contractor's obligation to provide property insurance differs from the Owner's obligations as described under Section A.2.3, indicate such differences in the space below. Additionally, if a party other than the Owner will be responsible for adjusting and settling a loss with the insurer and acting as the trustee of the proceeds of property insurance in accordance with Article 11 of the General Conditions, indicate the responsible party below.)*

.1 **Builder's Risk.** Unless otherwise provided, Contractor shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the state of Texas, a property insurance written on builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis, including boiler and machinery insurance, Coverage, if not included in the base coverage, shall include coverage against the perils of fire, (with extended coverage) and physical loss or damage including, without limitation or duplication of coverage, lightning, collapse, earthquake, flood, wind storm, hurricane, hail, explosion, riot, civil commotion, smoke, aircraft, land vehicles, theft, vandalism, malicious mischief, falsework, testing and start-up, temporary buildings, debris removal including demolition occasioned by enforcement of any applicable legal requirements, and all other perils, and shall include materials stored on-site, off-site, and in transit. The Contractor's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Final Completion, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees. Such coverage shall be primary coverage.

.2 **Causes of Loss.** The insurance required by this Section A.3.3.2.1 shall provide coverage for direct physical loss or damage, and shall not exclude the risks of fire, explosion, theft, vandalism, malicious mischief, collapse, earthquake, flood, or windstorm. The insurance shall also provide coverage for ensuing loss or resulting damage from error, omission, or deficiency in construction methods, design, specifications, workmanship, or materials. Sub-limits, if any, are as follows:

(*Indicate below the cause of loss and any applicable sub-limit.*)

.3 Causes of Loss Sub-Limit. Specific Required Coverages. The insurance required by this Section A.3.3.2.1 shall provide coverage for loss or damage to falsework and other temporary structures, and to building systems from testing and startup. The insurance shall also cover debris removal, including demolition, occasioned by enforcement of any applicable legal requirements, and reasonable compensation for the Architect's and Contractor's services and expenses required as a result of such insured loss, including claim preparation expenses. Sub-limits, if any, are as follows: (*Indicate below type of coverage and any applicable sub-limit for specific required coverages.*)

.4 Adjustment of Loss. The Owner, as a fiduciary, shall have power to adjust and settle any loss arising out of the Work, with insured, regardless of the purchaser of the insurance policy. The Contractor, upon receipt of proceeds, shall as fiduciary, pay all subcontractors their just shares of insurance proceeds received by the Contractor, and, by appropriate agreements, shall require subcontractors to make payment to their sub-subcontractors in similar manner. The Owner shall deposit, in a separate account, proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, then replacement of damaged property shall be performed by the Contractor with the insurance proceeds upon issuance of a Notice to Proceeds from the Owner.

.5 Occupancy or Use Prior to Substantial Completion. The Owner's occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section A.3.3.2.1 have consented, in writing, to the continuance of coverage. The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

.6 Employee Theft or Dishonesty. If this Builder's Risk policy excludes Employee Theft or Dishonesty coverage, including Third Parties, Contractor shall obtain separate coverage sufficient to protect Owner's interest and in an amount agreeable to Owner.

.7 Cancellation. The insurance policies required by this Section A.3.3.2 shall contain a provision that coverages afforded under the policies will not be canceled for any reason, other than nonpayment of premium, or reduced or restricted due to a material change in coverage until at least 30 days prior written notice of such cancellation or material change has been given to the Owner. Contractor shall provide Owner 30 days prior written notice of the expiration of any policy required by Section A.3.1.1.

.8 Construction Manager at Risk. If Contractor is a Construction Manager at Risk. Then, as specified in each AIA A133 Exhibit A Amendment, the amount of Builder's Risk insurance coverage shall be an amount equal to the Guaranteed Maximum Price; otherwise, in the total amount of the Contract Sum.

.9 Deductibles. For any claim made against the builder's risk insurance, the deductible shall not exceed $2,500 for a Contract Sum (or Guaranteed Maximum Price, if the Project is a Construction Manager at Risk project), of less than $4 million. For a Contract Sum (or Guaranteed Maximum Price, if the project is a Construction Manager at Risk project), of $4 million or more, the deductible shall not exceed $5,000. Contractor shall be responsible for losses within such deductible amounts.

« »

[« »] **§ A.3.3.2.2** « » ($ « ») « » ($ « »)

[« »] **§ A.3.3.2.3** « » ($ « ») « » ($ « »)

[« »] **§ A.3.3.2.4** Insurance for physical damage to property while it is in storage and in transit to the

construction site on an "all-risks" completed value form.

[« »] **§ A.3.3.2.5**

[« »] **§ A.3.3.2.6 Other Insurance**
(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

Coverage	**Limits**
« »	

§ A.3.4 Performance Bond and Payment Bond
The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, subject to the requirements of A201-2017, Article 11.1.2.1, as follows:
(Specify type and penal sum of bonds.)

Type	Penal Sum ($0.00)
Payment Bond	«$ or 100% of the Contract Sum as amended
Performance Bond	$ or 100% of the Contract Sum as amended»

The form of Payment and Performance Bonds shall be subject to the requirements of Texas law, current as of the date of this Agreement.

ARTICLE A.4 SPECIAL TERMS AND CONDITIONS
Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:

« See A201-2017, Article 11 »

This Agreement entered into as of the day and year first written above.

_____	_____
OWNER	CONTRACTOR
Dallas Independent School District	

GENERAL AND SUPPLEMENTARY CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

A201

DRAFT

AIA® Document A201™ – 2017

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)

BP# XXX: ORG #XXX XX Elementary School
School Address
Dallas, Texas 75XXX

THE OWNER:
(Name, legal status and address)

The Dallas Independent School District, a political subdivision of the State of Texas
9400 North Central Expressway
Dallas, Texas 75231

THE PROGRAM MANAGER:
(Name, legal status and address)

PMF Name
PMF Address
PMF City/State/Zip
«»«»
«»

THE ARCHITECT:
(Name, legal status and address)

A/E Name
A/E Address
A/E City/State/Zip

TABLE OF ARTICLES

1 GENERAL PROVISIONS

2 OWNER

3 CONTRACTOR

4 ARCHITECT ADMINISTRATION OF THE CONTRACT

5 SUBCONTRACTORS

6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

7 CHANGES IN THE WORK

8 TIME

9 PAYMENTS AND COMPLETION

10 PROTECTION OF PERSONS AND PROPERTY

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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11 INSURANCE AND BONDS

12 UNCOVERING AND CORRECTION OF WORK

13 MISCELLANEOUS PROVISIONS

14 TERMINATION OR SUSPENSION OF THE CONTRACT

15 CLAIMS AND DISPUTES

Version 10/27/2022

INDEX
(Topics and numbers in bold are Section headings.)

Acceptance of Nonconforming Work
9.6.6, 9.9.3, **12.3**
Acceptance of Work
9.6.6, 9.8.2, 9.9.3, 9.10.1, 9.10.3, 12.3
Access to Work
3.16, 6.2.1, 12.1
Accident Prevention
10
Acts and Omissions
3.2, 3.3.2, 3.12.8, 3.18, 4.2.3, 8.3.1, 9.5.1, 10.2.5, 10.2.8, 13.3.2, 14.1, 15.1.2, 15.2
Addenda
1.1.1
Additional Costs, Claims for
3.7.4, 3.7.5, 10.3.2, 15.1.5
Additional Inspections and Testing
9.4.2, 9.8.3, 12.2.1, **13.4**
Additional Time, Claims for
3.2.4, 3.7.4, 3.7.5, 3.10.2, 8.3.2, **15.1.6**
Administration of the Contract
3.1.3, **4.2**, 9.4, 9.5
Advertisement or Invitation to Bid
1.1.1
Aesthetic Effect
4.2.13
Allowances
3.8
Applications for Payment
4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5.1, 9.5.4, 9.6.3, 9.7, 9.10
Approvals
2.1.1, 2.3.1, 2.5, 3.1.3, 3.10.2, 3.12.8, 3.12.9, 3.12.10.1, 4.2.7, 9.3.2, 13.4.1
Arbitration
8.3.1, 15.3.2, **15.4**
ARCHITECT
4
Architect, Definition of
4.1.1
Architect, Extent of Authority
2.5, 3.12.7, 4.1.2, 4.2, 5.2, 6.3, 7.1.2, 7.3.4, 7.4, 9.2, 9.3.1, 9.4, 9.5, 9.6.3, 9.8, 9.10.1, 9.10.3, 12.1, 12.2.1, 13.4.1, 13.4.2, 14.2.2, 14.2.4, 15.1.4, 15.2.1
Architect, Limitations of Authority and Responsibility
2.1.1, 3.12.4, 3.12.8, 3.12.10, 4.1.2, 4.2.1, 4.2.2, 4.2.3, 4.2.6, 4.2.7, 4.2.10, 4.2.12, 4.2.13, 5.2.1, 7.4, 9.4.2, 9.5.4, 9.6.4, 15.1.4, 15.2
Architect's Additional Services and Expenses
2.5, 12.2.1, 13.4.2, 13.4.3, 14.2.4
Architect's Administration of the Contract
3.1.3, 3.7.4, 15.2, 9.4.1, 9.5
Architect's Approvals
2.5, 3.1.3, 3.5, 3.10.2, 4.2.7
Architect's Authority to Reject Work
3.5, 4.2.6, 12.1.2, 12.2.1
Architect's Copyright
1.1.7, 1.5
Architect's Decisions
3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 4.2.14, 6.3, 7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4.1, 9.5, 9.8.4, 9.9.1, 13.4.2, 15.2
Architect's Inspections
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 13.4
Architect's Instructions
3.2.4, 3.3.1, 4.2.6, 4.2.7, 13.4.2
Architect's Interpretations
4.2.11, 4.2.12
Architect's Project Representative
4.2.10
Architect's Relationship with Contractor
1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5, 3.7.4, 3.7.5, 3.9.2, 3.9.3, 3.10, 3.11, 3.12, 3.16, 3.18, 4.1.2, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.3.2, 13.4, 15.2
Architect's Relationship with Subcontractors
1.1.2, 4.2.3, 4.2.4, 4.2.6, 9.6.3, 9.6.4, 11.3
Architect's Representations
9.4.2, 9.5.1, 9.10.1
Architect's Site Visits
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4
Asbestos
10.3.1
Attorneys' Fees
3.18.1, 9.6.8, 9.10.2, 10.3.3
Award of Separate Contracts
6.1.1, 6.1.2
Award of Subcontracts and Other Contracts for Portions of the Work
5.2
Basic Definitions
1.1
Bidding Requirements
1.1.1
Binding Dispute Resolution
8.3.1, 9.7, 11.5, 13.1, 15.1.2, 15.1.3, 15.2.1, 15.2.5, 15.2.6.1, 15.3.1, 15.3.2, 15.3.3, 15.4.1
Bonds, Lien
7.3.4.4, 9.6.8, 9.10.2, 9.10.3
Bonds, Performance, and Payment
7.3.4.4, 9.6.7, 9.10.3, **11.1.2**, 11.1.3, **11.5**
Building Information Models Use and Reliance
1.8
Building Permit
3.7.1
Capitalization
1.3
Certificate of Substantial Completion
9.8.3, 9.8.4, 9.8.5
Certificates for Payment
4.2.1, 4.2.5, 4.2.9, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 14.1.1.3, 14.2.4, 15.1.4

Certificates of Inspection, Testing or Approval
13.4.4
Certificates of Insurance
9.10.2
Change Orders
1.1.1, 3.4.2, 3.7.4, 3.8.2.3, 3.11, 3.12.8, 4.2.8, 5.2.3, 7.1.2, 7.1.3, **7.2**, 7.3.2, 7.3.7, 7.3.9, 7.3.10, 8.3.1, 9.3.1.1, 9.10.3, 10.3.2, 11.2, 11.5, 12.1.2
Change Orders, Definition of
7.2.1
CHANGES IN THE WORK
2.2.2, 3.11, 4.2.8, **7**, 7.2.1, 7.3.1, 7.4, 8.3.1, 9.3.1.1, 11.5
Claims, Definition of
15.1.1
Claims, Notice of
1.6.2, 15.1.3
CLAIMS AND DISPUTES
3.2.4, 6.1.1, 6.3, 7.3.9, 9.3.3, 9.10.4, 10.3.3, **15**, 15.4
Claims and Timely Assertion of Claims
15.4.1
Claims for Additional Cost
3.2.4, 3.3.1, 3.7.4, 7.3.9, 9.5.2, 10.2.5, 10.3.2, **15.1.5**
Claims for Additional Time
3.2.4, 3.3.1, 3.7.4, 6.1.1, 8.3.2, 9.5.2, 10.3.2, **15.1.6**
Concealed or Unknown Conditions, Claims for
3.7.4
Claims for Damages
3.2.4, 3.18, 8.3.3, 9.5.1, 9.6.7, 10.2.5, 10.3.3, 11.3, 11.3.2, 14.2.4, 15.1.7
Claims Subject to Arbitration
15.4.1
Cleaning Up
3.15, 6.3
Commencement of the Work, Conditions Relating to
2.2.1, 3.2.2, 3.4.1, 3.7.1, 3.10.1, 3.12.6, 5.2.1, 5.2.3, 6.2.2, 8.1.2, 8.2.2, 8.3.1, 11.1, 11.2, **15.1.5**
Commencement of the Work, Definition of
8.1.2
Communications
3.9.1, **4.2.4**
Completion, Conditions Relating to
3.4.1, 3.11, 3.15, 4.2.2, 4.2.9, 8.2, 9.4.2, 9.8, 9.9.1, 9.10, 12.2, 14.1.2, 15.1.2
COMPLETION, PAYMENTS AND
9
Completion, Substantial
3.10.1, 4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1, 9.10.3, 12.2, 15.1.2
Compliance with Laws
2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 10.2.2, 13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14.1.1, 14.2.1.3, 15.2.8, 15.4.2, 15.4.3
Concealed or Unknown Conditions
3.7.4, 4.2.8, 8.3.1, 10.3
Conditions of the Contract
1.1.1, 6.1.1, 6.1.4
Consent, Written
3.4.2, 3.14.2, 4.1.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3, 13.2, 15.4.4.2
Consolidation or Joinder
15.4.4
CONSTRUCTION BY OWNER OR BY
SEPARATE CONTRACTORS
1.1.4, **6**
Construction Change Directive, Definition of
7.3.1
Construction Change Directives
1.1.1, 3.4.2, 3.11, 3.12.8, 4.2.8, 7.1.1, 7.1.2, 7.1.3, **7.3**, 9.3.1.1
Construction Schedules, Contractor's
3.10, 3.11, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2
Contingent Assignment of Subcontracts
5.4, 14.2.2.2
Continuing Contract Performance
15.1.4
Contract, Definition of
1.1.2
CONTRACT, TERMINATION OR
SUSPENSION OF THE
5.4.1.1, 5.4.2, 11.5, **14**
Contract Administration
3.1.3, 4, 9.4, 9.5
Contract Award and Execution, Conditions Relating to
3.7.1, 3.10, 5.2, 6.1
Contract Documents, Copies Furnished and Use of
1.5.2, 2.3.6, 5.3
Contract Documents, Definition of
1.1.1
Contract Sum
2.2.2, 2.2.4, 3.7.4, 3.7.5, 3.8, 3.10.2, 5.2.3, 7.3, 7.4, **9.1**, 9.2, 9.4.2, 9.5.1.4, 9.6.7, 9.7, 10.3.2, 11.5, 12.1.2, 12.3, 14.2.4, 14.3.2, 15.1.4.2, **15.1.5, 15.2.5**
Contract Sum, Definition of
9.1
Contract Time
1.1.4, 2.2.1, 2.2.2, 3.7.4, 3.7.5, 3.10.2, 5.2.3, 6.1.5, 7.2.1.3, 7.3.1, 7.3.5, 7.3.6, 7, 7, 7.3.10, 7.4, 8.1.1, 8.2.1, 8.2.3, 8.3.1, 9.5.1, 9.7, 10.3.2, 12.1.1, 12.1.2, 14.3.2, 15.1.4.2, 15.1.6.1, 15.2.5
Contract Time, Definition of
8.1.1
CONTRACTOR
3
Contractor, Definition of
3.1, 6.1.2
Contractor's Construction and Submittal
Schedules
3.10, 3.12.1, 3.12.2, 4.2.3, 6.1.3, 15.1.6.2
Contractor's Employees
2.2.4, 3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3, 11.3, 14.1, 14.2.1.1
Contractor's Liability Insurance
11.1

Contractor's Relationship with Separate Contractors and Owner's Forces
3.12.5, 3.14.2, 4.2.4, 6, 11.3, 12.2.4
Contractor's Relationship with Subcontractors
1.2.2, 2.2.4, 3.3.2, 3.18.1, 3.18.2, 4.2.4, 5, 9.6.2, 9.6.7, 9.10.2, 11.2, 11.3, 11.4
Contractor's Relationship with the Architect
1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5.1, 3.7.4, 3.10, 3.11, 3.12, 3.16, 3.18, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.4, 15.1.3, 15.2.1
Contractor's Representations
3.2.1, 3.2.2, 3.5, 3.12.6, 6.2.2, 8.2.1, 9.3.3, 9.8.2
Contractor's Responsibility for Those Performing the Work
3.3.2, 3.18, 5.3, 6.1.3, 6.2, 9.5.1, 10.2.8
Contractor's Review of Contract Documents
3.2
Contractor's Right to Stop the Work
2.2.2, 9.7
Contractor's Right to Terminate the Contract
14.1
Contractor's Submittals
3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 9.2, 9.3, 9.8.2, 9.8.3, 9.9.1, 9.10.2, 9.10.3
Contractor's Superintendent
3.9, 10.2.6
Contractor's Supervision and Construction Procedures
1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.4, 7.3.6, 8.2, 10, 12, 14, 15.1.4
Coordination and Correlation
1.2, 3.2.1, 3.3.1, 3.10, 3.12.6, 6.1.3, 6.2.1
Copies Furnished of Drawings and Specifications
1.5, 2.3.6, 3.11
Copyrights
1.5, **3.17**
Correction of Work
2.5, 3.7.3, 9.4.2, 9.8.2, 9.8.3, 9.9.1, 12.1.2, **12.2**, 12.3, 15.1.3.1, 15.1.3.2, 15.2.1
Correlation and Intent of the Contract Documents
1.2
Cost, Definition of
7.3.4
Costs
2.5, 3.2.4, 3.7.3, 3.8.2, 3.15.2, 5.4.2, 6.1.1, 6.2.3, 7.3.3.3, 7.3.4, 7.3.8, 7.3.9, 9.10.2, 10.3.2, 10.3.6, 11.2, 12.1.2, 12.2.1, 12.2.4, 13.4, 14
Cutting and Patching
3.14, 6.2.5
Damage to Construction of Owner or Separate Contractors
3.14.2, 6.2.4, 10.2.1.2, 10.2.5, 10.4, 12.2.4
Damage to the Work
3.14.2, 9.9.1, 10.2.1.2, 10.2.5, 10.4, 12.2.4
Damages, Claims for
3.2.4, 3.18, 6.1.1, 8.3.3, 9.5.1, 9.6.7, 10.3.3, 11.3.2, 11.3, 14.2.4, 15.1.7
Damages for Delay
6.2.3, 8.3.3, 9.5.1.6, 9.7, 10.3.2, 14.3.2
Date of Commencement of the Work, Definition of
8.1.2
Date of Substantial Completion, Definition of
8.1.3
Day, Definition of
8.1.4
Decisions of the Architect
3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 6.3, 7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4, 9.5.1, 9.8.4, 9.9.1, 13.4.2, 14.2.2, 14.2.4, 15.1, 15.2
Decisions to Withhold Certification
9.4.1, **9.5**, 9.7, 14.1.1.3
Defective or Nonconforming Work, Acceptance, Rejection and Correction of
2.5, 3.5, 4.2.6, 6.2.3, 9.5.1, 9.5.3, 9.6.6, 9.8.2, 9.9.3, 9.10.4, 12.2.1
Definitions
1.1, 2.1.1, 3.1.1, 3.5, 3.12.1, 3.12.2, 3.12.3, 4.1.1, 5.1, 6.1.2, 7.2.1, 7.3.1, 8.1, 9.1, 9.8.1, 15.1.1
Delays and Extensions of Time
3.2, **3.7.4**, 5.2.3, 7.2.1, 7.3.1, **7.4**, **8.3**, 9.5.1, **9.7**, 10.3.2, **10.4**, 14.3.2, **15.1.6**, 15.2.5
Digital Data Use and Transmission
1.7
Disputes
6.3, 7.3.9, 15.1, 15.2
Documents and Samples at the Site
3.11
Drawings, Definition of
1.1.5
Drawings and Specifications, Use and Ownership of
3.11
Effective Date of Insurance
8.2.2
Emergencies
10.4, 14.1.1.2, **15.1.5**
Employees, Contractor's
3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3.3, 11.3, 14.1, 14.2.1.1
Equipment, Labor, or Materials
1.1.3, 1.1.6, 3.4, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2
Execution and Progress of the Work
1.1.3, 1.2.1, 1.2.2, 2.3.4, 2.3.6, 3.1, 3.3.1, 3.4.1, 3.7.1, 3.10.1, 3.12, 3.14, 4.2, 6.2.2, 7.1.3, 7.3.6, 8.2, 9.5.1, 9.9.1, 10.2, 10.3, 12.1, 12.2, 14.2, 14.3.1, 15.1.4
Extensions of Time
3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3, 7.4, 9.5.1, 9.7, 10.3.2, 10.4, 14.3, 15.1.6, **15.2.5**
Failure of Payment
9.5.1.3, **9.7**, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2
Faulty Work
(See Defective or Nonconforming Work)
Final Completion and Final Payment
4.2.1, 4.2.9, 9.8.2, **9.10**, 12.3, 14.2.4, 14.4.3

Financial Arrangements, Owner's
2.2.1, 13.2.2, 14.1.1.4
GENERAL PROVISIONS
1
Governing Law
13.1
Guarantees (See Warranty)
Hazardous Materials and Substances
10.2.4, **10.3**
Identification of Subcontractors and Suppliers
5.2.1
Indemnification
3.17, **3.18**, 9.6.8, 9.10.2, 10.3.3, 11.3
Information and Services Required of the Owner
2.1.2, **2.2**, 2.3, 3.2.2, 3.12.10.1, 6.1.3, 6.1.4, 6.2.5, 9.6.1, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2, 14.1.1.4, 14.1.4, 15.1.4
Initial Decision
15.2
Initial Decision Maker, Definition of
1.1.8
Initial Decision Maker, Decisions
14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5
Initial Decision Maker, Extent of Authority
14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5
Injury or Damage to Person or Property
10.2.8, 10.4
Inspections
3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 12.2.1, 13.4
Instructions to Bidders
1.1.1
Instructions to the Contractor
3.2.4, 3.3.1, 3.8.1, 5.2.1, 7, 8.2.2, 12, 13.4.2
Instruments of Service, Definition of
1.1.7
Insurance
6.1.1, 7.3.4, 8.2.2, 9.3.2, 9.8.4, 9.9.1, 9.10.2, 10.2.5, **11**
Insurance, Notice of Cancellation or Expiration
11.1.4, 11.2.3
Insurance, Contractor's Liability
11.1
Insurance, Effective Date of
8.2.2, 14.4.2
Insurance, Owner's Liability
11.2
Insurance, Property
10.2.5, 11.2, 11.4, 11.5
Insurance, Stored Materials
9.3.2
INSURANCE AND BONDS
11
Insurance Companies, Consent to Partial Occupancy
9.9.1
Insured loss, Adjustment and Settlement of
11.5
Intent of the Contract Documents
1.2.1, 4.2.7, 4.2.12, 4.2.13
Interest
13.5
Interpretation
1.1.8, 1.2.3, **1.4**, 4.1.1, 5.1, 6.1.2, 15.1.1
Interpretations, Written
4.2.11, 4.2.12
Judgment on Final Award
15.4.2
Labor and Materials, Equipment
1.1.3, 1.1.6, **3.4**, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2
Labor Disputes
8.3.1
Laws and Regulations
1.5, 2.3.2, 3.2.3, 3.2.4, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 9.9.1, 10.2.2, 13.1, 13.3.1, 13.4.2, 13.5, 14, 15.2.8, 15.4
Liens
2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8
Limitations, Statutes of
12.2.5, 15.1.2, 15.4.1.1
Limitations of Liability
3.2.2, 3.5, 3.12.10, 3.12.10.1, 3.17, 3.18.1, 4.2.6, 4.2.7, 6.2.2, 9.4.2, 9.6.4, 9.6.7, 9.6.8, 10.2.5, 10.3.3, 11.3, 12.2.5, 13.3.1
Limitations of Time
2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2.7, 5.2, 5.3, 5.4.1, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15, 15.1.2, 15.1.3, 15.1.5
Materials, Hazardous
10.2.4, **10.3**
Materials, Labor, Equipment and
1.1.3, 1.1.6, 3.4.1, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1.2, 10.2.4, 14.2.1.1, 14.2.1.2
Means, Methods, Techniques, Sequences and Procedures of Construction
3.3.1, 3.12.10, 4.2.2, 4.2.7, 9.4.2
Mechanic's Lien
2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8
Mediation
8.3.1, 15.1.3.2, 15.2.1, 15.2.5, 15.2.6, **15.3**, 15.4.1, 15.4.1.1
Minor Changes in the Work
1.1.1, 3.4.2, 3.12.8, 4.2.8, 7.1, **7.4**
MISCELLANEOUS PROVISIONS
13
Modifications, Definition of
1.1.1
Modifications to the Contract
1.1.1, 1.1.2, 2.5, 3.11, 4.1.2, 4.2.1, 5.2.3, 7, 8.3.1, 9.7, 10.3.2
Mutual Responsibility
6.2

Nonconforming Work, Acceptance of
9.6.6, 9.9.3, **12.3**
Nonconforming Work, Rejection and Correction of
2.4, 2.5, 3.5, 4.2.6, 6.2.4, 9.5.1, 9.8.2, 9.9.3, 9.10.4, 12.2
Notice
1.6, 1.6.1, 1.6.2, 2.1.2, 2.2.2., 2.2.3, 2.2.4, 2.5, 3.2.4, 3.3.1, 3.7.4, 3.7.5, 3.9.2, 3.12.9, 3.12.10, 5.2.1, 7.4, 8.2.2 9.6.8, 9.7, 9.10.1, 10.2.8, 10.3.2, 11.5, 12.2.2.1, 13.4.1, 13.4.2, 14.1, 14.2.2, 14.4.2, 15.1.3, 15.1.5, 15.1.6, 15.4.1
Notice of Cancellation or Expiration of Insurance
11.1.4, 11.2.3
Notice of Claims
1.6.2, 2.1.2, 3.7.4, 9.6.8, 10.2.8, **15.1.3**, 15.1.5, 15.1.6, 15.2.8, 15.3.2, 15.4.1
Notice of Testing and Inspections
13.4.1, 13.4.2
Observations, Contractor's
3.2, 3.7.4
Occupancy
2.3.1, 9.6.6, 9.8
Orders, Written
1.1.1, 2.4, 3.9.2, 7, 8.2.2, 11.5, 12.1, 12.2.2.1, 13.4.2, 14.3.1
OWNER
2
Owner, Definition of
2.1.1
Owner, Evidence of Financial Arrangements
2.2, 13.2.2, 14.1.1.4
Owner, Information and Services Required of the
2.1.2, **2.2**, 2.3, 3.2.2, 3.12.10, 6.1.3, 6.1.4, 6.2.5, 9.3.2, 9.6.1, 9.6.4, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2, 14.1.1.4, 14.1.4, 15.1.4
Owner's Authority
1.5, 2.1.1, 2.3.32.4, 2.5, 3.4.2, 3.8.1, 3.12.10, 3.14.2, 4.1.2, 4.2.4, 4.2.9, 5.2.1, 5.2.4, 5.4.1, 6.1, 6.3, 7.2.1, 7.3.1, 8.2.2, 8.3.1, 9.3.2, 9.5.1, 9.6.4, 9.9.1, 9.10.2, 10.3.2, 11.4, 11.5, 12.2.2, 12.3, 13.2.2, 14.3, 14.4, 15.2.7
Owner's Insurance
11.2
Owner's Relationship with Subcontractors
1.1.2, 5.2, 5.3, 5.4, 9.6.4, 9.10.2, 14.2.2
Owner's Right to Carry Out the Work
2.5, 14.2.2
Owner's Right to Clean Up
6.3
Owner's Right to Perform Construction and to Award Separate Contracts
6.1
Owner's Right to Stop the Work
2.4
Owner's Right to Suspend the Work
14.3
Owner's Right to Terminate the Contract
14.2, 14.4
Ownership and Use of Drawings, Specifications and Other Instruments of Service
1.1.1, 1.1.6, 1.1.7, **1.5**, 2.3.6, 3.2.2, 3.11, 3.17, 4.2.12, 5.3
Partial Occupancy or Use
9.6.6, **9.9**
Patching, Cutting and
3.14, 6.2.5
Patents
3.17
Payment, Applications for
4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5, 9.6.3, 9.7, 9.8.5, 9.10.1, 14.2.3, 14.2.4, 14.4.3
Payment, Certificates for
4.2.5, 4.2.9, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 14.1.1.3, 14.2.4
Payment, Failure of
9.5.1.3, **9.7**, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2
Payment, Final
4.2.1, 4.2.9, **9.10**, 12.3, 14.2.4, 14.4.3
Payment Bond, Performance Bond and
7.3.4.4, 9.6.7, 9.10.3, **11.1.2**
Payments, Progress
9.3, **9.6**, 9.8.5, 9.10.3, 14.2.3, 15.1.4
PAYMENTS AND COMPLETION
9
Payments to Subcontractors
5.4.2, 9.5.1.3, 9.6.2, 9.6.3, 9.6.4, 9.6.7, 14.2.1.2
PCB
10.3.1
Performance Bond and Payment Bond
7.3.4.4, 9.6.7, 9.10.3, **11.1.2**
Permits, Fees, Notices and Compliance with Laws
2.3.1, **3.7**, 3.13, 7.3.4.4, 10.2.2
PERSONS AND PROPERTY, PROTECTION OF
10
Polychlorinated Biphenyl
10.3.1
Product Data, Definition of
3.12.2
Product Data and Samples, Shop Drawings
3.11, **3.12**, 4.2.7
Progress and Completion
4.2.2, **8.2**, 9.8, 9.9.1, 14.1.4, 15.1.4
Progress Payments
9.3, **9.6**, 9.8.5, 9.10.3, 14.2.3, 15.1.4
Project, Definition of
1.1.4
Project Representatives
4.2.10
Property Insurance
10.2.5, **11.2**
Proposal Requirements
1.1.1
PROTECTION OF PERSONS AND PROPERTY
10

Regulations and Laws
1.5, 2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 9.9.1, 10.2.2, 13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14, 15.2.8, 15.4
Rejection of Work
4.2.6, 12.2.1
Releases and Waivers of Liens
9.3.1, 9.10.2
Representations
3.2.1, 3.5, 3.12.6, 8.2.1, 9.3.3, 9.4.2, 9.5.1, 9.10.1
Representatives
2.1.1, 3.1.1, 3.9, 4.1.1, 4.2.10, 13.2.1
Responsibility for Those Performing the Work
3.3.2, 3.18, 4.2.2, 4.2.3, 5.3, 6.1.3, 6.2, 6.3, 9.5.1, 10
Retainage
9.3.1, 9.6.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3
Review of Contract Documents and Field Conditions by Contractor
3.2, 3.12.7, 6.1.3
Review of Contractor's Submittals by Owner and Architect
3.10.1, 3.10.2, 3.11, 3.12, 4.2, 5.2, 6.1.3, 9.2, 9.8.2
Review of Shop Drawings, Product Data and Samples by Contractor
3.12
Rights and Remedies
1.1.2, 2.4, 2.5, 3.5, 3.7.4, 3.15.2, 4.2.6, 5.3, 5.4, 6.1, 6.3, 7.3.1, 8.3, 9.5.1, 9.7, 10.2.5, 10.3, 12.2.1, 12.2.2, 12.2.4, **13.3**, 14, 15.4
Royalties, Patents and Copyrights
3.17
Rules and Notices for Arbitration
15.4.1
Safety of Persons and Property
10.2, 10.4
Safety Precautions and Programs
3.3.1, 4.2.2, 4.2.7, 5.3, **10.1**, 10.2, 10.4
Samples, Definition of
3.12.3
Samples, Shop Drawings, Product Data and
3.11, **3.12**, 4.2.7
Samples at the Site, Documents and
3.11
Schedule of Values
9.2, 9.3.1
Schedules, Construction
3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2
Separate Contracts and Contractors
1.1.4, 3.12.5, 3.14.2, 4.2.4, 4.2.7, 6, 8.3.1, 12.1.2
Separate Contractors, Definition of
6.1.1
Shop Drawings, Definition of
3.12.1
Shop Drawings, Product Data and Samples
3.11, **3.12**, 4.2.7
Site, Use of
3.13, 6.1.1, 6.2.1
Site Inspections
3.2.2, 3.3.3, 3.7.1, 3.7.4, 4.2, 9.9.2, 9.4.2, 9.10.1, 13.4
Site Visits, Architect's
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4
Special Inspections and Testing
4.2.6, 12.2.1, 13.4
Specifications, Definition of
1.1.6
Specifications
1.1.1, **1.1.6**, 1.2.2, 1.5, 3.12.10, 3.17, 4.2.14
Statute of Limitations
15.1.2, 15.4.1.1
Stopping the Work
2.2.2, 2.4, 9.7, 10.3, 14.1
Stored Materials
6.2.1, 9.3.2, 10.2.1.2, 10.2.4
Subcontractor, Definition of
5.1.1
SUBCONTRACTORS
5
Subcontractors, Work by
1.2.2, 3.3.2, 3.12.1, 3.18, 4.2.3, 5.2.3, 5.3, 5.4, 9.3.1.2, 9.6.7
Subcontractual Relations
5.3, 5.4, 9.3.1.2, 9.6, 9.10, 10.2.1, 14.1, 14.2.1
Submittals
3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 7.3.4, 9.2, 9.3, 9.8, 9.9.1, 9.10.2, 9.10.3
Submittal Schedule
3.10.2, 3.12.5, 4.2.7
Subrogation, Waivers of
6.1.1, **11.3**
Substances, Hazardous
10.3
Substantial Completion
4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, **9.8**, 9.9.1, 9.10.3, 12.2, 15.1.2
Substantial Completion, Definition of
9.8.1
Substitution of Subcontractors
5.2.3, 5.2.4
Substitution of Architect
2.3.3
Substitutions of Materials
3.4.2, 3.5, 7.3.8
Sub-subcontractor, Definition of
5.1.2
Subsurface Conditions
3.7.4
Successors and Assigns
13.2
Superintendent
3.9, 10.2.6
Supervision and Construction Procedures
1.2.2, **3.3**, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.4, 8.2, 8.3.1, 9.4.2, 10, 12, 14, 15.1.4

Suppliers
1.5, 3.12.1, 4.2.4, 4.2.6, 5.2.1, 9.3, 9.4.2, 9.5.4, 9.6, 9.10.5, 14.2.1
Surety
5.4.1.2, 9.6.8, 9.8.5, 9.10.2, 9.10.3, 11.1.2, 14.2.2, 15.2.7
Surety, Consent of
9.8.5, 9.10.2, 9.10.3
Surveys
1.1.7, 2.3.4
Suspension by the Owner for Convenience
14.3
Suspension of the Work
3.7.5, 5.4.2, 14.3
Suspension or Termination of the Contract
5.4.1.1, 14
Taxes
3.6, 3.8.2.1, 7.3.4.4
Termination by the Contractor
14.1, 15.1.7
Termination by the Owner for Cause
5.4.1.1, **14.2,** 15.1.7
Termination by the Owner for Convenience
14.4
Termination of the Architect
2.3.3
Termination of the Contractor Employment
14.2.2

TERMINATION OR SUSPENSION OF THE CONTRACT
14
Tests and Inspections
3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 10.3.2, 12.2.1, **13.4**
TIME
8
Time, Delays and Extensions of
3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, **8.3**, 9.5.1, 9.7, 10.3.2, 10.4, 14.3.2, 15.1.6, 15.2.5
Time Limits
2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2, 5.2, 5.3, 5.4, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15.1.2, 15.1.3, 15.4
Time Limits on Claims
3.7.4, 10.2.8, 15.1.2, 15.1.3
Title to Work
9.3.2, 9.3.3
UNCOVERING AND CORRECTION OF WORK
12
Uncovering of Work
12.1
Unforeseen Conditions, Concealed or Unknown
3.7.4, 8.3.1, 10.3
Unit Prices
7.3.3.2, 9.1.2
Use of Documents
1.1.1, 1.5, 2.3.6, 3.12.6, 5.3
Use of Site
3.13, 6.1.1, 6.2.1
Values, Schedule of
9.2, 9.3.1
Waiver of Claims by the Architect
13.3.2
Waiver of Claims by the Contractor
9.10.5, 13.3.2, **15.1.7**
Waiver of Claims by the Owner
9.9.3, 9.10.3, 9.10.4, 12.2.2.1, 13.3.2, 14.2.4, **15.1.7**
Waiver of Consequential Damages
14.2.4, 15.1.7
Waiver of Liens
9.3, 9.10.2, 9.10.4
Waivers of Subrogation
6.1.1, **11.3**
Warranty
3.5, 4.2.9, 9.3.3, 9.8.4, 9.9.1, 9.10.2, 9.10.4, 12.2.2, 15.1.2
Weather Delays
8.3, 15.1.6.2
Work, Definition of
1.1.3
Written Consent
1.5.2, 3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.2, 9.3.2, 9.10.3, 13.2, 13.3.2, 15.4.4.2
Written Interpretations
4.2.11, 4.2.12
Written Orders
1.1.1, 2.4, 3.9, 7, 8.2.2, 12.1, 12.2, 13.4.2, 14.3.1

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents consist of the Contract between Owner and Contractor, A101- 2017, as amended, OR the Contract between the Owner and Construction Manager at Risk A133-2019, as amended, and the A133-2019 Exhibit A (hereinafter the ~~Agreement~~Contract); Conditions of the Contract as amended (General, Supplementary and other Conditions, including but not limited to A201-2017, as amended); Contractor's proof of Payment and Performance Bonds and proof of insurance, ~~are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), all sections of the Project Manual and Construction Documents (as defined in Section 1.1.3 below) including~~ Drawings, Specifications, and Addenda issued prior to receipt of bids or proposals , ~~to execution of the Contract,~~ other documents listed in the ~~Agreement~~Contract, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the ~~Agreement~~Contract, the Contract Documents do not include other documents such as bidding requirements (advertisement or invitation to bid, Instructions to Bidders, sample forms, Contractor's bid or portions of Addenda relating to bidding requirements). All sections of the Project Manual shall be a part of the ~~Agreement~~Contract. In the event of conflict, terms and conditions contained in the ~~Agreement~~Contract, as amended, shall take precedence over terms and conditions contained in the General Conditions, as amended. The terms and conditions in the General Conditions, as amended, shall take precedence over all other terms and conditions contained in the other Contract Documents. ~~Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements.~~

1.1.1.1 The Contract, represents the entire and integrated agreement between the Owner and the Contractor and supersedes all prior negotiations, representations, or agreements, either written or oral. Any revision, amendment, or modification to the Standard Form of the Contract shall be valid, binding, and enforceable only if said revision, amendment, or modification is made conspicuous by being underlined, lined-through, or highlighted in this Contract signed by Contractor and the authorized representative of Owner's Board of Trustees.

§ 1.1.2 The Contract

The Contract Documents form the Contract for ~~Construction~~Construction (the "Contract"). The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a written Modification signed by the Contractor, approved by Owner's Board of Trustees, and signed by the representative of the Owner's Board of Trustees who is authorized to sign contracts. As a material consideration for the making of the Contract, modifications to the Contract shall not be constructed against the maker of said modifications. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor of the Contractor;~~,~~ (3) between the Program Manager and the Contractor~~between the Owner and the Architect or the Architect's consultants~~, or (4) between any persons or entities other than the Owner and the Contractor. ~~The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.~~

The Program Manager and/or Architect shall, however, be entitled to performance and enforcement of obligations of the Contractor under the Contract intended to facilitate performance of the duties of the Architect and/or the Program Manager.

1.1.2.1 To be effective, all Contract Documents including the A201-2017, as amended requiring signatures must be signed first by the Contractor representative and then by the Owner's authorized representative, after approval by Owner's Board of Trustees. If an approved Contact Document requiring Contractor's signature has not been signed, then the missing signature shall be provided within a reasonable period of time. Failure of Contractor to sign an approved Contract Document after notice and a reasonable opportunity to sign, shall be considered a material breach of the Contract by Contractor.

§ 1.1.3 The Work; Construction Documents

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project. The Work includes all labor, parts, supplies, skill, supervision, transportation, services, and other facilities and things necessary, proper or incidental to the carrying out and completion of the terms of the Contract Documents and all other items of cost or value needed to produce, construct and fully complete the public Work identified by the Contract Documents.

"Construction Documents" means: all Drawings, Specifications, geotechnical reports, Addenda, submittals, transmittals, deliverables, instructions to Contractors, and other documents, including those in electronic form, prepared by the Architect and the Architect's consultants and which set forth in detail the requirements for construction of the Project. The Construction Documents shall include Drawings and Specifications that establish, in detail, the quality levels of materials and systems required for the Project. The Construction Documents shall reflect all agreements between Owner and Architect concerning Owner's budgetary constraints, programmatic needs and expectations as to quality, functionality of systems, maintenance costs, and usable life of equipment and facilities. Said Construction Documents shall reflect the Owner's educational program and educational specifications, the State educational adequacy standards in 19 TAC § 61.104036, and the standards set forth in the Owner's architect agreement Section 3.1.4 of AIA document B101-2017. The Architect shall provide Construction Documents which are sufficient for Owner to complete construction of the Project, are free from material defects or omissions, and which shall comply with all applicable laws, ordinances, codes, rules, and regulations, as of the date of issuance of Construction Documents.

§ 1.1.4 The Project

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and or by Separate Contractors.

§ 1.1.5 The Drawings

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.6 The Specifications

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 Instruments PROJECT MANUAL of Service

Construction InstruDocuments of Service are include representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Construction InstruDocuments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials. The Project Manual is a volume assembled for the Work which may include the bidding requirements, sample forms, Conditions of the Contract and Specifications.

§ 1.1.8 PROGRAM MANAGERSInitial Decision Maker

The Owner may use Program Managers to carry out some of the functions of administration of the Owner's construction program. The Contractor, Architect, and Program Manager (when applicable) shall cooperate with each other in the performance of their respective functions. The management and reporting systems used by the Owner and/or Program Manager, including the assignment of the Program Manager, may be changed by Owner during the Project.

~~The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.~~

1.1.9 Addenda

Addenda are written or graphic instrument issued by the Owner ~~prior to the execution of the Contract~~, which modify or interpret the bidding or proposal documents, including Drawings and Specifications, by additions, deletions, clarifications, or corrections. Addenda will become part of the Contract Documents and Construction Documents when the Contract is executed. The Contractor and subcontractors shall include all addenda items on their copies of the Drawings and Specifications.

1.1.10 All references to "Contractor" shall include "Construction Manager at Risk" as appropriate.

1.1.11 ~~The Owner may retain Program Manager(s) to carry out some of the functions of the administration of the Owner's construction program. The Contractor, Architect, and Program Manager(s) (when applicable) shall cooperate with each other in the performance of their respective functions. The management and reporting systems used by the Owner and/or Program Manager(s) including the assignment of the Program Manager, may be changed by Owner during the Project.~~[Omitted]

1.1.11 Approved, Approved Equal, Approved Equivalents, Or Equal

The terms "Approved" and "Approved Equal" relate to the substitution of materials, equipment, or procedure in writing by the Architect prior to receipt of bids.

1.1.12 Abbreviations

AIA:	American Institute of Architects. (All references to AIA documents refer to AIA's trademarked documents. Each reference to a specific document shall refer to the documents as amended for this Project.)
AIEE:	American Institute of Electrical Engineers
ACI:	American Concrete Institute
AHERA:	Asbestos Hazardous Emergency Response Act
AISI:	American Iron and Steel Institute
AISC:	American Institute of Steel Construction
ANSI:	American National Standards Institute
ASA:	American Standards Association
ASTM:	American Society of Testing Materials
AWSC:	American Welding Society Code
CERCLA:	Comprehensive Environmental Response, Compensation, and Liability Act
EPA:	Environmental Protection Agency
FS:	Federal Specification
NEC:	National Electrical Code
OSHA:	Occupational Safety and Health Administration
SPR:	Simplified Practice Recommendation
TAS:	Texas Accessibility Standards
UL:	Underwriters Laboratories, Inc.

1.1.13 Bids or Bidding The term "Bids" or "Bidding" shall include any kind of competitive purchasing under Texas Government Code Chapter 2269.

1.1.14 Miscellaneous Other Words

1.1.14.1 Business Day

The term "business day" is a day that Owner's Administration Building is scheduled to be open for normal business purposes, unless closed by the Owner's Superintendent of Schools for inclement weather or other reason. Days on which the Administration Building is normally closed are: Thanksgiving Break, Winter Break, Spring Break, and Summer Break, as well as other federal, state, or local days specified in the calendar approved by the Owner's Board of Trustees on an annual basis. A business day does not include a day on which the Owner's Administration Building is open only for the purposes of conducting candidate filing, early voting, elections, or other special events.

1.1.14.2 Calendar Day
A calendar day is a day on the Gregorian Calendar. The Contract Time is established in calendar days. Extensions of time granted, if any, will be converted to calendar days.

1.1.14.3 Holidays
Owner-approved holidays for Contractor's Work are limited to: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day.

1.1.14.4 Work Day
Work days are all calendar days except Holidays.

1.1.14.5 Anticipated Weather Days
An allowance of regular Work Days, established as anticipated Work Days lost due to weather delays; said allowance shall be included in Contractor's proposed completion time. Only lost weather days in excess of Anticipated Weather Days shall be considered by Owner for time extensions based upon weather. ~~Section 15.1.5.3 lists required Anticipated Weather Days.~~

1.1.15 Contract Sum
"Contract Sum" shall have the same meaning as in Section 5.1 of the Contract (A133-20~~10~~09), for the Project when the Project is a Construction Manager at Risk Project OR the same meaning as in Article 4 of the Contract (A101-2017) for the Project.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.1.1 ~~The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.~~ The most recently issued contract document takes precedence over previously issued forms of the same document. Figures given on Drawings govern scale management, and large-scale details govern smaller scale Drawings. If an item is shown one place in the Drawings, but not another, or called for in a schedule or the specifications but not shown on the Drawings or shown on the Drawings but not in a schedule, it is to be included. Existing conditions take precedence over Drawings and Specifications for dimensions.

1.2.1.2 During the course of the Work, should any conflict be found in or between the Contract Documents, the Contractor shall be deemed to have estimated the Work on the basis of the greater quantity or better quality, or the most stringent requirement, unless he shall have obtained an interpretation in writing from the Architect as to what shall govern before the submission of his Proposal. The Architect, in case of such conflict, may interpret or construe the documents so as to obtain the most substantial and complete performance of the Work consistent with the Contract Documents and reasonably inferable therefrom, in the best interest of Owner, and the Architect's interpretation shall be final. The terms and conditions of this clause shall not relieve any part of any other obligation under the Contract Documents.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

1.2.4 Relation of Specifications And Drawings

General Requirements in the Specifications govern the execution of all Specifications. Summary paragraphs present a brief indication of the Work, but do not limit the Work as later detailed. The Drawings and Specifications are correlative and have equal authority and priority. Should the Drawings and Specifications have internal inconsistencies, then the Contractor shall base the bids and construction on the more expensive combination of quality and quantity of work indicated. For purposes of construction, the Architect shall determine the appropriate Work, after the Contractor brings the inconsistency to the Architect's attention. Failure to report an inconsistency shall be evidence that Contractor has elected to proceed in the more expensive manner.

1.2.5 ~~Optional Materials, Equipment and Processes~~Materials, Equipment, and Processes

Exact location and arrangement of the various pieces of equipment specified shall be determined with the approval of the Architect after equipment has been selected and/or as the Work progresses. All equipment shall, insofar as possible, be installed in such a manner as will not interfere with architectural or structural portions of the building. Should changes become necessary because of a failure of the Contractor to comply with the Contract Documents which results in equipment requiring more area than shown on the Contract Documents, the Contractor shall be fully responsible for completing any required modifications or eliminating any interferences. Where in the Drawings and Specifications, certain products, manufacturer's trade names, or catalog numbers are specified, it is done for the express purpose of establishing a standard of function, dimension, appearance, and quality of design in harmony with the Work, and is not intended for the purpose of limiting competition. Materials or equipment shall not be substituted unless the Architect has specifically accepted such substitution for use on this Project. When more than one material, process, or brand is specified for a particular item of Work, the choice shall be the Contractor's. The final selection of color and pattern will be made by the Owner from the range available within the option selected by the Contractor, unless the item is specified to match a specific color or sample furnished. Where particular items are specified, products of those named manufacturers are required unless Contractor submits for consideration proposed substitutions of materials equipment, or processes from those set out in the Contract Documents. Submittals of proposed substitutions should contain sufficient information to allow the Architect and Owner to determine if the proposed substitution is in fact equal to or better than the requirements in the Contract Documents. The Architect shall review and respond to proposed substitutions within fifteen (15) days of receipt. Contractor shall bear all risk caused by submitting substitutions, including all costs. The Owner may approve substitutions only when the substitution is clearly provided by the Contract to be equal in performance characteristics to the requirements of the Contract Documents, equally compatible with the existing installations and complementary to the architectural design for the Work. Contractor shall bear all related costs associated with the substitution. Certain special construction and equipment details may not be regularly included as part of the named manufacturer's standard catalog equipment, but shall be obtained by the Contractor from the manufacturer as required for the proper evaluation and/or function of the equipment. Reasonable minor variations in equipment are expected and will be acceptable, if approved by the Architect and Owner, however, indicated and specified performance and material requirements are the minimum. The Owner and the Architect reserve the right to determine the quality of equipment and materials that deviate from any of the indicated and specified requirements.

~~**1.2.5.1Product and Reference Standards**~~

~~When specific products, systems or items of equipment are referred to in the Contract Documents, any ancillary devices which the Contractor knows, or in accordance with the standard of care for a General Contractor should have known, is necessary for proper functioning shall also be provided. When standards, codes, manufacturer's instructions and guarantees are required and no edition is specified by the Contract Documents, the current edition at the time of Contract execution shall apply whether or not the proper edition was set out in the Contract Documents. References to standards, codes, manufacturer's instructions and guarantees shall apply in full, except:~~

~~.1 They do not supersede more stringent standards set out in the Contract Documents, and~~
~~.2 Any exclusions or waivers that are inconsistent with the Contract Documents do not apply.~~

1.2.6 Standards And Requirements

When the Contract Documents refer to standards, building codes, manufacturers' instructions, or other documents, unless otherwise specified, then the current edition as of the date of execution of the Contract by the last party to execute said Contract shall apply. It shall be the responsibility of the Architect to address revisions or amendments to applicable codes or standards which arise after the date of execution of the Contract and until Final Completion, pursuant to the terms of the Contract between Owner and Architect. Requirements of public authorities apply as minimum requirements only and do not supersede more stringent specified requirements.

General Requirements in the Specifications govern the execution of all Work. Summary paragraphs present a brief indication of the Work, but do not limit the Work as later detailed. Should the Drawings and Specifications have internal inconsistencies, then the Contractor shall base the bids and construction on the most expensive combination of quality and quantity of work indicated. For purposes of construction, the Architect shall determine the appropriate Work, after the Contractor brings the inconsistency to the Architect's attention. Failure to report an inconsistency shall be evidence that Contractor has elected to proceed in the more expensive manner.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles and identified references to Paragraphs, Subparagraphs, and Clauses in the documents., or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 All ownership rights, whether common law, statutory, or other reserved rights, including copyright ownership of the Construction Documents, are controlled by the Contract between the Owner and ~~T~~the Architect ~~and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights~~. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the ~~Instruments of Service~~Construction Documents. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of any~~the Architect's or Architect's consultants'~~ reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are granted a limited license~~authorized~~ to use and reproduce the Construction Documents~~Instruments of Service~~ provided to them, subject to any protocols established pursuant to Section~~s~~ 1.7 ~~and 1.8~~, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Construction Documents~~Instruments of Service~~. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the ~~Instruments of Service~~Construction Documents on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants. All copies of the Construction Documents, except the Contractor's record set, shall be returned or suitably accounted for to the copyright holder upon completion of the Work.

1.5.3 The Drawings, Specifications and other Documents, including those in electronic form, prepared by the Architect and the Architect's consultants are Instruments of Service through which the Work to be executed by the Contractor is described. The Contractor may retain one record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor or material or equipment supplier shall own or claim copyright in the Drawings, Specifications and other documents prepared by the Architect or Architect's consultants, and unless otherwise indicated the Architect and the Architect's consultants shall be deemed the authors of them and will retain all common law, statutory and other reserved rights, in addition to the copyrights. All copies of Instruments of Service, except the Contractor's record set, shall be returned or suitably accounted for to the Architect, on request, upon completion of the Work. The Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work without the written consent of the Owner, Architect and Architect's consultants. The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect and Architect's consultants appropriate to and for use in the execution of their Work under the Contract Documents. All copies made under this authorization shall bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Architect and Architect's consultants. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants copyrights or other reserved rights.

§ 1.6 Notice

§ 1.6.1 ~~Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement~~Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; if delivered at, or sent by registered or certified mail, or by courier service providing proof of delivery to the last business address known to the party giving notice, or if sent by electronic facsimile transmission, to the last business number known to the party giving notice, with electronic confirmation of receipt; or, if sent by electronic mail, to the email address of the Owner's or Contractor's designated representative, with electronic confirmation of receipt.

§ 1.6.2 ~~Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.~~

§ 1.7 Digital Data Use and Transmission

If ~~T~~the parties intend to transmit Construction Documents or any other information or documentation in digital form, they shall endeavor to establish necessary~~shall agree upon~~ protocols governing such~~the~~ transmissions, unless otherwise already provided in the Contract or the Contract Documents ~~and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data~~.

§ 1.8 EXECUTION OF CONTRACT DOCUMENTS

1.8.1 The Contract Documents must be signed by the Owner and Contractor. The ~~Agreement~~Contract between Owner and Contractor, as amended, including Conditions of the Contract, as amended, as well as all other Contract Documents that required signature of the Parties, including the A201-2017, as amended, must be signed first by the Contractor's representative. . After signing the ~~Agreement~~Contract and all other Contract Documents requiring signature, Contractor shall return the Contract Documents along with proof of insurance and payment and performance bonds to Owner. Once Owner has approved of the Contract Documents and the proof of insurance and payment and performance bonds, Owner shall sign the ~~Agreement~~Contract and all other Contract Documents requiring signature of the parties. When Owner has signed and approved all required documents, District shall issue a Notice to Proceed to Contractor.

1.8.2 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents. Should the Contractor find discrepancies, omissions or conflicts within the Contract Documents, or be in doubt as to their meaning, the Contractor shall at once notify in writing the Architect, the Program Manager and Owner, and Architect will issue a written Architect's Supplemental Instruction to all parties that is consistent with the Owner's Scope of the Work.

~~Building Information Models Use and Reliance~~

~~Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.~~

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the independent school district ~~oe enity~~ ~~person or entity~~ identified ~~as such in the Agreement and is referred to throughout~~ in the Contract Documents ~~as if singular in number~~. The Board of Trustees, by majority vote, is the only representative of the Owner, an independent school district, having the power to: enter into a contract; amend a contract, including but not limited to, AIA Document A133 Exhibit A; approve changes in the scope of the Work; approve and execute a Change Order or Construction Change Directive modifying the Contract Sum or Guaranteed Maximum Price; agree to an extension to the date of Substantial or Final Completion; or terminate a contract. The Board will act as soon as reasonably possible to avoid undue delays. The Board ~~shall~~

designates authorized representatives to act on its behalf for day-to-day operations under the Contract. Unless otherwise designated in the Contract Documents, Owner's authorized ~~in writing a~~ representative ~~who~~ shall be the Superintendent of Schools, who may delegate responsibilities as appropriate. ~~have express authority to bind the Owner~~ Except as otherwise provided in the Contract Documents, the Architect does not have such authority. Neither Architect nor Contractor may rely upon the direction of any employee of Owner who has not been designated in writing by the Superintendent or Board of Trustees; Owner shall not be financially responsible for actions taken by the Architect or Contractor in reliance upon direction from unauthorized persons ~~with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority~~. ~~The term "Owner" means the Owner or the Owner's authorized representative.~~

§ 2.1.2 ~~The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein~~ It shall be distinctly understood that by virtue of this Contract, no mechanic, contractor, material person, artisan, or laborer, skilled or unskilled, shall ever in any manner have, claim, or acquire any lien upon the buildings or any of the improvements of whatsoever nature or kind so erected or to be erected by virtue of this Contract or upon any of the land on which said buildings of any of the improvements are so erected, built, or situated, such property belonging to a political subdivision of the State of Texas. It shall be further understood that this Contract is not written for the benefit of their parties.

2.1.3 The Owner shall require the Contractor and the Architect to meet periodically at mutually-agreed-upon intervals, for the purpose of establishing procedures to facilitate cooperation, communication, and timely responses among the participants. By participating in this arrangement, the parties do not intend to create additional contractual obligations or modify the legal relationship which may otherwise exist.

2.1.4 The Owner may require that the Contractor use and/or respond to certain Owner-furnished forms or inquiries during the course of the Project. From time to time, there may be future revisions, changes, additions, or deletions to these forms. The fact that the Owner modifies and increases reasonable reporting requirements shall not serve as the basis for a claim for additional time or compensation by the Contractor.

2.1.5 The Contractor stipulates and agrees that the Owner has no duty to discover any design errors or omissions in the Drawings, Plans, Specifications, and other Construction Documents, and has no duty to notify Contractor of same. By entering into the Contract Documents or any Contract with any Architect, Owner does not warrant the adequacy and accuracy of any Drawings, Plans, Specifications, or other Construction Documents.

§ 2.2 ~~Evidence of the~~ Owner's Financial Arrangements

§ 2.2.1 ~~Prior to commencement of the Work and upon written request by the Contractor, t~~The Owner, being a public body under the laws of the State of Texas, must have adequate funds and/or financing as provided by law prior to award and execution of ~~shall furnish to~~ the Contract~~or~~ Documents~~reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately~~.

§ 2.2.2 At any time prior to the Owner's receipt of the executed ~~Agreement~~Contract with the required bonds and insurance, the Owner may, at its sole option and without cause, reject the offer described in this ~~Agreement~~Contract by delivering to the Contractor a written notice stating so. Such notice shall be signed by the Owner's Director of Purchasing or designee and shall be effective on receipt by the Contractor. The rejection of the offer described in this ~~Agreement~~Contract shall cause no obligation or duty to the District save return of bid or proposal security, if any, if rejection is without cause. This paragraph does not pertain to rejection for cause by the Owner, or for the Contractor's failure to provide required bonds or insurance ~~Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until~~

~~reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.~~

§ 2.2.3 ~~After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.~~

§ 2.2.4 ~~Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.~~

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.3.2 The "Architect" is the person ~~Owner shall retain an architect~~ lawfully licensed to practice architecture, or an entity lawfully practicing architecture, ~~in the jurisdiction where the Project is located. That person or entity is identified as the Architect~~ identified as such in the ~~Agreement~~Contract and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor ~~to whom the Contractor has no reasonable objection and~~ whose status under the Contract Documents shall be that of the Architect. Owner shall notify Contractor if successor architect has been employed by Owner. The term "Architect" means the Architect or the Architect's authorized representative.

§ 2.3.4 If requested to do so, in writing, by Contractor, prior to start of the Work, ~~T~~the Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. ~~The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.~~ The survey shall not relieve Contractor from its obligations to examine the site, or exercise proper precautions relating to the safe performance of the Work.

§ 2.3.5 Information or services reasonably necessary for the Work and under the Owner's control shall be furnished by the Owner with reasonable promptness where requested in writing by the Contractor. Under normal circumstances, fourteen (14) District Business days will be considered a reasonable time for Owner response. In any circumstance where information or services from the Owner, Program Manager or Architect is required, Contractor shall promptly notify in writing the Architect, with copy to the Program Manager, of the particular need. Absent such notification, any Claim based upon lack of such information or services shall be waived.~~The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services. Absent such timely notification, any Claim based upon lack of such information or services shall be waived.~~

§ 2.3.6 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Construction~~act~~ Documents, as provided for in the Project Manual, for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to fails to correct non-conforming or defective Work, fails to correct Work which is not in accordance with Contract Documents, or ~~correct defective Work, fails to correct Work that is not in accordance with the requirements of the Contract Documents or the Construction Documents as required by Section 12.2 or repeatedly~~ fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity~~, except to the extent required by Section 6.1.3~~. The authorized Owner's representative having the legal right to stop the Work shall be limited to the Owner's Superintendent of Schools or designee.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. ~~Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and t~~The Architect ~~may~~shall, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's, Program Manager and other consultants' additional services, if any, made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, then the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, then the Contractor may file a Claim pursuant to Article 15.

2.5.1 After the Work is complete the Owner may make emergency repairs to the Work if necessary to prevent further damage, or if the Contractor does not promptly respond to a notice of a condition requiring repairs. Contractor shall be responsible to Owner for this cost if the reason for the repairs is defects in Contractor's Work. If payments then or thereafter due the Contractor are not sufficient to cover such costs, the Contractor shall pay the difference to the Owner.

2.6 OWNER'S OCCUPANCY

Contractor agrees that the Owner may place and install as much equipment and furnishings during the progress of the building as is possible before completion of various parts of the Work, or may occupy portions of the Work before substantial completion of the entire Work, and further agrees that such placing and installing of equipment and furnishings or occupancy of portions of the Work shall not in any way evidence the substantial completion of the entire Work, or signify Owner's acceptance of the Work, nor does it affect claims for liquidated damages in case Substantial Completion is not achieved as required unless the failure to reach Substantial Completion is the result of the early move-in or occupancy. Owner will accept the responsibility for any damages to the Work caused by such occupancy.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the ~~Agreement~~Contract and is referred to throughout the Contract Documents as if singular in number. ~~The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract.~~ The term "Contractor" means the Contractor or the Contractor's authorized representative, and includes the Construction Manager at Risk, if applicable.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect or Program Manager in the ~~Architect's~~ administration of the Contract, activities of the Owner (or Owner's Program Manager, if applicable), or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

3.1.4 The Contractor represents and warrants the following to the Owner (in addition to the other representations and warranties contained in the Contract Documents), as an inducement to the Owner to execute this Contract, which

representations and warranties shall survive the execution and delivery of the Contract and the Final Completion of the Work:

.1 that it is financially solvent, able to pay its debts as they mature, and possessed of sufficient working capital to complete the Work and perform its obligations under the Contract Documents;

.2 that it is able to furnish the tools, materials, supplies, equipment, and labor required to timely complete the Work and perform its obligation hereunder and has sufficient experience and competence to do so;

.3 that it is authorized to do business in the State where the Project is located and properly licensed by all necessary governmental, public, and quasi-public authorities having jurisdiction over it, the Work, or the site of the Project; and

.4 that the execution of the Contract and its performance thereof are within its duly-authorized powers.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 ~~Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.~~ The Contractor represents and warrants by submission of a Proposal that he has carefully examined the Contract Documents, any soil test reports, drainage studies, geotechnical or other reports, and the site of the Work, and that, from his own investigations, he has satisfied himself as to the nature and location of the Work, the character, quality and quantity of surface and subsurface materials likely to be encountered, the character of equipment and other facilities needed for the performance of the Work, the general and local conditions and all other materials which may in any way affect the Work or its performance. Should the Contractor find discrepancies, omissions or conflicts within the Contract Documents, or be in doubt as to their meaning, the Contractor shall at once notify in writing the Architect and Owner, and Architect will issue a written addendum to all parties that is consistent with the Owner's Scope of the Work The Contractor shall not be entitled to any additional time or compensation for any additional work caused by the Contractor's fault, improper construction, or by Contractor's failure to carefully study and compare the Contract Documents to actual observable site conditions prior to execution of the Work.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Drawings and other Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are ~~not~~ for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; ~~however,~~ the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. ~~It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.~~ Contractor shall not perform any Work involving an error, inconsistency, or omission without further instructions to Contractor or revised Construction Documents from the Architect.

§ 3.2.3 Neither the Owner nor ~~T~~the Contractor is ~~not~~ required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

3.2.3.1 Any design errors or omissions noted by the Contractor during this review shall be reported promptly to the Architect, but it is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents

§ 3.2.4 If the Contractor has knowledge that any of the products or systems specified will perform in a manner that will limit the Contractor's ability to satisfactorily perform the Work or to honor his warranty, or will result in a limitation of or interference with the Owner's intended use, then the Contractor shall promptly notify the Architect and Owner in writing, providing substantiation for his position. Any necessary changes, including substitution of

materials, shall be accomplished by appropriate Modification. If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2, ~~or~~ 3.2.3, or 3.2.3.1, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2, ~~or~~ 3.2.3, or 3.2.3.1, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. Contractor shall take field measurements, verify field conditions, and shall carefully compare them to the Construction Documents. ~~If t~~The Contractor ~~performs those obligations, the Contractor~~ shall ~~not~~ be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities when the Contractor recognized or should have recognized such error, inconsistency, omissions or difference, and failed to report it to the Architect. Contractor shall not be entitled to additional compensation or additional Work caused by Contractor's failure to carefully study and compare the Construction Documents prior to the execution of the Work.

3.2.5 Prior to performing any Work, and only if applicable, Contractor shall locate all utility lines as shown and located on the plans and specifications, including the telephone company lines and cables, sewer lines, water pipes, gas lines, electrical lines, including, but not limited to, all buried pipelines and buried telephone cables, and shall perform any Work in such a manner so as to avoid damaging any such lines, cables, pipes, and pipelines. In addition, Contractor shall independently determine the location of same. Contractor shall be responsible for any damage done to such utility lines, cables, pipes, and pipelines during its Work, and shall be responsible for any loss, damage, or extra expense resulting from such damage. Repairs shall be made immediately to restore all service. Any delay for such break shall be attributable to Contractor. In addition, and only if applicable, Contractor shall review the appropriate AHERA and hazardous materials surveys for the particular campuses involved in the Project, and shall notify all Subcontractors and Sub-subcontractors of the necessity to review said surveys. Contractor shall perform any Work in such a manner as to avoid damaging, exposing, or dislodging any asbestos-containing materials that are clearly identified and located in AHERA and other hazardous material surveys. Before performing any portion of the Work, the Contractor shall fully investigate all physical aspects of the Project Site and verify all dimensions, measurements, property lines, grades and elevations, existing improvements, and general suitability of existing conditions at the Project site. If applicable, Contractor shall comply with U.S. Environmental Protection Agency rules concerning renovating, repairing, or painting work in schools built prior to 1978 involving lead-based paint.

3.2.6 The Owner shall be entitled to deduct from the Contract Sum, amounts paid to the Architect for the Architect to evaluate and respond to the Contractor's requests for information, where such information was available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, Owner provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation. If, in the reasonable opinion of the Architect, the Contractor does not make reasonable effort to comply with any of the above requirements of the Contract Documents, and this causes Architect or his Consultants to expend an unreasonable amount of time in the discharge of the duties imposed by the Contract Documents, then the Contractor shall bear the cost of compensation for the Architect's additional services made necessary by such failure.

3.2.7 The Contractor shall arrange meetings prior to commencement of the Work of all major Subcontractors to allow the Subcontractors to demonstrate an understanding of the Construction and Contract Documents to the Architect and to allow the Subcontractors to ask for interpretations, when necessary. The Contractor and each Subcontractor shall be evaluated and satisfy themselves as to the conditions and limitations under which the Work is to be performed, including:

.1 The location, condition, layout, drainage, and nature of the Project site and surrounding areas;
.2 Generally prevailing climatic conditions;
.3 Anticipated labor supply and costs;
.4 Availability and cost of materials, tools, and equipment; and
.5 Other similar issues.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract

Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects, in writing, to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

Contractor shall attend weekly, or as otherwise directed by Owner, job site progress meetings. Program Manager shall conduct such meetings; and, shall manage Architect's recording, transcribing and distributing minutes to attendees, Architect, and other appropriate parties

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors. It is understood and agreed that the relationship of Contractor to Owner shall be that of an independent Contractor. Nothing contained herein or inferable here from shall be deemed or construed to (1) make Contractor the agent, servant or employee of the Owner, or (2) to create any partnership, joint venture, or other association between the Owner and Contractor. Any direction or instruction by Owner or any of its authorized representatives in respect to the Work shall relate to the results the Owner desires to obtain from the Work, and shall in no way affect Contractor's independent Contractor status described herein. As part of that responsibility, Contractor shall enforce the Owner's alcohol-free, drug-free, tobacco-free, harassment-free, and weapon-free policies and zones, which will require compliance with those policies and zones by Contractor's employees, subcontractors, and all other persons carrying out the Contract. Contractor shall require all construction workers, whether Contractor's own forces or the forces of Contractor's subcontractors, while on Owner's property to refrain from committing any criminal conduct, using tobacco products, possessing or drinking alcoholic beverages, possessing or using illegal drugs or controlled substances, carrying or possessing weapons, speaking profane and/or offensive language, or engaging in any inappropriate interactions of any nature whatsoever with students and employees, including talking, touching, staring or otherwise contributing to a hostile or offensive environment for Owner's students and employees. All areas of campus, other than the defined construction area, shall be off limits to Contractor's forces, unless their work assignment specifies otherwise. Contractor shall also require adequate and appropriate dress and identification of Contractor's employees, subcontractors, and all other persons carrying out the Work. Contractor shall require all construction workers, whether Contractor's own forces or the forces of Contractor's subcontractors, to wear identification tags on the front of their persons during all times that they are on Owner's property. Such identification tags shall contain a current photograph and the worker's full name in a typeface large enough to be seen from a reasonable distance. The Contractor shall further ensure that no on-site fraternization shall occur between personnel under the Contractor's and Subcontractor's direct or indirect supervision and Owner's students or employees and the general public. Failure of an individual to adhere to these standards of conduct shall result in the immediate removal of the offending employee from all construction on any of Owner's property. Repeated removal of Contractor's or Contractor's subcontractor's forces, or one serious infraction, shall constitute a substantial breach of the Contract justifying the immediate termination by Owner pursuant to Article 14. Contractor shall require all construction workers, whether Contractor's own forces or the forces of Contractor's subcontractor, to park their personal motor vehicles on Owner's property only in the parking places designated by the Owner's campus principal. Any vehicles not parked in the appropriate locations shall be towed at the vehicle owner's sole expense. Contractor shall follow, and shall require all employees, agents, or subcontractors to follow, the tree ordinance of the municipality in which the Project is located. In addition, if not covered by the municipal tree ordinance, Contractor shall barricade and protect all trees on the Project, which shall be included in the Cost of the Work. Contractor shall institute a theft deterrence program designed to restrict construction worker access to properties of Owner that are currently in use, to maintain supervision of Contractor's and Contractor's subcontractor's forces, and to reimburse the Owner or those persons suffering a theft loss which results from Contractor's forces or Contractor's subcontractor's forces' actions, omissions, or failure to secure the Work connecting or adjacent to property of Owner.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work. Contractor shall execute the Work in a good and workmanlike manner, continuously and diligently in accordance with generally accepted standards of construction practice for construction of projects similar to the Project, using qualified, careful and efficient workers and in conformity with the provisions of the Contract Documents.

3.3.4 The Contractor shall properly and efficiently coordinate the timing, scheduling, and routing of all Work performed by all sub-contractors and sub-subcontractors.

3.3.5 To the extent that any portion of the Work requires a trench excavation exceeding five (5') feet in depth, in accordance with Texas Health and Safety Code § 756.023(a), Contractor shall fully comply, and shall require any applicable subcontractor to comply, with:

.1 The Occupational Safety and Health Administration standards for trench safety in effect for the Construction of the Work;
.2 The special shoring requirements, if any, of the Owner;
.3 Any geotechnical information obtained by Owner for use by the Contractor in the design of the trench safety system; and
.4 Trench excavation safety protection shall be a separate pay item, and shall be based on linear feet of trench excavated. Special shoring requirements shall also be a separate pay item, and shall be based on the square feet of shoring use.

3.3.6 The Contractor shall review Subcontractor safety programs, procedures, and precautions in connection with performance of the Work. However, the Contractor's duties shall not relieve any Subcontractor(s) or any other person or entity (e.g. a supplier), including any person or entity with whom the Contractor does not have a contractual relationship, of their responsibility or liability relative to compliance with all applicable federal, state, and local laws, rules, regulations, and ordinances which shall include the litigation to provide for the safety of their employees, persons, and property and their requirements to maintain a work environment free of recognized hazards. The foregoing notwithstanding, the requirements of this Paragraph are not intended to impose upon the Contractor any additional obligations that the Contractor would not have under any applicable state or federal laws, including, but not limited to, any rules, regulations, or statutes pertaining to the Occupations Safety and Health Administration.

3.3.7 It is understood and agreed that the relationship of Contractor to Owner shall be that of an independent contractor. Nothing contained in this Contract or inferable from this Contract shall be deemed or construed to: 1) make Contractor the agent, servant or employee of the Owner; or 2) create any partnership, joint venture, or other association between Owner and Contractor. Any direction or instruction by Owner or any of its authorized representatives in respect of the Work, shall relate to the result the Owner desires to obtain from the Work, and shall in no way affect Contractor's independent contractor status. Pursuant to Texas Labor Code § 214.008, the Contractor and any subcontractor on the Project, shall properly classify, as an employee or an independent contractor, in accordance with Texas Labor Code Chapter 201, any individual the Contractor or subcontractor directly retains and compensates for services performed in connection with this Contract. Any Contractor or subcontractor who fails to properly classify such an individual, may be subject to penalties of Texas Labor Code § 214.008(c).

§ 3.4 Labor and Materials

§ 3.4.1 These Contract Documents shall not be construed to deny or diminish the right of any person to work because of the person's membership or other relationship status with respect to any organization. Texas Government Code § 2269.054. These Contract Documents shall also not prohibit, require, discourage or encourage a person, or discriminate against a person bidding on this contract from entering into or declining to enter into, or adhering to, an agreement with a collective bargaining organization relating to this Project. Texas Government Code § 2269.0541. Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for qualified, careful, and efficient workers and labor, eligible to work in accordance with state and federal law. Contractor shall appropriately classify all workers in accordance with the Fair Labor Standards Act, its implementing regulations, and Texas Labor Code § 214.008. In addition, unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. Before ordering any material or doing any Work, Contractor shall verify all dimensions and check all conditions in order to assure Contractor that they are the same as those in Drawings, Specifications, and other Construction Documents. Any inconsistency shall be brought to the attention of the Architect. In the event that discrepancies occur between ordered material and actual conditions and Architect was not notified beforehand, then costs to correct such discrepancies shall be borne by Contractor.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the prior written consent of the Owner, after evaluation by the Architect and Program Manager ~~and~~ in accordance with a Change Order or Construction Change Directive.

3.4.2.1 After evaluation by the Architect, substitutions and alternates may be rejected by the Architect or Program Manager without explanation and will be considered only under one or more of the following conditions: (i) the proposal is required for compliance with interpretation of code requirements or insurance regulations then existing; (ii) specified products are unavailable through no fault of the Contractor; (iii) and when, in the judgment of the Architect, a substitution would be substantially in the Owner's best interests, in terms of cost, time, or other considerations.

3.4.2.2 The Contractor must submit to the Architect: (i) a full explanation of the proposed substitution and submittals of all supporting data, including technical information, catalog cuts, warranties, test results, installation instructions, operating procedures, and other like information necessary for a complete evaluation for the substitution: (ii) a written explanation of the reasons the substitution should be considered, including the benefits to the Owner and the Work in the event the substitution is acceptable; (iii) the adjustment, if any, in the Contract Sum; (iv) the adjustment, if any, in the time of completion of the Contract and the construction schedule; and (v) an affidavit stating (a) the proposed substitution conforms to and meets all requirements of the pertinent Specifications and the requirements shown on the Drawings, and (b) the Contractor accepts the warranty and will coordinate the Work to be complete in all respects, as if originally specified by the Architect. Proposals for substitution shall be submitted in writing to the Architect in sufficient time to allow the Architect no less than fifteen (15) working days for review. No substitutions will be considered or allowed without the Contractor's submittals of complete substantiating data and information.

3.4.2.3 Whether or not the Architect accepts any proposed substitution, the Contractor shall reimburse the Owner for any fees charged by the Architect or other consultants for evaluating each proposed substitution.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them. THE CONTRACTOR RELEASES, INDEMNIFIES AND HOLDS HARMLESS THE OWNER FOR CONTRACTOR'S FORCES' NON-COMPLIANCE WITH OWNER'S DRUG-FREE, ALCOHOL-FREE, WEAPON-FREE, HARASSMENT-FREE, AND TOBACCO-FREE ZONES, CONTRACTOR'S FORCES' NON-COMPLIANCE WITH CRIMINAL LAW, OR CONTRACTOR'S OR CONTRACTOR'S FORCES' NON-COMPLIANCE WITH IMMIGRATION LAW OR REGULATIONS. Any individual found by Owner to have violated these restrictions is subject to permanent removal from the Project, at the Owner's request. Contractor shall place similar language in its subcontract agreements, requiring the Subcontractors and Sub-subcontractors to be responsible for their own forces, and Contractor shall cooperate with the Owner to ensure Subcontractor and Sub-subcontractor compliance.

3.4.4 Including, but not limited to, the specific requirement of Article 10, Contractor, its subcontractors and vendors shall bear responsibility for compliance with all federal, state, and local laws, regulations, guidelines, and ordinances pertaining to work safety and applicable to the Work. Contractor further recognizes that the Owner and Architect do not owe the Contractor any duty to supervise or direct his work so as to protect the Contractor from the consequences of his own conduct.

3.4.5 Pursuant to Texas Education Code § 44.034, Contractor must give advance written notice to the Owner if the Contractor or an owner or operator of the Contractor has been convicted of a felony. The notice must include a general description of the conduct resulting in the conviction of a felony. The Owner may terminate this Contract if the Owner determines that the Contractor failed to give such notice or misrepresented the conduct resulting in the conviction. This paragraph requiring advance notice does not apply to a publicly-held corporation.

3.4.6 CRIMINAL HISTORY CHECKS

3.4.6.1 So that Owner can obtain the national criminal history record information required by Texas Education Code Section 22.08341 on all "covered employees" (as defined in Section 3.4.6.3) of Contractor, its subcontractors, or any subcontracting entities who will perform the Work, Contractor shall submit to Owner the name and all necessary identifying information necessary to enable Owner to obtain the national criminal history information on those covered employees before they begin the Work. Contractor's submission will include the employee's written authorization for Owner to obtain such criminal history information. Owner may, in its sole discretion, prohibit the use of any employee to perform the Work after its review of the criminal history information, but cannot disclose the criminal history information to Contractor. Contractor shall reimburse Owner for Owner's costs incurred in obtaining the criminal history information. Contractor's violation of this section shall constitute a substantial failure under Article 14.

3.4.6.2 Contractor will not assign any "covered employee" with a "disqualifying criminal history," as those terms are defined below, to work on the Project. If Contractor receives information that a covered employee has a reported disqualifying criminal history, then Contractor will immediately remove the covered employee from the Project and notify the Owner in writing within three (3) business days. If the Owner objects to the assignment of any covered employee on the basis of the covered employee's criminal history record information, then Contractor agrees to discontinue using that covered employee to provide services on Owner's Project. If Contractor has taken precautions or imposed conditions to ensure that the employees of Contractor and any subcontractor will not become covered employees, Contractor will ensure that these precautions or conditions continue throughout the time the contracted services are provided.

3.4.6.3 For the purposes of this Section, "covered employees" means employees, agents, or applicants of Contractor who has or will have continuing duties related to the services to be performed on Owner's Project and has or will have direct contact with Owner's students. The Owner will decide what constitutes direct contact with Owner's students. "Disqualifying criminal history" means: any conviction or other criminal history information designated by the Owner; any felony or misdemeanor conviction that would disqualify a person from obtaining educator certification under Texas Education Code § 21.060, and 19 Texas Administrative Code § 249.16; or one of the following offenses, if at the time of the offense, the victim was under 18 years of age or enrolled in a public school; a felony offense under Texas Penal Code Title 5 Offense Against Persons; an offense for which a defendant is required to register as a sex offender under Texas Code of Criminal Procedure Chapter 62; or an equivalent offense under federal law or the laws of another state.

3.4.7 OWNER'S ADDITIONAL REQUIREMENTS RELATED TO CRIMINAL HISTORIES

In addition, as provided in Section 3.4.6.1 above, Owner or Contractor will at least annually obtain criminal history record information that relates to any employee, agent, or applicant of the Contractor, if the person has or will have duties related to the Project, and the duties are or will be performed on Owner's Project, or at another location where students are likely to be present. Contractor shall assume all expenses associated with the background checks and shall immediately remove any employee, agent, or subcontractor who was convicted of a felony or a misdemeanor involving moral turpitude from Owner's property, or other location where students are likely to be present. Owner shall determine what constitutes "moral turpitude" or a "location where students are likely to be present."

3.4.7.1 If the Contractor is the person or owner or operator of the business entity, that individual may not self-certify regarding the criminal history record information and its review, and must submit original evidence acceptable to the Owner with this ~~Agreement~~Contract showing compliance

3.4.8 PREVAILING WAGE RATES

3.4.8.1 Contractor, Contractor's Subcontractors and Sub-subcontractors shall pay all workers not less than the general prevailing rate of per diem wages for work of a similar character where the project is located as detailed in the "Minimum Wage Schedule" attached to this Contract. Wages listed are minimum rates only. However, no claims for additional compensation above the Contract Sum shall be considered by the Owner because of payments of wage rates in excess of the applicable rate provided herein. Texas Government Code § 2258.001 *et seq*.

3.4.8.2 Contractor shall forfeit, as a penalty to the Owner, $60 for each laborer, worker, or mechanic, employed for each calendar day or part of the day that the worker is paid less than the wage rates stipulated in the Contract Documents.

3.4.8.3 Owner reserves the right to receive and review payroll records, payment records, and earning statements of employees of Contractor, and of Contractor's Subcontractors and Sub-subcontractors.

3.4.8.4 In executing the Work under the Contract Documents, Contractor shall comply with all applicable state and federal laws, including but not limited to, laws concerned with labor, equal employment opportunity, safety and minimum wages.

3.4.8.5 If no schedule is attached to the Contract, Contractor shall use the wage rates contained in the Project Manual for the Project. If no wage rates are in the Project Manual, then the parties shall use the wage rate determined by the U.S. Department of Labor in accordance with the Davis-Bacon Act, 40 U.S.C. § 276a, (which can be accessed on the internet at https://www.wdol.gov/or https://beta.sam.gov/) effective as of the date of this Contract.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require, ~~or permit~~ and that the Work will conform to the requirements of the Contract Documents.~~permit~~. The Contractor further warrants that Contractor shall perform the Work in a good and workmanlike manner, continuously and diligently in accordance with generally accepted standards of construction practice for construction of projects similar to the Project, except to the extent the Contract Documents expressly specify a higher degree of finish or workmanship, in which case the standard shall be the higher standard. All material shall be installed in a true and straight alignment, level and plumb; patterns shall be uniform; and jointing of materials shall be flush and level, unless otherwise directed in writing by the Architect. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance (unless such maintenance is Contractor's responsibility), improper operation, or normal wear and tear and normal usage, but such exclusions shall only apply after Owner has taken occupancy of the damaged or defective portion of the Project. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. Notwithstanding anything in the Contract Documents to the contrary, Owner and Contractor expressly agree that the warranties stated herein shall mean the individual warranties associated with each particular Work within the Project, and each such individual warranty shall run from the applicable Work's Final Completion date (unless otherwise expressly provided in the applicable Contract Documents for that particular Work.) Contractor's express warranty is in addition to, and not in lieu of, Owner's other available remedies. All required warranties on equipment, machinery, materials, or components shall be submitted to the Architect on the manufacturer's or supplier's approved forms for delivery to the Owner. The warranties set out in this Subparagraph are not exclusive of any other warranties or guarantees set out in other places in the Contract Documents or expressed or implied under applicable law.

§ 3.5.2 ~~All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4~~Contractor shall certify that the ~~Project~~Work has been constructed in general conformance with the Architect's or Engineer's plans, specifications, and Construction Documents, as modified from time to time pursuant to the terms of the Contract Documents. Contractor shall fully complete a "Certification of Project Completion" as required by 19 Texas Administrative Code § 61.1040~~36~~.

3.5.3 In the event of failure of materials, products, or workmanship, either during construction or the warranty period, the Contractor shall take appropriate measures to ensure correction of defective Work or replacement of the defective items, without cost to the Owner. Such warranty shall be maintained notwithstanding that certain systems may be activated prior to Substantial Completion as required for the satisfactory completion of the Project. Upon written notice from the Owner or Architect, the Contractor shall promptly remedy defects as covered by Contractor's warranty. If Contractor does not respond to the written notice, either by beginning corrective work or notifying Owner in writing regarding when corrective work will begin, within ten (10) days of Contractor's receipt of the written notice, then the Owner may take measures to correct the Work and Contractor will be obligated to reimburse Owner's costs. The provisions of this subparagraph shall be in addition to, and not in lieu of, any other rights and remedies available to the Owner.

3.5.3.1 All required warranties on equipment, machinery, materials, or components shall be submitted to the Architect on the manufacturer's or supplier's approved forms at the time of Substantial Completion

3.5.4 When deemed necessary by the Owner and prior to installation of any item specifically made subject to a performance standard or regulatory agency standard under any provision of the Contract Documents, Contractor shall furnish proof of conformance to the Architect. Proof of conformance shall be in the form of:

.1 an affidavit from the manufacturer certifying that the item is in conformance with the applicable standards; or

.2 an affidavit from a testing laboratory certifying that the product has been tested within the past year and is in conformance with the applicable standards; or

.3 such further reasonable proof as is required by the Architect.

3.5.5 The Contractor agrees to issue the warranty (or warranties) in the name of the Owner, or assign the warranty (or warranties) to the Owner at Final Completion of the Work, such assignment to be effective no later than Final Completion, for any and all material, equipment, fixtures, and furniture (if supplied or installed by Contractor or its subcontractor), or other special warranties, and manufacturers' warranties relating to materials and labor used in the Work. Contractor further agrees to perform the Work in such manner so as to preserve any and all manufacturer's warranties. All forms will be required to be submitted prior to Final Payment.

3.5.6 The warranties of Contractor provided in Section 3.5 shall in no way limit or abridge the warranties of the suppliers of equipment and systems which are to comprise a portion of the Work and all such warranties shall be in form and substance as required by the Contract Documents. Contractor shall take no action or fail to act in any way which results in the termination or expiration of such third party warranties or which otherwise results in prejudice to the rights of Owner under such warranties. Contractor agrees to provide all notices required for the effectiveness of such warranties and shall include provisions in the contracts with the providers and manufacturers of such systems and equipment whereby Owner shall have a direct right, but not a duty, of enforcement of such warranty obligations.

3.5.7 Contractor shall maintain a complete and accurate schedule of the date(s) of Substantial Completion, the date(s) of Final Completion, and the dates upon which the warranty under Section 12.2 herein on each phase or building will expire. Contractor shall provide a copy of such schedules to Owner and Architect. Prior to termination of the warranty period under Section 12.2 herein, Contractor shall accompany Owner and Architect on re-inspection of each Work in the Project and Contractor shall be responsible from correcting any warranty items which are observed or reported during the warranty period under Section 12.2 herein. Contractor shall prosecute such warranty work under Section 12.2 herein without interruption until accepted by Owner and Architect, even though such work shall extend beyond the warranty period under Section 12.2 herein. If Contractor fails to provide the schedules to Owner and Architect, Contractor's warranty obligation described herein shall continue until such inspection is conducted and deficiencies are corrected.

3.5.8 Prior to receipt of Final Payment, Contractor shall:

.1 Obtain duplicate original warranties, executed by all subcontractors, making the dates of beginning of the warranties the Date of Final Completion; and the warranties of suppliers and manufacturers, making the dates of beginning of the warranties no later than the Date of Final Completion;

.2 Verify that the documents are in proper form and contain full information;

.3 Co-sign warranties when required;

.4 Bind all warranties in commercial quality 8-1/2 X 11 inch three-ring binder, with hardback, cleanable, plastic covers;

.5 Label the cover of each binder with a typed or printed title labeled "WARRANTIES", along with the title of the Project, name, address, and telephone number of Contactor, and name of its responsible principal;

.6 Include a Table of Contents, with each item identified by the number and title of the specification section under which the product is specified;

.7 Separate each warranty with index tab sheets keyed to the Table of Contents listing; and

.8 Deliver warranties and bonds in the form described above, to the Architect who will review same prior to submission to the Owner.

3.5.8.1 Contractor and Owner acknowledge that the Project may involve construction work on more than one school building for the Owner. Each building, or approved phase of each building, shall have its own, separate, and independent date of substantial completion, dates upon which the one-year warranty on each phase or building, which is substantially complete, will expire, and dates of final completion. Contractor agrees to provide notice of the warranty expiration date to Owner and Architect at least one month prior to the expiration of the one (1) year warranty period on each building or each phase of the building that has been substantially completed. If Owner, Architect or Program Manager discovers during the warranty period, deficiencies not previously reported, Contractor shall accompany the Owner, Architect and Program Manager on an inspection of such deficiencies and Contractor shall be responsible for correcting any such deficiencies not caused by the Owner or the use of the building. For extended warranties required by various sections, i.e., roofing, compressors, mechanical equipment, Owner will notify the Contractor of deficiencies and Contractor shall start remedying these defects within fifteen (15 days of initial notification from Owner. Contractor shall prosecute the work without interruption until accepted by the Owner and the Architect, even though such prosecution should extend beyond the limit of the warranty period. If Contractor fails to provide notice of the expiration of the one (1) year warranty period at least one month prior to the expiration date, Contractor's warranty obligation described in this paragraph shall continue until such inspection is conducted and any deficiencies found in the inspection corrected Contractor shall certify that the Work has been constructed in accordance with the Contract Documents. Any work performed by the Contractor that is not in accordance with the Contract Documents is defective and a breach of this agreement unless the Owner has agreed in writing to waive the defect. The Contractor shall provide all reasonable assistance in achieving compliance with building code specifications, accessibility standards, and Texas Education Agency Commissioner's rules in the Work.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect. Owner is an exempt entity under the tax laws of the State of Texas. Texas Tax Code § 151.309; 34 TAC § 3.322. The Owner represents that this Project is eligible for exemption from the State Sales Tax on tangible personal property and material incorporated in the Project, provided that the Contractor fulfills the requirements of the Texas Tax Code § 151.309; § 151.310; § 151.311, and 34 TAC § 3.291 and § 3.287. For the purpose of establishing exemptions, it is understood and agreed that the Contractor may be required to segregate materials and labor costs at the time a Contract is awarded. Contractor will accept a Certificate of Exemption from the Owner, pursuant to Texas Tax Code § 151.054(e), § 151.155, and 34 TAC § 3.287. Contractor shall obtain Certificates of Resale from Contractor's suppliers. Texas Tax Code § 151.154; 34 TAC § 3.285. Failure of Contractor or any Sub-Contractor to obtain Certificates of Resale from their suppliers shall make the Contractor or Sub-Contractor responsible for absorbing the tax without compensation from Owner. Contractor shall pay all necessary local, county, and state taxes, income tax, compensation tax, social security, and withholding payments, as required by law. CONTRACTOR HEREBY RELEASES, INDEMNIFIES, AND HOLDS HARMLESS OWNER FROM ANY AND ALL CLAIMS AND DEMANDS MADE AS A RESULT OF THE FAILURE OF CONTRACTOR OR ANY SUBCONTRACTOR TO COMPLY WITH THE PROVISIONS OF ANY OR ALL SUCH LAWS AND REGULATIONS.

3.6.2 ~~1~~ The Dallas Independent School District is an exempt organization as defined by the Limited Sales and Excise Use Tax Act of Texas. The Contractor may issue an exemption certificate in lieu of sales tax on the purchase, rental or lease of all materials, supplies, equipment used or consumed and other tangible personal property incorporated into the property being improved by virtue of this Contract, as well as all materials, supplies, equipment and other tangible personal property used or consumed by the Contractor in performing this Contract with the Dallas Independent School District. The Contractor may issue exemption certificate(s) to its suppliers in lieu of said sales tax for all of said materials and supplies. The uses of said materials and supplies for which an exemption from the said sales tax is claimed and any such exemption certificate(s), shall comply with the applicable rulings of the State Comptroller.

3.6.3 ~~2~~ The Contractor shall be held to have studied all tax laws for the State of Texas, the County of Dallas, Texas and the City of Dallas, Texas, and shall pay all taxes for which he may be liable as a consumer or user of goods, or otherwise without addition to the contract price. The Contractor shall pay all sales, consumer, use and other similar taxes required by law.

3.6.4 ~~3~~ Title to all goods or materials purchased under a~~s~~ resale certificate shall vest in the District at the time of initial possession by the Program Manager and shall be used only in performance of Services under this ~~Agreement~~Contract. Program Manager shall cause such items to promptly be marked, labeled or otherwise physically identified as the District's property. Program Manager shall cause items purchased under a resale certificate to send the receiving ticket to the District to be added to inventory before use by the Program Manager. Any tangible personal property purchased under a resale certificate as described above not fully used up in the Services shall remain with the District

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 ~~Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded~~After Architect has filed the plans and specifications with the Texas Department of Licensing and Regulation, Architect shall notify Contractor that Contractor may make and submit the applications for the building permit. The ~~Owner~~Contractor shall pay the municipality directly for the building permit and all other development "impact" fees, if any. The Contractor shall continue to be responsible for payment of other permits, governmental fees, licenses and inspections necessary for proper execution of the Contract and which are legally required when bids or proposals are received. Such fees and expenses shall only be reimbursable to Contractor if expressly agreed to herein.

Architect shall assist Contractor in obtaining an Occupancy Permit by accompanying governing officials during inspections, including the architectural barrier inspection and correction, of the Project, if requested to do so by the Program Manager or the Owner. Architect shall assist the Contractor in obtaining the Certificate of Occupancy prior to the issuance of the Certificate of Substantial Completion.

3.7.1.1 The Owner shall pay directly to the governing authority the cost of all permanent property utility assessments and similar connection charges.

3.7.1.2 The Contractor shall pay directly all temporary utility charges, tap charges, and water meter charges, without reimbursement from Owner. After consultation with the Owner, the Contractor shall also obtain all permits and approvals, and pay all fees and expenses, if any, associated with National Pollutant Discharge Elimination System (NPDES) regulations administered by the Environmental Protection Agency (EPA) and local authorities, if applicable, that require completion of documentation and/or acquisition of a "Land Disturbing Activities Permit" for the Project. Also after consultation with the Owner, the Contractor shall obtain all permits and approvals, and pay all fees and expenses, if any, associated with Storm Water Pollution Prevention and Pollution Control Plan (SWPPP) regulations administered by the Texas Commission on Environmental Quality (TCEQ) and local authorities. Contractor's obligations under this Section may or may not require it to obtain or perform engineering services during the pre-construction phase to prepare proper drainage for the construction sites. Any drainage alterations made by Contractor during the construction process, which require the issuance of a permit, shall be at Contractor's sole cost. Reimbursable expenses shall not include any fines or penalties assessed against the Contractor, Contractor's subcontractors, the Project, or the Owner.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work. In addition, Contractor shall authorize posting of any notices required of Owner pursuant to Texas Business and Commerce Code, Section 116.0001, or any notices concerning the Workers Compensation insurance carried by other parties involved in the Project, including without limitation, Architect, at the same location where Contractor posts notices regarding Workers Compensation. If applicable, the Contractor shall procure and obtain all bonds required of the Owner or the Contractor by the municipality in which the Project is located or by any other public or private body with jurisdiction over the Project. In connection with such bonds, the Contractor shall prepare all applications, supply all necessary back-up material, and furnish the surety with any required personal undertakings. The Contractor shall also obtain and pay all charges for all approvals for street closings, traffic control, parking meter removal, and other similar matters as may be necessary or appropriate from time to time for the performance of the Work.

§ 3.7.3 If the Contractor performs Work when Contractor knows~~ing~~ or reasonably should have known it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, the Contract Documents, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 [*Intentionally deleted*] ~~Concealed or Unknown Conditions~~

~~If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than three 14(3) business days after first observance of the conditions. Contractor agrees that this is a reasonable notice requirement. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially, report findings and a recommended resolution in writing to Owner and Contractor. If Owner's Board of Trustees and Contractor cannot agree on an equitable adjustment to the Contract Sum or Contract Time, then either party may pursue alternative dispute resolution as provided for in Article 15, within ninety (90) days of the Architect's recommendation. If such conditions will cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, the Architect will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.~~

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect in writing. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

3.7.6 The Contractor shall be responsible for timely notification to and coordination with all utility companies regarding the provision of services to the Project. The Contractor shall inform the Architect and Program ~~at~~Manager at once when the Owner's participation is required, and the Architect shall immediately notify the Owner. Connections for temporary and permanent utilities and payment for temporary utilities services required for the Work, whether the Work is new construction or renovation of an existing facility, are the responsibility of the Contractor unless otherwise agreed. If the Work is new construction, the payment for temporary and/or permanent utility services shall be the responsibility of the Contractor until Substantial Completion.

3.7.6.1 The Owner shall pay directly to the relevant jurisdiction those fees presently called "Storm Water Disposal Fees" to the water and sewage departments. Contractor shall ascertain amounts and advise Architect. Water meter charges shall be paid by the Contractor

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, unless required to do so by the terms of the Construction Documents.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

.1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site ~~and all required taxes~~, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, bonds, insurance, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

.3 whenever costs are more than or less than allowances, the Contract Sum or the Owner's Contingency, at Owner's discretion, unless required to do so by the terms of the Construction Documents, shall be adjusted accordingly ~~by Change Order~~. The amount of the adjustment~~Change Order~~ shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner ~~with reasonable promptness~~ , to avoid delay in the Work, provided that if a decision is needed to avoid delay, Contractor shall notify Architect and Program Manager in writing sufficiently in advance of needed date to allow reasonable time for selections to be made

3.8.4 When performing Work under allowances, Contractor shall solicit and receive not less than three (3) written proposals and shall provide the Work as directed by the Architect, upon Owner's written approval, on the basis of the best value to the District.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. In addition, the Contractor may employ a project manager and necessary assistants who may supervise several Project sites. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. Important communication shall be similarly confirmed in writing. Other communications shall be similarly confirmed on written request in each case. Questions about plan interpretation or directions shall be submitted to the Architect in the form of a written request for information and the Architect shall respond to such request for information in a reasonable and timely fashion. Contractor's selection of project manager or superintendent(s) shall be approved by Owner, and Contractor shall not replace the project manager or superintendent(s) without Owner's consent or until a replacement project manager or superintendent(s) has been selected in accordance with this Section. The Owner may reject or require removal of any job superintendent, project manager, or employee of the Contractor, Subcontractor, or Sub-Subcontractor involved in the Project. Contractor shall provide an adequate staff for the proper coordination and expedition of the Work. Owner reserves the right to require Contractor to dismiss from the Work any employee or employees that Owner may deem incompetent, careless, insubordinate, or in violation of any provision in these Contract Documents. This provision is applicable to Subcontractor, Sub-Subcontractor, and their employees.

§ 3.9.2 ~~The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.~~

§ 3.9.3 ~~The~~ Contractor's superintendent shall be present full-time on the site as soon as possible after commencement of the Work, and shall remain~~ed~~ assigned to this Work and present on the site during performance of the Work, throughout the course of the Work, until items requiring completion or correction, identified at Substantial Completion pursuant to Section 9.8, have been completed or corrected. From Substantial Completion until Final Completion, the superintendent shall be on the site as necessary to ensure that Final Completion occurs within 30 days of Substantial Completion~~not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed~~.

3.9.4 Owner shall be notified not less than 24 hours before any time that superintendent will not be present at the site for any reason except periodic illness. If the reason is due to illness, then Owner shall be notified at the beginning of that day. Owner shall be notified of the identity of the acting superintendent. In the event the superintendent is absent from the site and notice has not been provided nor has an acting superintendent been assigned to the Work, then an amount equal to the superintendent's daily rate shall be deducted for the amount owed to the Contractor under general conditions for such day.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare for and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project. The schedule shall not interfere with the operation of Owner's existing facilities and operations without Owner's prior written approval.

3.10.1.2 In the event that the Contractor is entitled to an extension of the Substantial Completion Date or any required interim completion date under the Contract Documents, Owner shall be entitled to direct the acceleration or re-sequencing of the Work in order to achieve the prior scheduled Substantial Completion Date or interim completion dates, and Contractor shall be reimbursed for the amount of the premium portion of overtime actually incurred in respect thereto and shall be entitled to an increase adjustment to the Contract Sum to the extent of the premium portion of overtime so incurred. Before proceeding with any such Owner-directed acceleration plan under this subparagraph, the Contractor shall have received the Owner's prior written approval of the plan and its anticipated not-to-exceed cost.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall prepare and submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect and Program Manager reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in ~~general~~ accordance with the most recent schedules submitted to the Owner and Architect.

3.10.4 The Contractor shall hold weekly progress meetings at the Project Site, or at such other time and frequency as are acceptable to the Owner. Program Manager shall conduct such meetings; and, shall manage Architect's recording, transcribing and distributing minutes to attendees, Architect, and other appropriate parties. Progress of the Work shall be reported at said meeting with reference to Contractor's construction schedule. The Contractor shall submit to the Architect, with each monthly application for payment, a copy of the progress schedule showing all modifications required, and shall take whatever corrective action is necessary to assure that the project completion schedule is met at no additional cost to Owner, except as allowed herein. In the event that Contractor shall fall behind schedule at any time, Contractor shall develop and deliver a recovery plan to the Owner with a recovery schedule and a program describing the additional manpower, overtime, material expediting, resequencing of the Work, and other steps Contractor shall take to meet the requirements of the Contract. Contractor shall not be entitled to compensation from the Owner or any increase in the Contract Sum for the schedule recovery efforts. No approval or consent by the Owner of any plan for resequencing or acceleration of the Work submitted by Contractor shall constitute a waiver by Owner of any damages or losses which Owner may suffer by reason of such resequencing or the failure of Contractor to meet the Substantial Completion Date or the Final Completion Date.

3.10.5 The process of approving Contractor's schedules and updates to Contractor's schedule shall not constitute a warranty by the Owner that any non-Contractor milestones or activities will occur as set out on Contractor's schedule. Approval of a Contractor's schedule does not constitute a commitment by the Owner to furnish any Owner-furnished information or material any earlier than Owner would otherwise be obligated to furnish that information or material under the Contract Documents. Failure of the Work to proceed in the sequence scheduled by

Contractor shall not alone serve as the basis for a Claim for additional compensation or time. In the event there is interference with the Work, which is beyond its control, Contractor shall attempt to reschedule the Work in a manner that will hold resulting additional time and costs to a minimum. The construction schedule shall be in a detailed format satisfactory to the Owner, the Architect and Program Manager. If not accepted, the construction schedule shall be promptly revised by the Contractor in accordance with the recommendations of the Owner, Program Manager and Architect and re-submitted for acceptance. The Contractor shall monitor the progress of the Work for conformance with the requirements of the construction schedule and shall promptly advise the Owner of any delays or potential delays. The accepted construction schedule shall be updated to reflect actual conditions (sometimes referred to in these Supplementary Conditions as progress reports) as set forth in Subparagraph 3.10.1 or if requested by either the Owner or the Architect.

3.10.6 The Owner shall have the right to reschedule the time of day for the performance of any part of the Work that may interfere with the operation of the Owner's premises or any tenants or invitees thereof. The Contractor shall, upon the Owner's request, reschedule any portion of the Work affecting operation of the premises during hours when the premises are not in operation. Any rescheduling of performance of the Work under this Subparagraph 3.10.6 may be grounds for an extension of the Contract Time, if permitted under Subparagraph 8.3.1, and an equitable adjustment in the Contract Sum, if: 1) the performance of the Work was properly scheduled by the Contractor in compliance with the requirements of the Contract Documents, 2) such rescheduling is required for the convenience of the Owner and is not attributable to any act or omission of Contractor.

3.10.7 The Owner's need for delivery of completed work, or portions thereof, is largely controlled by the necessities of the school calendar and operations of school programs within that calendar. These needs are reflected in any scheduled completion dates and milestone dates set out in the Contract Documents. The Contractor shall perform the work in such a way as to not interfere with school operations, the importance of meeting milestones and completion dates, and Contractor acknowledges and agrees that if these dates are not met, there may be a relaxation in the needed delivery dates because of the school calendar. When it appears to Owner or Contractor that a Contract milestone or completion date cannot be met for reasons not the fault of the Contractor, Contractor will develop with the Owner, Program Manager and Architect a plan and a budget under the Change Order provision of the Contract Documents to meet such a situation either (at Owner's option) by accelerating the Work to overcome the delays, or suspending or otherwise slowing the Work to efficiently take advantage of any relaxation in Owner's need for the completed Work.

§ 3.11 Documents and Samples at the Site

The Contractor shall maintain and make available, at all times, at the Project site, the Constructionact Documents, including Change Orders, Construction Change Directives, field test records (including environmental inspection and test records), inspection certificates or records, manufacturers' certificates, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner at all times, and delivered to the Architect for completion of record drawings.

3.11.2 In addition to any other requirement in the Contract Documents and prior to installation, Contractor shall furnish or cause a subcontractor to furnish for the Owner's and Architect's written approval, a physical sample of each specified item, product, fixture, or device which is visible by the general public and/or attached to an architecturally-finished surface. Samples shall be suitably labeled, adequately protected, and properly stored at the site. Samples which are approved and undamaged will be considered to be suitable for incorporation into the Work.

§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required by the Contract Documents and~~Their purpose is to demonstrate~~ how the Contractor proposes to conform to the ~~information given and the design concept expressed in the~~ Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents~~, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule~~, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

§ 3.12.6 By approving and submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents ~~to the Owner and Architect~~ that the Contractor has ~~(1) reviewed and approved them, (2)~~ determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and ~~(3)~~ checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. Specific dimensions, quantities, installation and performance of equipment and systems in compliance with the Construction Documents and the Contract Documents remain the Contractor's responsibility.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. ~~The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents.~~ The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, completeness, and accuracy of the services, certifications, and approvals performed or provided by such design professionals~~, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy~~. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. A registered architect must prepare

plans and specifications for all the Work, as governed by the Texas Occupations Code Chapter 1051; and a registered engineer must prepare plans, specifications, and estimates for all Work governed by Texas Occupations Code Chapter 1001. In the event that Contractor retains a licensed design professional under the terms of this paragraph, Contractor shall require that the licensed design professional carry commercial general liability and errors and omissions insurance coverage in the same amounts and forms as required by the Architect on this Project. In the event that the licensed design professional retained by the Contractor will be conducting on-site services or observations, the licensed design professional shall also carry worker's compensation insurance and comprehensive automobile liability in the same amounts and form as required of the Architect to this Project.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

3.12.11 The Contractor shall submit complete drawings, data, and samples to the Architect at least fifteen (15) days prior to the date the Contractor needs the reviewed submittals and samples returned. The Contractor shall be prepared to submit color samples on any key items (such as quarry tile, vinyl wall covering, etc.) within fifteen (15) days of the award of Subcontract(s). All color samples required for the Work shall be received within sixty (60) days of the date of the approval of the Contract Sum, if the Project is an A101 project; or Guaranteed Maximum Price, if the Project is an A133 project. Once samples of all key items are received, the Architect will finalize color selections.

3.12.12 The Contractor shall submit the number of copies of product data and samples which the Contractor and subcontractors need for their use, plus two (2) additional sets for the Architect, one (1) additional set for the Owner, and one (1) additional set for each of the Architect's consultants involved with the particular section of Work. Where shop drawings are involved, the Contractor shall submit one (1) high quality reproducible transparency, and one (1) opaque print of the shop drawing for the Architect, plus one (1) additional opaque print for each of the Architect's consultants involved with the particular section of Work. The reproducible transparency will be marked by the Architect and/or his consultants. After final review and correction of the submittal, the Contractor shall send one corrected set to the Architect and each of the Architect's consultants involved with the particular section of the Work.

3.12.13 The Architect's review of Contractor's submittals shall be limited to examination of an initial submittal and one (1) re-submittal. The Architect's review of additional submittals will be made only with the consent of the Owner after notification by the Architect. The Owner shall be entitled to reimbursement from the Contractor of amounts paid to the Architect for evaluation of such additional re-submittals.

3.1.2.14 The Contractor represents and warrants that all shop drawings shall be prepared by persons and entities possessing expertise and experience in the trade for which the shop drawings are prepared and, if required by the Architect or applicable law, by a licensed engineer.

§ 3.13 Use of Site

3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment. When the Work is to be performed at an existing school location, Contractor shall schedule and perform the Work in a manner that does not compromise the safety to school students, faculty and staff, and does not unreasonably disrupt or interfere with the continuing normal routine of the school. If a School Operations Parameters Statement is a part of the Contract Documents, Contractor will comply with its terms, at no increase in price.

3.13.2 Only materials and equipment which are to be used directly in the Work shall be brought to and stored on the Project site by the Contractor. After equipment is no longer required for the Work, it shall be properly removed from the Project site. Protection of construction material and equipment stored at the Project site from weather, theft, damage, and all other adversity is solely the responsibility of the Contractor.

3.13.3 The Contractor and its subcontractor shall not erect any sign on the Project site without the prior written consent of the Owner.

3.13.4 Contractor shall ensure that the Work, at all times, is performed in a manner that affords Owner reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work shall be performed in such a manner that the public area adjacent to the Site of the Work shall be free from all debris, building material, and equipment likely to cause hazardous conditions. Without limitation of any other provision of the Construction Documents, Contractor shall use its best efforts to minimize any interference with the occupancy or beneficial use of any area or building adjacent to the site of the Work, or the building, in the event of partial occupancy.

3.13.5 Without prior approval of the Owner, the Contractor shall not permit any workers to use any existing facilities at the Project site, including, without limitation, lavatories, toilets, entrance and parking areas other than those designated by the Owner. The Contractor shall comply with all rules and regulations promulgated by the Owner in connection with the use and occupancy of the Project site and the Building.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly provided, however, that any such cutting, fitting, or patching can only be performed if the cutting, fitting, or patching results in Work that is in accordance with the Construction Documents and Contract Documents. ~~All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.~~

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

3.14.3 No cutting of structural elements will be permitted unless specifically approved in writing by Architect. Fitting and patching shall only be done with new products, and shall only be performed by those skilled in performing the original Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall, on a daily basis, keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. Contractor shall provide on-site containers for the collection of waste materials, debris and rubbish, and shall periodically remove waste materials, debris and rubbish from the Work and dispose of all such materials at legal disposal areas away from the site. All cleaning operations shall be scheduled so as to ensure that contaminants resulting from the cleaning process will not fall on newly-coated or newly-painted surfaces. Immediately after unpacking materials, all packing case lumber or other packing materials, wrapping or other like flammable waste shall be collected and removed from the building and premises. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project. Care shall be taken by all workers not to mark, soil, or otherwise deface any finish. In the event that any finish becomes defaced in any way by mechanics or workers, the Contractor or any of his Subcontractors shall clean and restore such surfaces to their original condition.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the ~~Owner shall be entitled to reimbursement from~~from the cost thereof shall be charged to the Contractor.

3.15.3 The Contractor shall be responsible for the protection of the Work. Prior to the Architect's inspection for Substantial Completion, the Contractor shall clean exterior and interior surfaces exposed to view; remove temporary labels, stains, putty, soil, paint and foreign substances from all surfaces, including glass and painted surfaces; polish transparent and glossy surfaces; clean equipment and fixtures to a sanitary condition; replace air filters in mechanical equipment; clean roofs, gutters, and downspouts; remove obstructions and flush debris from drainage systems; clean site; sweep paved areas, and rake clean other surfaces; remove trash and surplus materials from the site; clean and polish all floors; clean and polish all hardware; and repair all Work damaged during cleaning.

3.15.4 After construction is complete, Contractor shall: (1) employ skilled workers for final cleaning; (2) remove grease, mastic adhesive, dust, dirt, stains, fingerprints, labels and other foreign materials from all sight-exposed interior and exterior surfaces; (3) wash and shine glazing and mirrors; (4) polish glossy surfaces to a clear shine; (5) vacuum clean carpet and similar soft surfaces; (6) clean (damp mop with clean mop and water) resilient and hard surface floors, repeating as necessary until no visible residue remains on floors; (7) clean plumbing fixtures to a sanitary condition; (8) clean surfaces of all equipment and remove excess lubrication; (9) clean permanent filters and replace disposable filters in ventilating system if units are operated during construction and clean ducts, blowers, and coils; (10) clean light fixtures; (11) remove waste, foreign matter, and debris from roofs, gutters, area ways, and drainage ways; (12) remove waste, debris, and surplus materials from the site; (13) remove stains, spills, and foreign substances from paved areas; and (14) broom clean exterior concrete and paved surfaces, and rake clean the grounds.

§ 3.16 Access to Work

The Contractor shall provide the Owner, Program Manager and Architect and their designated representatives with access to the Work in preparation and progress wherever located. The presence of the Owner, Program Manager or Architect at the Work site does not imply acceptance or approval of the Work. ~~The presence of the Owner, Architect, or their representatives does not constitute acceptance or approval of the Work.~~

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. THE CONTRACTOR SHALL DEFEND SUITS OR CLAIMS FOR INFRINGEMENT OF COPYRIGHTS AND PATENT RIGHTS AND SHALL WAIVE AND RELEASE CLAIMS AGAINST THE OWNER, PROGRAM MANAGER AND ARCHITECT, AND SHALL INDEMNIFY AND HOLD HARMLESS THE OWNER AND ARCHITECT ~~HARMLESS~~ FROM LOSS ON ACCOUNT THEREOF, PROVIDED, HOWEVER, CONTRACTOR ~~BUT~~ SHALL NOT BE RESPONSIBLE TO ARCHITECT FOR SUCH DEFENSE OR LOSS WHEN A PARTICULAR DESIGN, PROCESS, OR PRODUCT OF A PARTICULAR MANUFACTURER OR MANUFACTURERS IS REQUIRED BY THE CONTRACT DOCUMENTS, OR WHERE THE COPYRIGHT VIOLATIONS ARE CONTAINED IN DRAWINGS, SPECIFICATIONS, OR OTHER DOCUMENTS PREPARED BY THE ~~OWNER OR~~ ARCHITECT, AND SHALL NOT BE RESPONSIBLE TO OWNER IF OWNER REQUIRES A PARTICULAR DESIGN, PROCESS, OR PRODUCT THAT CONSTITUTES A COPYRIGHT VIOLATION. However, if the Contractor has reason to believe that the required design, process, or product is an infringement of a copyright or patent ~~is discovered by, or made known to, the Contractor,~~ the Contractor shall be responsible for ~~the~~such loss unless such~~the~~ information is promptly furnished to the Owner and Architect in writing.

§ 3.18 Indemnification

§ 3.18.1 TO THE FULLEST EXTENT PERMITTED BY LAW, THE CONTRACTOR SHALL WAIVE AND RELEASE CLAIMS AGAINST AND SHALL INDEMNIFY AND HOLD HARMLESS THE OWNER, ARCHITECT, ARCHITECT'S CONSULTANTS, OWNER'S TRUSTEES, CONSULTANTS, -PROGRAM MANAGER, AND OFFICERS, AGENTS AND EMPLOYEES OF ANY OF THEM FROM AND AGAINST CLAIMS, DAMAGES, LOSSES, CAUSES OF ACTION, SUITS, JUDGMENTS AND EXPENSES, INCLUDING BUT NOT LIMITED TO ATTORNEYS' FEES, ARISING OUT OF OR RESULTING FROM PERFORMANCE OF THE WORK, PROVIDED THAT SUCH CLAIM, DAMAGE, LOSS, OR EXPENSE IS ATTRIBUTABLE TO BODILY INJURY, SICKNESS, DISEASE OR DEATH, OR TO INJURY TO OR DESTRUCTION OF TANGIBLE PROPERTY (INCLUDING THE WORK ITSELF), INCLUDING LOSS OF USE RESULTING THEREFROM, BUT ONLY TO THE EXTENT CAUSED IN WHOLE OR IN PART BY THE WILLFUL OR NEGLIGENT ACTS OR OMISSIONS OF THE CONTRACTOR, A SUBCONTRACTOR, ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY THEM, ANYONE THEY CONTROL OR EXERCISE CONTROL OVER OR ANYONE FOR WHOSE ACTS THEY MAY BE LIABLE, REGARDLESS OF WHETHER OR NOT SUCH CLAIM, DAMAGE, LOSS, OR EXPENSE IS CAUSED IN PART BY A PARTY BY ANY WILLFUL OR NEGLIGENT ACTS OR OMISSIONS OF OWNER OR OWNER'S CONSULTANTS OR OTHER INDEMNIFIED PARTIES. SUCH OBLIGATION SHALL NOT BE CONSTRUED TO NEGATE, ABRIDGE, OR REDUCE OTHER RIGHTS OR OBLIGATIONS OF INDEMNITY THAT WOULD OTHERWISE EXIST AS TO A PARTY OR PERSON DESCRIBED IN THIS SECTION 3.18. ALL COSTS AND EXPENSES SO INCURRED BY ANY OF THE INDEMNIFIED PARTIES IN THAT EVENT SHALL BE REIMBURSED BY CONTRACTOR TO THE INDEMNIFIED PARTIES, AND ANY COST AND EXPENSES SO INCURRED BY INDEMNIFIED PARTIES SHALL BEAR INTEREST UNTIL REIMBURSED BY CONTRACTOR, AT THE RATE OF INTEREST PROVIDED TO BE PAID BY THE JUDGMENT UNDER THE LAWS OF THE STATE OF TEXAS.

3.18.2 IN CLAIMS AGAINST ANY PERSON OR ENTITY INDEMNIFIED UNDER THIS SECTION 3.18 BY AN EMPLOYEE OF THE CONTRACTOR, A SUBCONTRACTOR, ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY THEM, OR ANYONE FOR WHOSE ACTS THEY MAY BE LIABLE, THE INDEMNIFICATION OBLIGATION UNDER SECTION 3.18.1 SHALL NOT BE LIMITED BY A LIMITATION ON AMOUNT OR TYPE OF DAMAGES, COMPENSATION, OR BENEFITS PAYABLE BY OR FOR THE CONTRACTOR OR A SUBCONTRACTOR UNDER INSURANCE POLICIES, WORKERS' COMPENSATION ACTS, DISABILITY BENEFIT ACTS, OR OTHER EMPLOYEE BENEFIT ACTS.

3.18.3 THE OBLIGATIONS OF THE CONTRACTOR UNDER THIS SECTION 3.18 SHALL NOT EXTEND TO THE LIABILITY OF THE ARCHITECT. THE ARCHITECT'S CONSULTANTS, AND AGENTS, AND EMPLOYEES OF ANY OF THEM, CAUSED BY OR RESULTING FROM: (1) DEFECTS IN PLANS, DESIGNS, OR SPECIFICATIONS PREPARED, APPROVED, OR USED BY THE ARCHITECT OR ENGINEER; OR (2) NEGLIGENCE OF THE ARCHITECT OR ENGINEER IN THE RENDITION OR CONDUCT OF PROFESSIONAL DUTIES CALLED FOR OR ARISING OUT OF THE CONSTRUCTION CONTRACT AND THE PLANS, DESIGNS, OR SPECIFICATIONS THAT ARE A PART OF THE CONSTRUCTION CONTRACT; AND (3) ARISING FROM: (A) PERSONAL INJURY OR DEATH; (B) PROPERTY DAMAGE; OR (C) ANY OTHER EXPENSES THAT ARISE FROM PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE OR AS OTHERWISE LIMITED BY TEXAS CIVIL PRACTICE & REMEDIES CODE SECTION 130.001 ET SEQ.

3.18.4 THE OWNER MAY CAUSE ANY OTHER CONTRACTOR WHO MAY HAVE A CONTRACT WITH THE OWNER TO PERFORM CONSTRUCTION OR INSTALLATION WORK IN THE AREAS WHERE WORK WILL BE PERFORMED UNDER THIS AGREEMENT, TO AGREE TO INDEMNIFY AND TO HOLD THE OWNER AND THE CONTRACTOR HARMLESS FROM ALL CLAIMS FOR BODILY INJURY AND PROPERTY DAMAGE TO THE SAME EXTENT AS IS PROVIDED IN SECTION 3.18.1 ABOVE. LIKEWISE, CONTRACTOR AGREES TO INDEMNIFY AND TO HOLD THE OWNER'S OTHER CONTRACTORS HARMLESS FROM ALL CLAIMS FOR BODILY INJURY AND PROPERTY DAMAGE TO THE SAME EXTENT AS PROVIDED IN SECTION 3.18.1 ABOVE.

3.18.5 THE PROVISIONS OF SECTION 3.18 IN ITS ENTIRETY SHALL SURVIVE THE COMPLETION, TERMINATION, OR EXPIRATION OF THIS CONTRACT.

3.18.6 It is agreed with respect to any legal limitations now or hereafter in effect and affecting the validity or enforceability of the indemnification obligations under Paragraph 3.18, such legal limitations are made a part of the indemnification obligation and shall operate to amend the indemnification obligation to the minimum extent necessary to bring the provision into conformity with the requirements of such limitations, and as so modified, the indemnification obligations shall continue in full force and effect.

3.18.7 It is understood and agreed that Subparagraph 3.18.1 above is subject to, and expressly limited by, the terms and conditions of Texas Civ. Prac. & Rem. Code Ann. Sec. 130.001 to 130.005, as amended.

3.18.8 THE OWNER MAY CAUSE ANY OTHER CONTRACTOR WHO MAY HAVE A CONTRACT WITH THE OWNER TO PERFORM CONSTRUCTION OR INSTALLATION WORK IN THE AREAS WHERE WORK WILL BE PERFORMED UNDER THIS AGREEMENT, TO AGREE TO INDEMNIFY AND TO HOLD THE OWNER AND THE CONTRACTOR HARMLESS FROM ALL CLAIMS ATTRIBUTABLE TO BODILY INJURY, SICKNESS, DISEASE, OR DEATH OR TO INJURY TO, OR DESTRUCTION OF TANGIBLE PROPERTY (INCLUDING THE WORK ITSELF) INCLUDING LOSS OF USE, TO THE SAME EXTENT AS PROVIDED IN SUBPARAGRAPH 3.18.1 ABOVE.

3.19 ANTITRUST VIOLATION. To permit the Owner to recover damages suffered in antitrust violations, Contractor hereby assigns to Owner any and all claims for overcharges associated with this Contract which violate the antitrust laws of the United States, 15 U.S.C.A. Section 1 *et seq*. The Contractor shall include this provision in its agreements with each subcontractor and supplier. Each subcontractor shall include such provisions in agreements with sub-subcontractors and suppliers.

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the ~~Agreement~~Contract.

§ 4.1.2 Owner shall notify Contractor when the duties, responsibilities or limitation of authority of the Architect have been modified

4.1.3 Except as expressly provided herein, the Contractor shall not be relieved of Contractor's obligation to perform the Work in strict accordance with the Construction Documents and the Contract Documents by the duties, responsibilities, or activities of the Architect.

§ 4.2 Administration of the Contract

§ 4.2.1 Certain portions of the administration of the Contract will be performed by the Architect, others by the Program Manager. Both the Architect and the Program Manager will be treated as the Owner's representatives to the extent set out in the Contract Documents. Neither the Architect nor the Program Manager shall have the authority to act on behalf of ~~the Owner only to the extent provided in the Contract Documents.~~ Owner unless such authority is expressly granted in the Contract Documents, nor shall such authority be implied from any act or representation of the Architect or Program Manager. ~~The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction, until the date the Architect issues the final~~ This period shall extend until payment is due, and, with the Owner's concurrence, from time to time during the one-year period for correction of Work described in Section 12.2.2~~Certificate for Payment~~. ~~The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, or as they may be amended in the future.~~

§ 4.2.2 The Architect, as a representative of the Owner, ~~will~~shall visit the site at least twice per week (or more per week when deemed necessary by the Owner's Superintendent or when necessary to protect Owner's interests) and at any other intervals appropriate to the stage of construction, to inspect ~~or as otherwise agreed with the Owner, to become generally familiar with~~ the progress, ~~and~~ quantity and quality of the ~~portion of the~~ Work completed, to reject any observed nonconforming Work, and to determine ~~in general~~ if the Work ~~observed~~ is being performed in a manner indicating that the Work, when ~~fully~~ completed, will be in accordance with the Construction Documents and the Contract Documents and on time. Furthermore, a minimum of two job site meetings per month from commencement of construction through Final Completion will be initiated by the Architect and attended by the Contractor. Attendees will include Owner, the Contractor's project manager and/or superintendent, Architect's project representative, and Architect. The Architect, Owner and their representatives shall at all times have access to the Work. Architect, or its structural consultant will provide on-site observation prior to and during all concrete pours that contribute to the structural integrity of the building, including all pours of concrete piers, footings, grade beams, floor slabs, and concrete superstructure components, if applicable. In addition, Architect or its structural consultant will provide on-site observation prior to covering up or closing up of portions of the construction, which if covered, would conceal problems with the structural integrity of the Project. Contractor shall not close or cover said Work until said observations have occurred. Contractor or Architect will advise Owner of the need for any third party laboratory or testing services to assist the Architect and Owner. On the basis of the on-site observations by Architect, Architect shall keep Owner and Contractor informed of the progress and the quality of the Work, through Architect's field reports, and shall guard Owner against defects and deficiencies in the Work. Architect shall promptly notify Owner and Contractor, orally, regarding any defect or nonconforming Work, which shall be followed by notice in writing of defects or nonconforming Work noted and corrective action taken or recommended. ~~However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work.~~ The Architect, however, ~~will~~shall not have control over~~, charge of~~, or responsibility for the Contractor's construction means, methods, techniques, sequences, ~~or~~ procedures, or ~~for the~~ safety ~~precautions and~~ programs, but this does not relieve Architect of Architect's responsibilities under this Contract. Any services by Contractor made necessary by Contractor's construction defect or nonconforming Work, shall be performed at no additional cost to Owner ~~in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents~~.

§ 4.2.3 ~~On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work.~~ The Architect will not be responsible for the Contractor's

failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work. The Contractor shall reimburse the Owner for compensation paid to the Architect for additional site visits made necessary by the fault, neglect, or request of the Contractor.

§ 4.2.4 Communications

~~Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, T~~the Owner and Contractor shall ~~endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. However, Owner reserves the right to communicate directly with Contractor and Subcontractors include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project.~~ Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. ~~The Contract Documents may specify other communication protocols.~~

§ 4.2.5 As further provided in the Contract Documents, ~~B~~based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect ~~has authority to~~ shall reject Work that does not conform to the Construction Documents and the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will ~~have~~recommend to Owner additional ~~authority to require~~ inspection or testing of the Work in accordance with ~~Sections 13.4.2 and 13.4.3~~the provision of the Contract Documents, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Owner to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work. Architect and/or Contractor shall promptly notify, orally and in writing, the other party and Owner of any fault or defect in the Project or nonconformance with Construction Documents or the Contract Documents they may respectively discover, and each, upon discovery of the defect or nonconformance, shall be responsible for notifying the other party and Owner of those corrective actions they respectively take; provided, however, Contractor shall have no duty to notify Owner of discoveries made or actions taken by Architect. Testing or inspection required by this subparagraph shall be conducted subject to the requirements of Chapter 2269 of the Texas Government Code.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Construction Documents and the Contract Documents. The Architect's action will be taken ~~in accordance~~ with ~~the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with~~ reasonable promptness as to cause no delay in the Work or in the activities of the Owner, Contractor, or Separate Contractors, while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation ~~or performance~~ of equipment or systems, ~~all of which~~ remain the responsibility of the Contractor as required by the Construction Documents and the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component. If any submittal does not comply with the requirements of the Construction Documents or the Contract Documents, then Architect shall require Contractor to come into compliance. The Architect shall promptly report, in writing, to the Contractor, Program Manager and Owner any errors, inconsistencies, and omissions discovered by the Architect in the Shop Drawings, Product Data, and Samples.

§ 4.2.8 The Architect ~~will~~shall review, prepare, and make recommendations to Owner regarding all Change Orders and Construction Change Directives for the Owner's approval and execution in accordance with the Construction Documents and the Contract Documents, accompanied by all supporting documentation. The Architect~~, and~~ may ~~order~~authorize minor changes in the Work not involving any adjustment in Contract Sum or Guaranteed Maximum

Price, or an extension of the Contract Time which are consistent with the intent of the Contract Documents. If necessary, the Architect shall prepare, reproduce, and distribute Drawings and Specifications to describe Work to be added, deleted, or modified, as provided in Section 7.4. The Architect shall accept requests by the Owner, and Owner shall review properly prepared, timely requests by the Contractor for change in the Work, including adjustments to the Contract Sum or Guaranteed Maximum Price, or Contract Time. A properly prepared request for a change in the Work by the Contractor shall be accompanied by sufficient supporting data and information to permit the Architect ~~will investigate and~~to make a reasonable determination~~s~~ without extensive investigation or preparation of additional drawings or specifications. If the Architect determines that requested changes in the Work are not materially different from the requirements of the Construction Documents or the Contract Documents, and do not change the Contract Sum or Guaranteed Maximum Price, or Contact Time, then the Architect may issue an order for a minor change in the Work, with prior written notice to the Owner or recommend to the Owner that the requested change be denied. The Architect is not authorized to approve changes involving major system such as: Heating, Ventilation and Air Conditioning ("HVAC"); roof, foundation; outward appearance, color scheme, floor plans, building materials; drainage or mechanical equipment with Owner's prior written consent ~~and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4~~.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; ~~issue Certificates of Substantial Completion pursuant to Section 9.8;~~ will receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor ~~pursuant to Section 9.10~~; and will issue a final Certificate for Payment ~~pursuant to Section 9.10~~upon compliance with the requirements of the Contract Documents.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the ~~Project representatives~~ Architect have been ,modified.

§ 4.2.11 The Architect will interpret and ~~decide matters~~make recommendations concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If no agreement is made concerning the time within which interpretations required of the Architect shall be furnished in compliance with this Paragraph 4.2, then delay shall not be recognized on account of failure by the Architect to furnish such interpretations until 15 days after written request is made for them.

§ 4.2.12 Interpretations ~~and decisions~~or recommendations of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and ~~decisions~~recommendations, the Architect will endeavor to secure faithful performance by both Owner and Contractor~~, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith~~.

§ 4.2.13 The ~~Architect's~~ Owner's decisions on matters relating to aesthetic effect ~~wi~~shall be final ~~if consistent with the intent expressed in the Contract Documents~~.

§ 4.2.14 The Architect will review and respond to requests for information about the Construction Documents and the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information, at no additional cost to the Owner.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a Separate Contractor or the subcontractors of a Separate Contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract

Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner, ~~and~~ Architect and Program Manager, in writing, of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect ~~ma~~or ~~ys~~Program Manager shall notify, in writing, the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Owner or Architect to provide notice ~~within the 14-day period~~promptly shall constitute notice of no reasonable objection. All subcontractors shall be procured in accordance with Texas Education Code Chapter 44, Subchapter B, and Texas Government Code Chapter 2269, as applicable. A notice of no reasonable objection shall in no way relieve the Contractor from full responsibility for performance and completion of the Work and its obligations under the Contract Documents. The Contractor shall be fully responsible for the performance of its subcontractors, including those recommended or approved by the Owner.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Program Manager or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner, Program Manager ~~or~~ Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. When~~If~~ the parties agree on a proposed substitute ~~but rejected~~ Subcontractor ~~was reasonably capable of performing the Work~~, then the Contract Sum and Contract Time ~~sh~~may~~ll~~ be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not change a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitute.

5.2.5 Each Contractor or Subcontractor shall be required to completely familiarize itself with the plans and specifications, to visit the Work site to completely familiarize itself with existing conditions, and to conduct any other appropriate investigations, inspections, or inquiries prior to submission of a bid or proposal. No increases in Contract Sums or Guaranteed Maximum Price shall be allowed for failure to so inspect or investigate.

The Contractor shall disclose to the Owner any ownership interest or affiliation between the Contractor and any potential subcontractor prior to entering into a subcontract and the Owner shall have the right, in its sole discretion and pursuant to 5.2.3., to reject any such affiliated subcontractor. Further, Contractor shall not subcontract the work as a whole.

The approval of Subcontractors in no way relieves the Contractor from full responsibility for performance and completion of the Work and its obligations under the Contract Documents. The Contractor shall be fully responsible for the performance of its Subcontractors, including those recommended or approved by the Owner

5.2.6 The Contractor agrees to utilize Subcontractors that are historically underutilized businesses in accordance with the Minority and Women Owned Business Enterprise (M/WBE) forms and guidelines attached hereto as Exhibit "C".

No changes to the Plan may be made unless approved in writing by the Owner. The Contractor, prior to the execution of this Contract, shall report their M/WBE participation goal as a percent of the Contract Sum. During the performance of all Work under this ~~Agreement~~Contract, the Contractor and its agents shall comply with all M/WBE policies of the Owner. The information shall be identified per firm, discipline and participation. While this ~~Agreement~~Contract is in effect and until the expiration of one year after final completion, the Owner may require information from the Contractor, and may conduct audits, to assure that the Plan is being, and was, followed,. With each Contractor's application for payment, the Contractor shall report their updated M/WBE Plan and actual M/WBE participation information.

5.2.7 Contractor shall promptly notify the Owner, Architect and Program Manager of any material defaults by any subcontractor

§ 5.3 Subcontractual Relations

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. The terms and conditions of the Contract Documents shall be incorporated by reference into each subcontract agreement, included as provided below. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights. , Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors. Each subcontractor shall provide proof of insurance to Contractor consistent with the Contractor's insurance to Owner and in an amount commensurate with the Work to be performed by the Subcontractor.

5.3.2 Neither the Owner nor the Architect shall be obligated to pay or to ensure the payment of any monies to subcontractors due to any non-payment to the Contractor or non-payment of subcontractors by the Contractor.

5.3.3 The Contractor shall require any potential subcontractor to disclose to the Contractor any ownership interest or familial relationship between the Contractor, the Architect, or the Owner, and the potential subcontractor prior to entering into a subcontract. Contractor shall report to Owner all such disclosures and the Owner shall have the right, in its sole discretion, to reject any such affiliated subcontractor.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for any unperformed portion of the Work is assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to ~~Section~~Article 14.~~2~~ or abandonment of the Project by the Contractor; and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and

.2 assignment is subject to the prior rights and obligations of the surety, if any, obligated under bond relating to the Contract; and

.3 The Subcontractor provides bonds as required by law of prime contractors and by Owner.

~~When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.~~

§ 5.4.2 ~~Upon~~ ~~s~~Such assignment shall not constitute a waiver by Owner of its rights against Contractor, including, but not limited to, claims for defaults, delays or defects for which a subcontractor or material vendor may also be liable~~, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension~~.

§ 5.4.3 ~~Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the~~ Owner shall only be ~~assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally~~ responsible for compensating subcontractors for Work performed or materials furnished from and after the date on which the Owner gives written notice of its acceptance of the subcontract agreement. Owner shall not be responsible for any Work performed or materials furnished by subcontractors prior to the date of Owner's written notice of acceptance.~~all of the successor contractor's obligations under the subcontract~~.

5.4.4 Each subcontract shall specifically provide that the Owner shall only be responsible to the Subcontractor after written notice for undisputed amounts not previously paid to Contractor subsequent to the Owner's exercise of any rights under this conditional assignment.

5.4.5 Contractor shall be fully responsible for the performance of its Subcontractors, including those selected or approved by the Owner

5.5 NOTICE OF SUBCONTRACTOR DEFAULT

Contractor shall promptly notify Owner and Architect of any material defaults by any Subcontractor or Sub-subcontractor. Notwithstanding any provision contained in Article 5 to the contrary, it is hereby acknowledged and agreed that Owner has in no way agreed, expressly or implicitly, nor will Owner agree, to allow any Subcontractor, Sub-subcontractor or other materialman or worker employed by Contractor the right to obtain a personal judgment or to create a mechanic's or materialman's lien against Owner for the amount due from the Owner or the Contractor.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation. The Owner reserves the right to perform other non-Project-related construction work, maintenance and repair work, and school program operations at the site and near the site during the time period of the Work. Owner shall have access to the building on the site at all times.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor ~~Agreement~~Contract.

§ 6.1.3 The ~~Owner~~ Contractor shall ~~provide for~~ coordinat~~eion of~~ the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor to ensure that the Work remains on schedule~~, who shall cooperate with them~~. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement between the Owner and Contractor. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 It shall be the responsibility of the Contractor to assist, review, coordinate, and schedule work performed by any of Owner's separate contractors including the hazardous materials abatement contractor. Contractor shall not be required to contract directly with the hazardous materials abatement contractor or Owner's separate contractor's however, Contractor shall coordinate all aspects of the hazardous materials abatement contractor's and Owner's separate contractor's work, including required monitoring, testing and inspections by independent firms, with the Work under this ~~Agreement~~Contract. The Contractor shall be totally responsible for coordination between its Subcontractors and the hazardous materials abatement contractor and any other Owner's separate contractors. Contractor will cooperate with the Owner to allow site access and staging areas for hazardous materials abatement contractor and Owner's separate contractors and consultants. Contractor shall review Owner's contract with the hazardous materials abatement contractor and Owner's separate contractors and become familiar with the requirements and scope of services contained therein. Contractor shall continually review the work performed by the hazardous materials abatement contractor and Owner's separate contractors and immediately notify the Owner and Program Manager if at any time during the performance of Contractor's work, the hazardous materials abatement contractor or any of Owner's separate contractors fail, in any way, to provide sufficient, competent manpower or timely perform its services. In addition, the Contractor shall be responsible for coordinating and providing all construction administration necessary for the Work and the work of the hazardous materials abatement contractor and any of Owner's separate contractors ~~Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.~~

§ 6.2 ~~Mutual~~Contractor's Responsibility

§ 6.2.1 It shall be the responsibility of the Contractor to assist, review, and coordinate the scheduling of work performed by any of the Owner's Separate Contractors including the hazardous materials abatement contractor.

Contractor shall not be required to contract directly with the hazardous materials abatement contractor or Owner's separate contractor's however, Contractor shall coordinate all aspects of the hazardous materials abatement contractor's and Owner's separate contractor's work, including required monitoring, testing and inspections by independent firms, with the Work under this ~~Agreement~~Contract. The Contractor shall be totally responsible for coordination between its Subcontractors and the hazardous materials abatement contractor and any other Owner's separate contractors. Contractor will cooperate with the Owner to allow site access and staging areas for hazardous materials abatement contractor and Owner's separate contractors and consultants. Contractor shall review Owner's contract with the hazardous materials abatement contractor and Owner's separate contractors and become familiar with the requirements and scope of services contained therein. Contractor shall continually review the work performed by the hazardous materials abatement contractor and Owner's separate contractors and immediately notify the Owner and Program Manager if at any time during the performance of Contractor's work, the hazardous materials abatement contractor or any of Owner's separate contractors fail, in any way, to provide sufficient, competent manpower or timely perform its services In addition, the Contractor shall be responsible for coordinating and providing all construction administration necessary for the Work and the work of any of Owner's Separate Contractors. The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents. Contractor shall be responsible for coordination between Contractor's subcontractors and Owner's Separate Contractors. Contractor shall review Owner's contract with Owner's Separate Contractors and become familiar with the requirements and scope of services contained therein.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify, in writing, the Architect and Owner of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work, and shall promptly report, in writing, to the Architect and Owner if Owner's Separate Contractors fail in any way to timely perform their services or negatively impact Contractor's schedule or ability to perform the Work. Failure of the Contractor to notify, in writing, the Architect and Owner of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper, and is performed in a timely manner, to receive the Contractor's Work. The Contractor shall not be responsible for latent discrepancies or defects in the construction or operations by the Owner or Separate Contractor ~~that are not apparent~~.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. ~~The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.~~

6.2.3.1 If the Architect or Program Manager is required to provide additional services, as provided in the Contract between the Owner or Program Manager ~~-~~and the Architect, specifically relating to additional compensation for the Architect for evaluating an excessive number of claims submitted by the Contractor or others in connection with the Work in accordance with Owner's Contract with the Architect, then such services shall be paid for by the Contractor through the Owner, unless the additional services result from negligence of or an omission by the Architect and Program Manager.~~-~~

6.2.3.2 If the Architect provides services in connection with a legal proceeding, except when the Architect is a party thereto, and the Owner requests the Architect, in writing, to provide such services, then the cost of such services shall be paid for by the party whose act or omission was a proximate cause of the problem that led to the requirement to provide such services. Such services shall be paid for by such party through Owner, who upon receipt of same shall reimburse the Architect.

6.2.3.3 All construction costs resulting from the Contractor's negligence, lack of oversight, inattention to details, failure to investigate, or failure to follow the Construction Documents or Contract Documents, will be borne by the Contractor.

§ 6.2.4 The Contractor shall promptly remedy damage wrongfully caused by~~that~~ the Contractor ~~wrongfully causes~~ to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

§ 6.2.5 The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Owner~~Architect~~ will allocate the cost among those responsible.

6.3.1 Job site cleanup will be performed on a daily basis. The Owner and/or Program Manager will periodically check the site to see that all construction areas, nearby roads, walkways and/or grounds are maintained in a clean and safe manner. The cost to clean up the site will be assessed to the Contractor each time the Owner is required to clean the area due to failure of the Contractor or his designee to satisfactorily perform or enforce this site clean-up requirements. The Owner will assess the cost. Before assessing the cost, the Contractor shall be given notice of the failure to clean the site and one business day after the date of the notice to clean up the site. If the Contractor fails to clean up the site, after notice, the Owner may assess the cost for cleanup.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive, Contingency Authorization or order for a minor change in the Work~~,~~. A properly prepared written request for a change in the Work by Contractor shall be accompanied by sufficient supporting data and information to permit the Architect to make a recommendation to Owner. The Contract Sum and/or Contract Time may be increased for changes in the Work if the provisions of Article 7 have been met.

Architect shall review properly prepared, timely requests by Contractor for a proposed change in the Work, including but not limited to adjustments to the Contract Sum or Contract Time. A properly prepared request for a proposed change shall be accompanied by sufficient supporting data and information to permit Architect to make a reasonable determination without extensive investigation or preparation of additional drawings or specifications

§ 7.1.1.1 No changes in the Contract Sum and/or Contract Time will be allowed for a change in the Work unless prior to performing the changed Work the Contractor has provided the Owner in writing with a proposal for any change in price and/or change in Contract Time caused by the change in Work, and a Change Order is subsequently executed. A field directive or field order shall not be recognized as having any impact upon the Contract Sum or the Contract Time, and Contractor shall have no Claim therefore, unless it shall, prior to complying with the directive and in any event within ten (10) days of receiving the directive, submit a change proposal to the Owner, and a Change Order is subsequently executed, or Contractor satisfies the requirements of Paragraph 15

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone. A change in the work that does not require a change in Contract Sum or Contract Time may be paid from the Contingency Allowance. A Contingency Allowance Expenditure Authorization (CAEA) is a written order prepared by the Architect and signed by the Owner, Contractor and Program Manager directing a change in the Work. A CAEA shall not be used for minor changes in the Work. Note: If the Construction Manager Percentage Fee was not previously included in the approved GMP, the approved additions or deductions for authorized amounts for Contingency Expenditures will also include an appropriate adjustment for the Construction Manager Fee at the percentage approved in Article 5.1.1 and 5.1.2 of the modified AIA Document A133.

7.1.2.1 Contractor shall make no change in the materials used or in the specified manner of constructing and/or installing the Work or supply additional labor, services, or materials beyond that actually required by the terms of the Contract Documents, unless made pursuant to a written order from Owner authorizing Contractor to proceed with the change. No claim for an adjustment of the contract price will be valid unless so ordered.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Construction Documents or the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work. Except as permitted in

Paragraph 7.3 or 15, a change in the Contract Sum or the Contract Time shall be accomplished only by Change Order. -Contractor shall not make any claim for an adjustment to time, Contract Sum, or Guaranteed Maximum Price due to: a change in the materials used; a change in the specified manner of constructing and/or installing the Work; or additional labor, services, or materials beyond that actually required by the terms of the Construction Documents or the Contract Documents, unless made pursuant to a written order or directive from Owner authorizing Contractor to proceed with a change in the Work. No claim for an adjustment to time, Contract Sum, or Guaranteed Maximum Price shall be valid unless so ordered or directed.

7.1.4 The total Contractor mark-up for overhead, profit, or fee for work performed by the Contractor's own forces shall not exceed 10% of the cost of the change in the Work. The total Contractor mark-up for overhead, profit, or fee for supervision of work performed by subcontractors' forces shall not exceed 4% of the cost of the change in the Work. The total subcontractor mark-up for overhead, profit, or fee for work performed by the subcontractor's forces shall not exceed 10% of the cost of the change in the Work. In no event shall total mark-up for overhead, profit, or fee in any work which involves a subcontractor or one or more sub-subcontractors, regardless of who performs the Work, exceed 14% of the total cost of the change in the Work.

7.1.5 The Contractor, upon receipt of written notification by the Architect of a proposed item of change in the Work, shall prepare as soon as possible a Change Proposal in such form or forms as directed by the Architect.

.1 Each separate Change Proposal shall be numbered consecutively and shall include materials, costs, labor costs, fees, overhead and profit. The Proposal shall specify all cost related to the proposed Change in the Work, including any disruption or impact on performance;

.2 The Subcontractor's itemized accounting shall be included with the Change Proposal;

.3 If a Change Proposal is returned to the Contractor for additional information or if the scope of the proposed change in the Work is modified by additions, deletions or other revisions, the Contractor shall revise the Change Proposal accordingly and resubmit the revised Change Proposal to the Architect and Program Manager;

.4 A revised Change Proposal shall bear the original Change Proposal number suffixed by the letter "R" to designate a revision in the original Change Proposal. If additional revisions to a revised Change Proposal are necessary, each subsequent revision shall be identified by an appropriate numeral suffix immediately following the "R" suffix;

.5 Upon written approval of a Change Proposal by the Owner, the Architect and the Program Manager; the Architect will prepare a Change Order authorizing such change in the Work; and

.6 The Contractor shall request extensions of Contract Time due to changes in the Work only at the time of submitting its Change Proposal. Contractor's failure to do so shall represent a waiver of any right to request a time extension

7.1.5.1 The combined overhead and profit included in the total cost to the Owner of a change in the Work shall be based on the following schedule:

.1 For approved additions or deductions to the Cost of the Work (not including preconstruction or general condition costs), the Construction Manager's Fee will be increased or decreased at the same percentage approved in Section 5.1.1 and 5.1.2 in the approved A133 contract document.

.2 For approved additions or deductions to any of the Construction Manager's subcontracts for self-performed work paid in accordance with the Section 2.3.2.2 of the A133 contract document, the self-performed work fee will be the same as approved in Section 2.3.2.2 of the A133 contract document.

.3 For approved additions or deductions to approved Subcontracts, the maximum markup on changed Work performed by the Subcontractor's own forces will be ten (10%) percent of the approved allowable Change Order costs.

.4 For approved additions or deductions to approved Subcontracts, the maximum markup on changes for Work performed by the Subcontractor's Sub-subcontractors will be four (4%) percent of the amount due the Sub-subcontractor.

.5 Cost to which overhead and profit is to be applied shall be determined in accordance with Subparagraph 7.3.7

.6 In order to facilitate checking of quotations for extras or credits, all proposals except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials, and Subcontracts. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are Subcontracts, they shall be itemized also.

7.1.6 ~~5~~ Allowance balances may be used to fund changes in the Work. The Contractor will not be allowed an

overhead, profit, or fee mark-up when changes in the Work are funded by one of the Allowances. The combined overhead and profit included in the total cost to the Owner of a change in the Work shall be based on the following schedule:

.1 For the Contractor, for Work performed by the Contractor's own forces, ten (10%) percent of the cost.

.2 For the Contractor, for Work performed by the Contractor's Subcontractor's, four (4%) percent of the amount due the subcontractors.

.3 For each Subcontractor involved, for Work performed by that Subcontractor's own forces, ten (10%) percent of the cost.

.4 For each Subcontractor involved, for Work performed by the Subcontractor's Sub-subcontractors, four (4%) percent of the amount due the Sub-subcontractor.

.5 Cost to which overhead and profit is to be applied shall be determined in accordance with Subparagraph 7.3.76.

.6 In order to facilitate checking of quotations for extras or credits, all proposals except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials and Subcontracts. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are Subcontracts, they shall be itemized also

7.1.7 ~~6~~ If the Contract Sum is $1,000,000.00 or more, or if the Contract Sum is less than $1,000,000.00, and any Change Order, Construction Change Directives, or other Changes in the Work would increase the Contract Sum to $1,000,000.00 or more, the total of all Change Orders, Construction Change Directives, or other Changes in the Work, may not increase the Contract Sum by more than 25% of the original Contract Sum. Any Change Order, Construction Change Directive, or other Change in the Work that would exceed that limit is void and of no effect. Texas Education Code § 44.0411.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

.1 The change in the Work;

.2 The amount of the adjustment, if any, in the Contract Sum or Guaranteed Maximum Price; and

.3 The extent of the adjustment, if any, in the Contract Time.

7.2.2 Methods used in determining adjustments to the Contract Sum or Guaranteed Maximum Price may include those listed in Section 7.3.3.

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation. Sufficient substantiating data shall include a proposal itemized for the various components of work added or deleted, segregated by labor, material and equipment. Details to be submitted will include detailed line item estimates showing detailed material quality takeoffs, material prices by item, and of related labor hour pricing information and extension by line item by drawings as applicable);

.2 Unit prices stated in the Contract Documents or subsequently agreed upon and supported by sufficient substantiating data to permit evaluation;

.3 Cost to be determined in a manner agreed upon by the parties and a mutually-acceptable fixed or percentage fee or the percentage fee established at 7.1.5; or;

.4 As provided in Subparagraph 7.3.7.

7.2.3 Contractor stipulates that acceptance of a Change Order by the Contractor constitutes full accord and satisfaction for any and all Claims, whether direct or indirect, arising from the subject matter of the Change Order.

7.2.4 In no event shall a single change, or the aggregate of all changes, result in the total costs, reimbursements, and fees exceeding the Contract Sum or the Guaranteed Maximum Price, unless agreed to in writing by Owner prior to the commencement of such modified or changed Work.

7.2.5 Agreement on any Change Order shall constitute a final settlement of all claims by the Contractor directly or indirectly arising out of or relating to the change in the Work which is the subject of the Change Order, including, but not limited to, all direct and indirect costs and impact costs associated with such change and any and all adjustments to the Contract Sum and the Contract Time

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Guaranteed Maximum Price, or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum or Guaranteed Maximum Price, and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 The Construction Change Directive shall include a unilateral change in the Contract Sum and/or Contract Time reflecting the Owner's reasonable view of the appropriate change in the Contract Sum and/or Contract Time for the change in the work covered by the Construction Change Directive. Until agreement is reached by the Owner and Contractor on these issues, the change in Contract Sum and Contract Time set out in the Construction Change Directive shall be used for schedule of values, payment, and scheduling purposes.

~~If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:~~

~~.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation; Sufficient substantiating data shall include a proposal itemized for the various components of work added or deleted, segregated by labor, material and equipment. Details to be submitted will include detailed line item estimates showing detailed material quality takeoffs, material prices by item and of related labor hour pricing information and extension (by line item by drawings as applicable.~~

~~.2 Unit prices stated in the Contract Documents or subsequently agreed upon; and supported by sufficient substantiating data to permit evaluation.~~

~~.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or~~

~~.4 As provided in Section 7.3.4.~~

§ 7.3.4 [*Not used*] ~~If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:~~

~~.1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;~~

~~.2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;~~

~~.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;~~

~~.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and~~

~~.5 Costs of supervision and field office personnel directly attributable to the change.~~

§ 7.3.5 ~~If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.~~

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Guaranteed Maximum Price, or Contract Time.

§ 7.3.7 In the absence of agreement between Owner and Contractor on the proper change to the Contract Sum or Contract Time because of a change in the Work, Contractor may treat the matter as a Claim under Paragraph 15. In

such event, the Contractor shall be entitled to recover only the amount by which its direct costs have been reasonably increased over the direct cost of performing the Work without the change in the work, plus three percent (3%) on Subcontractor's Work) of direct cost to cover home office overhead, profit, and all other costs. Direct costs shall be limited to the following:

~~A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.~~

.1 Reasonable Cost of Labor, including Social Security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;

.2 Materials, supplies and equipment, equipment including cost of transportation, whether incorporated or consumed;

.3 Rental cost of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others at rates that are no greater than market rates in the locale of the Work at the time of the Work. Unless otherwise established in the Contract, the rental value of the Contractor's own equipment shall not be more than normal local rental rates for contractor-owned equipment;

.4 Premiums for all bonds and insurance permit fees and sales, use or similar taxes related to the Work; and

.5 Cost of Subcontractor for performing the change in the Work. The amount allowable for Subcontractors shall be calculated using the same standards set out herein for direct Work by the Contractor.

.6 Additional cost of supervision and field office personnel directly attributable to the change.

Contractor and each Subcontractor involved shall furnish evidence of costs such as copies of original invoices for materials, payroll vouchers for labor, etc., upon request by the Architect, Owner, or Program Manager. Any increase in Contract Time shall be limited to the amount of time by which activities critical to overall completion of the Project are delayed by the change in the Work. If it is reasonably possible to perform the change in the Work concurrently with Work that is critical to overall completion, no time extension shall be granted by reason of a change in the Work.

§ 7.3.8 [*Not Used*] ~~The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that which results in a net decrease in the Contract Sum shall be actual net cost of the work deleted, including all profit and overhead, plus the Contractor's allocated percentage of three (3%) percent on Subcontractor's work of direct cost to cover supervision, field office and home office overhead, profit and all other costs cost When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.~~

§ 7.3.9 [Not Used] ~~Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.~~

§ 7.3.10 ~~When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.~~

§ 7.4 Minor Changes in the Work

With prior written notice to the Owner's representative, ~~T~~the Architect may order minor changes in the Work that are consistent with the ~~intent of the~~ Construction Documents or the Contract Documents and do not involve an adjustment in the Contract Sum or Guaranteed Maximum Price, or an extension of the Contract Time, nor requiring any payment from the Contingency Allowance. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Guaranteed Maximum Price, or Contract Time, or requiring a payment from the Contingency Allowance, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect

the Contract Sum or Guaranteed Maximum Price, or Contract Time, or the Contingency Allowance, the Contractor waives any adjustment to the Contract Sum or Guaranteed Maximum Price, or extension of the Contract Time or the Contingency Allowance. The Contractor shall carry out such written orders promptly. Minor changes in the Work shall not include changes that involve the outward appearance of the structure, color schemes, floor plans, building materials, landscaping, or mechanical equipment

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for ~~Substant~~Final Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the ~~date established in the Agreement~~ first business day after Contractor's receipt of the written Notice to Proceed. The Notice to Proceed shall not be issued by Architect until the Contract (or Amendment, if Contractor is a Construction Manager at Risk) has been signed by the Contractor, approved by Owner's Board of Trustees, signed by the Owner's authorized representative, and Owner and Architect have received, and approved as to form, all required payment and performance bonds and insurance, in compliance with Article 11. Issuance of the Notice to Proceed shall not relieve the Contractor of its responsibility to comply with Article 11.

8.1.2.1 If the Notice to Proceed is delayed due to delays in issuance of the building permit by municipal authorities or other unanticipated delays, *and* if building materials are expected to increase in price due to that delay, Contractor may, if Owner expressly agrees in writing, purchase such materials before receiving the Notice to Proceed from Owner. Contractor shall store and insure such building materials until use. In the event the project is cancelled, Contractor's contract is terminated, or the materials are not used (in whole or in part) on the Project, Contractor shall sell the unused materials to Owner at Contractor's actual cost, or reduce its billing to Owner in that amount, if Contractor retains the material.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8. The date of Final Completion is the date certified by the Architect in accordance with Paragraph 9.10. Unless otherwise agreed in writing by Owner, Contractor agrees that Final Completion shall occur not more than 30 days after the date of Substantial Completion.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the ~~Agreement~~Contract, the Contractor ~~confirms~~stipulates that the Contract Time is a reasonable period for performing the Work.

If Contractor fails to achieve Substantial Completion of the Work on or before the date(s) specified for Substantial Completion in this Contract and the other Contract Documents, Contractor shall pay to the Owner, as liquidated damages, the sum set out in the Contract between Owner and Contractor for each calendar day that Substantial Completion is delayed after the date(s) specified for Substantial Completion. The total liquidated damage claim is determined by multiplying daily-liquidated damage amounts stated in the Contract by the number of days late. A fraction of a day shall be counted as a full day. It is hereby agreed that the actual damages which Owner will suffer by reason of late completion would be difficult to ascertain, and the liquidated damages to which Owner is entitled hereunder are a reasonable forecast of just compensation for the harm that would be caused by Contractor's failure to achieve Substantial Completion of the Work on or before the date(s) specified for Substantial Completion, and not a penalty. Liquidated damages shall be paid as they accrue and may be adjusted from any progress payment due.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, ~~,~~ prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance. Unless the date of commencement is established by the Contract Documents or a Notice to Proceed given by the Owner, the Contractor shall notify the Owner in writing not less than five (5) days or other agreed period.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial and Final Completion within the Contract Time.

8.2.4 The Contractor is subject to liquidated damages, as specified in the Contract, if the Work is not completed by the date of Substantial Completion or the date of Final Completion.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress in performing work that is critical to overall completion of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of or Program Manager, or a Separate Contractor; (2) by changes ordered in the Work; (3) by ~~labor disputes,~~ fire, governmental actions~~unusual delay in deliveries~~, ~~unavoidable casualties,~~ or adverse weather conditions documented in accordance with Section 15.1.6.2~~, or other causes beyond the Contractor's control~~; (4) by delay authorized, in writing, by the Owner ~~pending mediation and binding dispute resolution~~; or (5) by other causes that the Contractor asserts, and the Owner and Architect determine~~s~~, may justify delay, then the Contract Time ~~sh~~may~~ll~~ be extended for such reasonable time as the Owner, ~~and~~ Architect or Program Manager may determine. Adjustments in the Contract Time will be permitted for a delay only to the extent such delay is not caused or could not have reasonably been anticipated by the Contractor, and could not be limited or avoided by the Contractor's timely notice to the Owner of the delay, and only if Contractor satisfies the conditions of this Paragraph 8.3. Contractor has the burden to prove that any of the foregoing alleged causes of delay significantly impacted construction progress on the critical path, as a condition precedent to any extension of the Contract Time.

The Contractor shall anticipate and include in the construction schedule lost time due to adverse weather conditions in accordance with the number of Lost Time Workdays per month in the Dallas area in accordance with the following schedule:

January – 5
February – 4
March – 5
April – 6
May – 6
June – 4
July – 4
August – 4
September – 5
October – 4
November – 4
December – 4

A request for a time extension based on unusually adverse weather conditions will not be permitted unless the cumulative actual days of Lost Time Workdays for the period when the critical path of the project is subject to impact from Lost Time Workdays exceeds the cumulative number of expected Lost Time Workdays for the same period. The final calculation of entitlement to a time extension cannot be made until at least sixty (60) days prior to the agreed date for Substantial Completion of the Project ~~is completed~~ and the time extensions for unusually adverse weather may not be made until that time. However, Contractor will submit claimed Lost Time Workdays in accordance with the submission times provided in 8.3.2. No day on which substantial Contractor forces are able to perform the work on the Project for more than fifty percent (50%) of the usual workday will be counted as a Lost Time Workday. Lost Time Workdays will not be calculated for any period when the critical path of the project is not subject to impact from adverse weather conditions.

§ 8.3.2 ~~Claims relating to time shall be made in accordance with applicable provisions of Article 15.~~ On or before the fifteenth (15th) day of each month of the Work, Contractor shall submit in writing a request for all time extensions to which it believes itself to be entitled for the preceding month, other than time extensions for changes in the Work, which are to be submitted in accordance with the requirements of Article 7. If Contractor's request for time extension for Changes in the Work is denied and Contractor wishes to pursue the matter, Contractor shall submit in writing a request for that extension by the fifteenth (15th) day of the month following the denial. Any claim for time extension not submitted under the terms of this Subparagraph shall be waived.

8.3.2.1 Owner, after consultation with the Architect and Program Manager, shall grant time extensions to the extent it believes them to be proper. Time extensions granted by the Owner may be incorporated into schedules for completion of the Work. In the event that Contractor believes that it is entitled to additional time extensions beyond those granted by the Owner, it may make a claim for them provided it can meet the requirements of Paragraph 15.1.

§ 8.3.3 This Contract ~~Section 8.3~~ does not permit~~reclude~~ the recovery of damages, including, without limitation, extended home office overhead expenses, general conditions, or other consequential damages, by the Contractor for delay or disruption or for extensions of time due to bad weather or acts of God. Contractor agrees that the only possible compensation for any delay is an extension of time ~~by either party under other provisions of the Contract Documents~~.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the ~~Agreement~~Contract and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents. In the event that the Project is a Construction Management at Risk Project, the Contract Sum shall not exceed the Guaranteed Maximum Price.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices ~~sh~~may~~ll~~ be equitably adjusted by prior written agreement.

§ 9.2 Schedule of Values

9.2.1 Before the first Application for Payment, ~~,~~ the Contractor shall submit a schedule of values to the Architect and Program Manager before the first Application for Payment, allocating the entire Contract Sum or, in the case of a Guaranteed Maximum Price, within 15 days after establishing the Guaranteed Maximum Price, to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect or Program Manager may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment. The schedule of values shall be prepared in such a manner that each major item of work, whether done by Contractor's own forces or subcontracted, is shown as a single line item on AIA Document G702 and G703, Application and Certificate for Payment and Continuation Sheet. If the Contractor is a Construction Manager at Risk, then the Contractor's fee and general conditions shall be specifically shown, and AIA Documents G702CMa and G703 shall be used.

9.2.2 ~~i~~If the Project is a Construction Manager at Risk project, in order to facilitate the review of Applicants for Payment, the Schedule of Values shall be submitted on AIA Documents G702 and G703, and shall include the following:

.1 Contractor's cost for Contractor's fee (if applicable) bonds and insurance, mobilization, or general conditions, etc. shall be listed as individual line item.

.2 Contractor's costs for various construction items shall be detailed. For example, concrete work shall be subdivide into footings, grade beams, floor slabs, or paving, etc.

.3 On major subcontracts, such as mechanical, electrical, and plumbing, the schedule shall indicate line items and amounts in detail (for example: underground, major equipment, fixtures, installation fixtures, or start-up, etc.)

.4 Costs for subcontract work shall be listed without any additional mark-up of Contractor's costs for overhead, profit, or supervision.

.5 If payment for stored materials is requested prior to installation, then material and labor shall be listed as separate line items.

.6 Contractor shall provide a report of actual versus projected reimbursable expenses (general conditions), updated monthly.

§ 9.3 Applications for Payment

§ 9.3.1 At ~~least ten days before the date established for each progress payment~~, the time specified in the Contract, the Contractor shall submit to the Architect and Program Manager an itemized Application for Payment for operations completed prepared in accordance with the schedule of values~~, if required under Section 9.2, for completed portions of the Work~~. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage ~~if provided for in the Contract Documents~~.

§ 9.3.1.1 As provided in Section 7.3.8, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, but not yet included in Change Orders. Contractor agrees that, for purposes of Texas Government Code Sections 2251 and 2251.042, receipt of the Application for Payment by the Architect shall not be construed as receipt of an invoice by the Owner. Contractor further agrees that Owner's receipt of the Certificate for Payment shall be construed as receipt of an invoice by the Owner, for purposes of Texas Government Code Sections 251.021 and 2251.042~~As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders~~.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor ~~doe~~has not ~~intend~~ been invoiced by~~to pay~~ a Subcontractor or supplier, unless ~~such~~Contractor has self-performed the Work ~~has been performed by others whom the Contractor intends to pay~~.

9.3.1.3 Until Final Completion of the Work, the Owner shall withhold retainage as provided in the Contract Documents, except that Owner shall not pay amounts for which the Architect refuses to certify payment, or the Owner refuses to pay, as provided herein Section 9.4 or 9.5 as amended. The remaining retainage shall be paid with the Final Payment, unless there is a bona fide dispute between Owner and Contractor and the reason for the dispute is that labor, services, or materials provided by Contractor, or a person under Contractor's direction or control, failed to comply with the express terms of the Contract, or if the surety on any surety bond does not agree to the release of retainage. Written notice of the basis for withholding retainage under Texas Government Code Sections 2252.031 – 2252.032 must be provided to Contractor. If there is no bona fide dispute and neither party is in default, Contractor may cure any noncompliant labor, services, or materials, or offer Owner reasonable compensation for such noncompliant labor, services, or materials that cannot promptly be cured. Owner is not required to accept such offer.

§ 9.3.2 ~~Unless otherwise provided in the Contract Documents, p~~Payments ~~shaw~~ill be made on the basis of invoices for specific ~~account of~~ materials ~~and~~or equipment ~~delivered and suitably stored at the site for subsequent~~ incorporate~~d~~ion in the Work, and ~~. If approved in advance by the Owner, payment may similarly be made for~~ specific materials ~~and~~or equipment (1) suitably stored the site or (2) suitably stored at some off~~-the~~ site ~~at a~~ location, provided the following conditions are met for ~~agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored~~ off~~-the~~ site storage:

.1 The location must be agreed to, in writing, by Owner and Surety.
.2 The location must be a bonded warehouse.
.3 The Contractor's Surety must agree, in writing, to the amounts included in each Application for Payment.
.4 The Contractor must bear the cost of the Owner's and Architect's expenses related to visiting the off-site storage area and reviewing the stored contents. Contractor acknowledges that Architect's time may be an Additional Service and shall compensate Architect directly for same upon request.
.5 Payment shall not include any charges for overhead or profit on stored materials.
.6 Payments for materials or equipment stored on or off the site shall be conditioned upon submission by the Contractor of bills of sale or such other documentation satisfactory to the Owner to establish the

Owner's title to such materials or equipment or otherwise protect the Owner's interest, including applicable insurance (naming the Owner as insured and naming the specific materials or equipment stored and their location) and proof of delivery to the site for those materials and equipment stored off the site. Under no circumstances will the Owner reimburse the Contractor for down payment, deposits, or other advance payment for materials or equipment until the materials or equipment are delivered to Owner's site or the agreed-upon off-site storage. Failure to follow these procedures shall result in nonpayment for storage of or insurance on stored materials and equipment. Failure to follow these procedures shall also result in nonpayment of materials and equipment until said materials and equipment are incorporated into the Work.

CONTRACTOR AGREES TO INDEMNIFY OWNER FROM ANY LOSS RESULTING FROM A BREACH OF THIS SECTION. Any off-site storage shall be in a bonded warehouse, suitably marked for the individual project, in addition to the requirements above

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work. Neither Contractor nor any of its materialmen, laborers, or Subcontractors shall have any lien rights against the Owner's lands, building funds, materials or other property. No materialmen, laborers or Subcontractor of the Contractor shall have any enforceable rights against the Owner of this Contract. Materialmen, laborers and Subcontractors of the Contractor may have rights under any Payment Bond provided by the Contractor, but cannot look to the Owner for any help in enforcement of those rights. CONTRACTOR SHALL WAIVE, RELEASE, INDEMNIFY, AND HOLD OWNER HARMLESS FROM ANY LIENS, CLAIMS, SECURITY INTERESTS OR ENCUMBRANCES FILED BY THE CONTRACTOR, SUBCONTRACTORS, OR ANYONE CLAIMING BY, THROUGH, OR UNDER THE CONTRACTOR OR SUBCONTRACTOR FOR ITEMS COVERED BY PAYMENTS MADE BY THE OWNER TO CONTRACTOR.

9.3.4 Contractor shall submit Applications for Payment, in quadruplicate, using AIA Documents G702 and G703 Application and Certificate of Payment (or G702CMa, if applicable) and Continuation Sheet or electronically, if acceptable to Owner. All blanks in the form must be completed and signatures of Contractor and Notary Public must be original on each form. Incomplete or inaccurate Applications for Payment shall be returned to the Contractor by the Architect for completion and/or correction. Owner shall have no responsibility for payment of same if the Application for Payment is incomplete or inaccurate.

9.3.5 By signing each Application for Payment, the Contractor stipulates and certifies to the following; that the information presented is true, correct, accurate, and complete; that the Contractor has made the necessary detailed examinations, audits, and arithmetic verifications; that the submitted Work has been completed to the extent represented in the Applications for Payment; that the materials and supplies identified in the Applications for Payment have been purchased, paid for, and received; that the subcontractors have been paid as identified in the Applications for Payment or that Contractor has been invoiced for same; that Contactor has made the necessary on-site inspections to confirm the accuracy of the Applications for Payment; that there are no known mechanics' or materialmens' liens outstanding at the date of the Applications for Payment; that all due and payable bills with respect to the Work have been paid to date or are included in the amount requested in the current Payment Application; that, except for such bills not paid but so included, there is no known basis for the filing of any mechanics' or materialmens' liens on the Work; that the Payment Application includes only Work self-performed by Contractor or for which Contractor has been invoiced; and that releases from all Subcontractors and materialmen have been obtained in such form as to constitute an effective release of lien under the laws of the State of Texas, covering all Work performed and for which payment has been made by the Owner to the Contractor. Contractor understands that documents submitted to Owner become government documents under the laws of the State of Texas. Contractor further understands that falsification of Contractor's Applications for Payment may constitute a violation of the penal laws of the State of Texas, including, but not limited to, Texas Penal Code Sections 32.46; 37.09, and 37.10, and may justify termination of Contractor's Contract with Owner. Contractor further understands and agrees that falsification of documents may entitle Owner to restitution as permitted by Texas law and these Contract Documents.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, carefully evaluate and review the Applications for Payment and, when appropriate, return the Applications for Payment to the Contractor as provided in Section 9.3.4. If the Applications for Payment are complete, then the Architect shall sign and either (1) certify and issue to the Owner a Certificate for Payment in the full amount of the Applications for Payment, with a copy to the Contractor; or (2) certify and issue to the Owner a Certificate for Payment for such amount as the Architect and Program Manager determines is properly due, and notify the Contractor and Owner in writing of the Architect's or Program Manager reasons for withholding certification and disputing in part certification as provided in Section 9.5.1; or (3) withhold certification of the entire Applications for Payment, and notify the Contractor and Owner in writing with a detailed statement of the Architect's reason for withholding certification in whole in accordance with Texas Government Code Section 2251.042(a), and as provided in Section 9.5.1. Architect's written reason for withholding certification shall be submitted in accordance with, and construed as the notice required by Texas Government Code Section 2251.042 *et. seq.* Owner may not withhold from payments more than 110% of the disputed amount.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect or Program Manager to the Owner, ~~based on the Architect's evaluation of the Work and the data in the Application for Payment,~~ that the Architect has observed the progress of the Work and determined that, in the Architect's professional opinion, ~~to the best of the Architect's knowledge, information, and belief,~~ the Work has progressed to the point indicated, and the quality of the Work is in accordance with the Contract Documents. Further, the issuance of the Certificate for Payment will constitute a representation by the Architect or Program Manager to the Owner that the Architect or Program Manager has carefully evaluated and certified that the amounts requested in the Applications for Payment are valid and correct and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect or Program Manager in writing to the Owner. However, the issuance of a Certificate for Payment will not be a representation that the Architect and Program Manager has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data unless requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum. Examinations, audits, and verifications, if required by the Owner, will be performed by the Owner's accountants or other representatives of the Owner acting in the sole interest of the Owner.

9.4.3 The issuance of a Certificate for Payment shall constitute a recommendation to the Owner regarding the amount to be paid. This recommendation is not binding on the Owner if Owner knows of other reasons under the Contract Documents why payment should be withheld.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect or Program Manager may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's or Program Manager's opinion the representations to the Owner ~~required by Section 9.4.2 cannot be made~~. If the Architect or Program Manager is unable to certify payment in the amount of the Application, the Architect or Program Manager will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect or Program Manager cannot agree on a revised amount, the Architect or Program Manager will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect ~~t~~ or Program Manager may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's or Program Manager's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

.1 defective Work not remedied;

.2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;

.3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;

.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

.5 damage to the Owner or a Separate Contractor;

.6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; ~~or~~

.7 repeated failure to carry out the Work in accordance with the Contract Documents; or

.8 failure to submit a written plan indicating action by the Contractor to regain the time schedule for completion of Work within the Contract time.

§ 9.5.2 When ~~either party~~the Contractor disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, ~~that party~~the Contractor may submit a Claim in accordance with Article 15.

§ 9.5.3 Architect's written reason for withholding certification shall be construed as the notice required by Texas Government Code Section 2251.042 *et seq*~~When the reasons for withholding certification are removed, certification will be made for amounts previously withheld~~.

§ 9.5.4 Notwithstanding any provision contained within this Article, if the Work has not attained Substantial Completion or Final Completion by the required dates, subject to extensions of time allowed under the Contract Documents, ~~If~~ then Architect or Program Manager may withhold~~s~~ any further ~~c~~Certificate~~ion~~ for ~~p~~Payment ~~under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the~~ from Contractor to the extent necessary to preserve sufficient funds to complete construction of the Project and to cover liquidated damages. ~~failed to make payment for Work properly performed or material or equipment suitably delivered. If t~~The Owner shall not be deemed in default by reason of withholding ~~makes~~ payment~~s~~ as provided in Sections 9.3.4, 9.4.3, 9.5.1, or this Section ~~by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment~~.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment for undisputed amounts in the manner and within the time provided in the Contract Documents, and shall so notify the Architect. Owner shall notify Contractor within 21 days if Owner disputes the Architect's Certificate of Payment pursuant to Texas Government Code Section 2251.042 *et seq*, listing the specific reason for nonpayment. Payments to the Contractor shall not be construed as releasing the Contractor or his Surety from any obligations under the Contract Documents.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than ~~seven~~ ten days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner. In compliance with Texas Government Code Section 2251.022, the Contractor shall, within ten (10) days following receipt of payment from the Owner, pay all bills for labor and materials performed and furnished by others in connection with the Work, and shall, if requested, provide the Owner with evidence of such payment. Contractor shall include a provision in each of its subcontracts imposing the same payment obligations on its Subcontractors as are applicable to the Contractor hereunder, and if the Owner so requests, shall provide to the Owner copies of such Subcontractor payments. If the Contractor has failed to make payments promptly to the Contractor's Subcontractors or for materials or labor used in the Work for which the Owner has made payment to the Contractor, then the Owner shall be entitled to withhold payment to the Contractor, in part or in whole, to the extent necessary to protect the Owner. This Section is subject to the provisions of Texas Business and Commerce Code Chapter 56.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner, Program Manager nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier~~, except as may otherwise be required by law~~. Any action taken by Owner to require the Contractor to pay a Subcontractor shall not impose any liability on Owner to the Subcontractor or supplier.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 ~~Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.~~ Payments received by the Contractor from the Owner for Work properly performed by Subcontractors, or materials properly provided by suppliers, shall be held in trust by the Contractor for the benefit of those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor. Texas Property Code § 162.001.

§ 9.6.8 ~~Provided the Owner has fulfilled its payment obligations under the Contract Documents, t~~THE CONTRACTOR SHALL DEFEND AND INDEMNIFY THE OWNER FROM ALL LOSS, LIABILITY, DAMAGE OR EXPENSE, INCLUDING REASONABLE ATTORNEY'S FEES AND LITIGATION EXPENSES, ARISING OUT OF ANY LIEN CLAIM OR OTHER CLAIM FOR PAYMENT BY ANY SUBCONTRACTOR OR SUPPLIER OF ANY TIER. UPON RECEIPT OF NOTICE OF A LIEN CLAIM OR OTHER CLAIM FOR PAYMENT, THE OWNER SHALL NOTIFY THE CONTRACTOR. IF APPROVED BY THE APPLICABLE COURT, WHEN REQUIRED, THE CONTRACTOR MAY SUBSTITUTE A SURETY BOND FOR THE PROPERTY AGAINST WHICH THE LIEN OR OTHER CLAIM FOR PAYMENT HAS BEEN ASSERTED.

9.6.9 Contractor shall not withhold as retainage a greater percentage from Subcontractors or materialmen than the percentage that Owner withheld as retainage from payments to Contractor.

§ 9.7 Failure of Payment

9.7.1 ~~If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or~~ Pursuant to Texas Government Code Section 2251.051, if the Owner does not pay the Contractor any payment certified by the Architect and Program Manager, which is undisputed, due and owing ~~within seven days~~ after the date the payment is due under the Contract Documents ~~established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution~~, then the Contractor ~~may~~, upon ~~s~~tenven (10) additional days' written notice to the Owner, Program Manager and Architect, that payment has not been made and the Contractor intends to suspend performance for nonpayment, may stop the Work until payment of the amount owing has been received. ~~The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents~~If the Owner provides written notice to the Contractor that: 1) payment has been made; or 2) a bona fide dispute for payment exists, listing the specific reasons for nonpayment, then Contractor shall be liable for damages resulting from suspension of the Work. If a reason specified is that labor, services, or materials provided by the Contractor are not provided in compliance with the Contract Documents, then the Contractor shall be provided a reasonable opportunity to cure the noncompliance or to compensate Owner for any failure to cure the noncompliance. No amount shall be added to the Contract Sum as a result of a dispute between Owner and Contractor unless and until such dispute is resolved in Contractor's favor.

9.7.2 ~~If the Architect does not issue a Certificate for Payment within seven (7) days after receipt of the Contractor's Application for Payment, through no fault of the Contractor, then the Contractor shall provide written notice to the Owner, and the Owner shall have fourteen (14) business days after receipt of such notice to provide or obtain a Certificate for Payment. If Owner fails to provide or obtain the Certificate for Payment, then the Contractor may, upon fourteen (14) additional business days' written notice to the Owner and Architect, stop the Work until payment of the undisputed amount owing has been received.~~[*Intentionally deleted*]

9.7.3 If the Owner is entitled to reimbursement or payment from the Contractor under or pursuant to the Contract Documents, then such payment shall be made promptly upon demand by the Owner. Notwithstanding anything contained in the Contract Documents to the contrary, if the Contractor fails to promptly make any payment due to Owner, pursuant to the Contractor, or if the Owner incurs any costs and expenses to cure any default of the Contractor or to correct defective Work, then the Owner shall have an absolute right to offset such amount against the Contract Sum and, in the Owner's sole discretion and without waiving any other remedies, may elect either to:

.1 deduct an amount equal to that which the Owner is entitled from any payment then or thereafter due to Contractor form the Owner, or

.2 issue a written notice to the Contractor reducing the Contract Sum by an amount equal to that which the Owner is entitled.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use; all Project systems included in the Work or designated portion thereof have been successfully tested and are fully operational; all required governmental inspections and certifications required by the Work have been made, approved, and posted; designated initial instruction of Owner's personnel in the operation of Project systems has been completed; and all the required finishes set out in the Construction Documents are in place. The only remaining Work shall be minor in nature so that the Owner can occupy the Work or the applicable portion of the Work for all of its intended purposes on that date; and the completion of the Work by the Contractor will not materially interfere with or hamper Owner's, or Owners' tenant normal school operations, or other intended use. As a further condition of a determination of Substantial Completion, the Contractor shall certify that all remaining Work with respect thereto will be completed within the time specified by the Contract Documents for Final Completion. As provided in the Contract Documents, Owner may occupy a portion of the facility prior to Substantial Completion.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Architect and Program Manager shall prepare ~~shall prepare~~ and a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect and Program Manager will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, then the Architect shall so notify the Contractor, Program Manager and Owner in writing, and the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion. Except with the consent of the Owner, the Architect shall perform no more than five (5) inspections to determine whether the Work or a designated portion thereof has attained Substantial Completion in accordance with the Contract Documents. The Owner shall be entitled to reimbursement from the Contractor for amounts paid to the Architect for any additional inspections.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will timely prepare, sign and issue Owner's ~~a~~ Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of ~~Substantial~~ Final Completion of the Work or designated portion ~~thereof unless otherwise provided in the Certificate of Substantial Completion~~.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. ~~Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.~~

9.8.6 The Contractor shall keep all required insurance in full force, and utilities on, until the Certificate of Substantial Completion is issued, and accepted by the Owner in writing, regardless of the stated date of Substantial Completion, subject to 11.2.2. Acceptance shall not be unreasonably withheld.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when ~~such portion is designated by separate agreement with~~agreed to by the Owner and ~~the Contractor in writing, provided such occupancy or use is consented to by the insurer and~~ authorized by public authorities having jurisdiction over the ~~Project~~Work. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided that the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work resulting from such occupancy, use or installation, and property and liability insurance, ~~and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2.~~ Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect. Contractor agrees that the Owner may place and install as much equipment and furnishings as is possible before completion or partial completion of portions of the Work.

§ 9.9.2 Immediately prior to such partial occupancy, ~~or~~ use, or installation, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless ~~otherwise~~ expressly agreed upon in writing, partial occupancy or use of a portion or portions of the Work or installation of furnishings and equipment shall not constitute acceptance of Work not complying with the requirements of the Contract Documents, nor shall it constitute evidence of Substantial Completion or Final Completion.

9.9.4 In the event that Owner takes partial occupancy or installs furnishings and equipment prior to Substantial Completion of the Project. Contractor shall obtain an endorsement to Contractor's Builder's Risk Policy to provide extended coverage for partial occupancy if Contractor's Builder's Risk Coverage required by Article 11 would not otherwise provide such coverage.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect and the Program Manager finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect and the Program Manager will promptly prepare, sign, and issue Owner's Certificate of Final Completion and a final Certificate for Payment ~~stating that to the best of the Architect's knowledge, information and belief,~~ certifying to the Owner that, ~~and~~ on the basis of the Architect's and the Program Manager's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance, including all retainages, found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's and the Program Manager final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. Final payment shall be made by the Owner in accordance with Owner's regular schedule for payments. Architect is not required to perform more than two inspections to determine whether a designated portion of the Work has attained Final Completion in accordance with the Contract Documents. One inspection may require multiple visits and more than one day to complete The Owner shall be entitled to reimbursement from the Contractor for amounts paid to the Architect for any additional inspections cause by act or commission of Contractor.

9.10.1.1 Final Completion means actual completion of the Work, including any extras or Change Orders reasonably required or contemplated under the Contract Documents other than warranty work as further defined in the Form of Contractor's Final Completion Notice attached hereto and incorporated herein as Exhibit "D

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) using AIA Document G706, an affidavit that payrolls, bills for materials and equipment, and

other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) ~~a certificate~~ evidencing satisfactory to Owner that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) using AIA Document G707, consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) ~~if required by the Owner,~~ except for amounts previously withheld by the Owner, other data establishing payment or satisfaction of obligations, such as AIA Document G706A, notarized subcontractor's lien releases, receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees. In addition, the following items must be completed and received by the Owner before Final Payment will be due:

.1 Written certifications required by Sections 10.5, 10.6, and 10.7;
.2 Final list of subcontractors (AIA Document G705);
.3 Contractor's certification in Texas Education Agency's Certification of Project Compliance, located at www.tea.state.tx.us/school.finance/facilities/cert_2004.pdf;
.4 Contractor's warranties, organized as required elsewhere in the Contract Documents;
.5 Maintenance and Instruction Manuals;
.6 Owner's Final Completion Certificate; and
.7 "As-constructed record drawings." At the completion of the Project, the Contractor shall submit one (1) complete set of "as-constructed" record drawings, with all changes made during construction, including concealed mechanical, electrical, and plumbing items. The Contractor shall submit these as electronic, sepia, or other acceptable medium, in the discretion of the Owner. The "as-constructed" record drawings shall delete the seal of the Architect and/or the Engineer and any reference to those firms providing professional services to the Owner, except for historical or reference purposes.

Documents identified as affidavits must be notarized. All manuals will contain an index listing the information submitted. The Index section will be divided and identified by tabbing each section as listed in the index. Upon request, the Architect will furnish the Contractor with blank copies of the forms listed above. Final payment shall be paid by the Owner to the Contractor within thirty (30) days after Owner's Board of Trustees has voted to accept the Work and approve Final Payment.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, ~~except that~~and it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall not constitute a waiver of any Claims by the Owner. ~~except those arising from~~

~~.1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;~~
~~.2 failure of the Work to comply with the requirements of the Contract Documents;~~
~~.3 terms of special warranties required by the Contract Documents; or~~
~~.4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.~~

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously asserted pursuant to Article 15~~made in writing~~ and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract and shall conform to all provisions of the "Manual of Accident Prevention in Construction," published by the Associated General Contractors of America, Inc., latest edition, and the Contractor further agrees to fully comply with all safety standards required by the Occupational Safety and Health Administration ("OSHA") 29 U.S.C. Section 651 *et seq*., and all amendments thereto. However, the Contractor's duties herein shall not relieve any Subcontractor or any other person or entity, including any person or entity required to comply with all applicable federal, state, and local laws, rules, regulations, and ordinances from the obligation to provide for the safety of their employees, persons, and property and their requirements to maintain a work environment free of recognized hazards. Contractor shall provide reasonable fall protection safeguards and provide approved fall protection safety equipment for use by all exposed Contractor employees.

10.1.2 Contractor's employees, agents, Subcontractors, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, shall not perform any service for Owner while under the influence of any amount of alcohol or any illegal controlled substance; or use, possess, distribute, or sell alcoholic beverages while on Owner's premises. No person shall: use, possess, distribute, or sell illegal or nonprescribed controlled drugs or drug paraphernalia; misuse legitimate prescription or over-the-counter drugs; or act in contravention of warnings on medications while performing the Work or while on Owner's premises. Contractor's employees, agents, Subcontractors, or anyone directly or indirectly employed by any of them, shall not distribute or sell alcohol or drugs of any kind to Owner's students or staff, regardless of the location of the distribution or sale.

10.1.3 Contractor will comply with all applicable federal, state, and local drug and alcohol-related laws and regulations (e.g., Department of Transportation regulations, Drug-Free Workplace Act). Contractor has adopted or will adopt its own policy to assure a drug-free and alcohol-free workplace while on Owner's premises or performing the Work. Contractor will remove any of its employees, agents, subcontractors, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, from performing the Work any time there is suspicion of alcohol and/or drug use, possession, or impairment involving such person, and at any time an incident occurs where drug or alcohol use could have been a contributing factor. Owner has the right to require Contractor to remove any person from performing the Work any time cause exists to suspect alcohol or drug use. In such cases, the person so removed may only be considered for return to work after the Contractor certifies, as a result of a for-cause test, conducted immediately following removal, that said person was in compliance with this Contract. Contractor will not use any person to perform the Work who fails or refuses to take, or tests positive on, any for-cause alcohol or drug test.

10.1.4 Owner has also banned the presence of all weapons on the Project site, whether or not the owner thereof has a permit for a weapon, and Contractor agrees that Contractor's representatives, employees, agents, and subcontractors will abide by same. Weapons may only be permitted in Owner's parking lots if weapons are locked in personal vehicles in Owner's parking lot.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

.1 employees on the Work, school personnel, students, and other persons on Owner's premises, and other persons who may be affected thereby, including the installation of fencing between the Work site and any connecting or adjacent property of Owner, when required by Texas Education Code Section 22.08341;

.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and

.3 other property at the site or adjacent thereto, such as other buildings, and their contents, fencing, trees, shrubs, lawns, walks, athletic fields, facilities and tracks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including installing fencing, posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards. The Contractor shall also be responsible, at the Contractor's sole cost and expense, for all measures necessary to protect any personal or real property adjacent to the project and improvements therein. Any damage to such property or improvements shall be promptly repaired by the Contractor.

§ 10.2.4 When use or storage of ~~explosives or other~~ hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel and shall only conduct such activities after giving reasonable advance written notice of the presence or use of such materials, equipment, or methods to Owner and Architect. The storage of explosives on Owner's property is prohibited. The use of explosive materials on Owner's property is prohibited unless expressly approved in advance in advance by authorities having jurisdiction, in writing, by Owner and Architect. When use or storage of hazardous materials or equipment or unusual construction methods are necessary, the Contractor shall give the Owner, Program Manager and the Architect reasonable advance notice of the presence or use of such materials, equipment or methods.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, ~~.~~ except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. ~~The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor.~~ The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect. Additionally, Contractor shall submit a Safety Plan for the Owner's approval prior to commencing the Work.

Unless otherwise specified in the Contract Documents, Contractor shall be responsible for initiating, maintaining, supervising, and enforcing all safety precautions and programs in connection with the Work. It shall be the duty and responsibility of the Contractor and all of its Subcontractors to be familiar and comply with all requirements of ~~Public Law 91-596,~~ 29 U.S.C. §§ 651 *et. Sseq.*, the Occupational Safety and Health Act of 1970, (OSHA) and all amendments thereto, and to enforce and comply with all of the provisions of the Act. Contractor shall comply with all applicable laws and regulations of any public body having jurisdiction for safety of persons or property to protect them from damage, injury or loss and shall erect and maintain all necessary safeguards for such safety and protection. However, the Contractor's duties shall not relieve any subcontractor(s) or any other person or entity (e.g., a supplier) including any person or entity with liability relative to compliance with all applicable federal, state and local laws, rules, regulations, and ordinances which shall include the obligation to provide for the safety of their employees, persons, and property and their requirements to maintain a work environment free of recognized hazards.

§ 10.2.7 The Contractor shall not load or permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

10.2.8 The Contractor shall do all things reasonably necessary to protect the Owner's premises and all persons from damage and injury when all or a portion of the Work is suspended for any reason.

10.2.9 The Contractor shall promptly report, in writing, to the Owner, Program Manager and Architect all accidents arising out of or in connection with the Work which causes death, bodily injury, or property damage, giving full details and statements of any witnesses. In addition, if death, serious bodily injuries, or serious property damages are caused, then the accident shall be reported immediately by any means necessary to give actual notice to the Owner's representative, Program Manager and the Architect.

10.2.10 Contractor's obligations under Section 10.2 as to each portion of the Project shall continue until Owner takes possession of and occupies that portion of the Project.

§ 10.2.11~~8~~ Injury or Damage to Person or Property

If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The written notice shall provide sufficient detail to enable the other party to investigate the matter. Contractor understands and acknowledges that, under Texas law, Owner has sovereign and/or governmental immunity as to all torts except as to the Owner's permitted use or operation of Owner's motor vehicles, subject to any defenses under law.

§ 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify, in writing, the Owner and Architect of the condition. In the event the Contractor encounters polychlorinated biphenyl (PCB), and the specifications require the PCB's removal, the Contractor shall remove the PCB and store it in marked containers at the jobsite provided by the Owner. If PCBs are found which are leaking, then Contractor shall stop work on the affected fixture and shall contact Owner for removal and disposal of the leaking PCBs.

10.3.1.1 In the event Contractor encounters on the Project site any Hazardous Substance, or what Contractor may reasonably believe to be a Hazardous Substance, and which is being introduced to the Work, or exists on the Project site, in a manner in violation of any applicable Environmental Laws, Contractor shall immediately stop work in the area affected and report the condition to Owner, Program Manager and Architect in writing

§ 10.3.2 The Work in the affected area shall not thereafter be resumed except by written authorization of Owner if in fact a Hazardous Substance has been encountered and has not been rendered harmless. Contractor shall be responsible for the consequences of any failure to stop work under this Subparagraph 10.3. ~~Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start up~~The Contractor may be entitled to an equitable adjustment regarding the Date of Substantial Completion and/or Final Completion.

§ 10.3.3 IF THE CONTRACTOR IMPORTS HAZARDOUS MATERIALS ONTO THE PROJECT SITE, THEN CONTRACTOR HEREBY ~~TO THE FULLEST EXTENT PERMITTED BY LAW, THE OWNER SHALL~~ INDEMNIFIES~~Y~~ AND HOLD HARMLESS THE OWNER, ITS ~~CONTRACTOR, SUBCONTRACTORS, ARCHITECT, ARCHITECT'S~~ CONSULTANTS, TRUSTEES, OFFICERS, ~~AND~~ PROGRAM MANAGER, AGENTS AND EMPLOYEES ~~OF ANY OF THEM FROM AND~~ AGAINST ANY CLAIMS~~, DAMAGES, LOSSES, AND EXPENSES, INCLUDING BUT NOT LIMITED TO ATTORNEYS' FEES~~, ARISING OUT OF OR RELATING TO ~~RESULTING FROM~~SUCH IMPORTATION, INCLUDING BUT NOT LIMITED TO ~~PERFORMANCE OF THE WORK IN THE AFFECTED AREA IF IN FACT THE MATERIAL OR SUBSTANCE PRESENTS THE RISK OF BODILY INJURY OR DEATH AS DESCRIBED IN SECTION 10.3.1 AND HAS NOT BEEN RENDERED HARMLESS, PROVIDED THAT SUCH CLAIM, DAMAGE, LOSS, OR EXPENSE IS~~

~~ATTRIBUTABLE TO BODILY INJURY, SICKNESS, DISEASE OR DEATH, OR TO INJURY TO OR DESTRUCTION OF TANGIBLE PROPERTY (OTHER THAN THE WORK ITSELF), EXCEPT TO THE EXTENT THAT SUCH DAMAGE, LOSS, OR EXPENSE IS DUE TO THE FAULT OR NEGLIGENCE OF THE PARTY SEEKING INDEMNITY~~COSTS AND EXPENSES THE OWNER INCURS FOR REMEDIATION OF A MATERIAL OR SUBSTANCE THE CONTRACTOR BRINGS TO THE SITE, AS PROVIDED FOR IN SUBPARAGRAPH 3.18.

~~For purposes of this Agreement, the term "Hazardous Substance" shall mean and include any element, constituent, chemical, substance, compound, or mixture, which are defined as a hazardous substance by any applicable local, state or federal law, rule, ordinance, by-law, or regulation pertaining to environmental regulation, contamination, clean-up or disclosure, including, without limitation, The Comprehensive Environmental Response, Compensation and Liability Act of 1980 ("CERCLA"), The Resource Conservation and Recovery Act ("RCRA"), The Toxic Substance Control Act ("TSCA"), The Clean Water Act ("CWA"), The Clean Air Act ("CAA"), and the Marine Protection Research and Sanctuaries Act ("MPRSA"). The Occupational Safety and Health Act ("OSHA"), The Superfund Amendments and Reauthorization Act of 1986 ("SARA"), or other state superlien or environmental clean-up or disclosure statutes including all state and local counterparts of such laws (all such laws, rules and regulations being referred to collectively as "Environmental Laws"). It is the Contractor's responsibility to comply with this Paragraph 10.3 based on the law in effect at the time its services are rendered and to comply with any amendments to those laws for all services rendered after the effective date of any such amendments.~~

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site ~~unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances~~.

§ 10.3.5 For purposes of this ~~Agreement~~Contract, the term "Hazardous Substance" shall mean and include any element, constituent, chemical, substance, compound, or mixture, which are defined as a hazardous substance by any applicable local, state or federal law, rule, ordinance, by-law, or regulation pertaining to environmental regulation, contamination, clean-up or disclosure, including, without limitation, The Comprehensive Environmental Response, Compensation and Liability Act of 1980 ("CERCLA"), The Resource Conservation and Recovery Act ("RCRA"), The Toxic Substance Control Act ("TSCA"), The Clean Water Act ("CWA"), The Clean Air Act ("CAA"), and the Marine Protection Research and Sanctuaries Act ("MPRSA"). The Occupational Safety and Health Act ("OSHA"), The Superfund Amendments and Reauthorization Act of 1986 ("SARA"), or other state superlien or environmental clean-up or disclosure statutes including all state and local counterparts of such laws (all such laws, rules and regulations being referred to collectively as "Environmental Laws"). It is the Contractor's responsibility to comply with this Paragraph 10.3 based on the law in effect at the time its services are rendered and to comply with any amendments to those laws for all services rendered after the effective date of any such amendments.~~The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.~~

§ 10.3.6 In those instances in which the presence of a Hazardous Substance was set forth in the AHERA documents or In which the Contractor has other written notice of such through information given to Contractor by Owner or its representative prior to execution of the ~~Agreement~~Contract, Contractor shall not be entitled to a Claim for any delays, disruption or interference it encounters. In those instances of Work stoppage due to the existence of such Hazardous Substances which were not set forth in the AHERA plans and of which the Contractor has no other prior notice, Contractor may be entitled to a Claim for delay or Work stoppage if the requirements of Article 15 are not met. ~~If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.~~

§ 10.4 Emergencies

10.4.1 In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.~~Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.~~

10.4.2 The performance of the foregoing services by the Contractor shall not relieve the subcontractors of their responsibility for the safety of persons and property and or compliance with all federal, state, and local statutes, rules, regulations, and orders of any governmental authority applicable to the conduct of the Work.

10.5 ASBESTOS OR ASBESTOS-CONTAINING MATERIALS

10.5.1 Contractor shall submit to the Architect a written certification addressed to the Owner that all materials used in the construction of this Project contain less than 0.10% by weight of asbestos and for which it can be demonstrated that, under reasonably foreseeable job site conditions, will not release asbestos fibers in excess of 0.1 fibers per cubic centimeter. The written certification shall further state that, should asbestos fibers be found at this Project in concentrations greater than 0.1 fibers per cubic centimeter, then Contractor shall be responsible for determining which materials contain asbestos fibers and shall take all necessary corrective action to remove those materials from the Project, at no additional cost to the Owner. The written certification shall be dated, shall reference this specific Project, and shall be signed by not less than two (2) officers of the Contractors.

10.5.2 Final Payment shall not be made until this written certification has been received.

10.6 LEAD-FREE MATERIAL IN POTABLE WATER SYSTEM

10.6.1 Prior to payment of retainage and final payment, the Contractor and each subcontractor involved with the potable water system, shall furnish a written certification that the potable water system is "lead-free."

10.6.2 The written certification shall further state that should lead be found in the potable water system built under this Project, then Contractor shall be responsible for determining which materials contain lead and shall take all necessary corrective action to remove lead from the Project, at no additional cost to the Owner. The written certification shall be dated, shall reference this specific Project, and shall be signed by not less than two (2) officers of the Contractor.

10.7 HAZARDOUS MATERIALS CERTIFICATION

The Contractor shall provide written certification that no materials used in the Work contain lead or asbestos materials in them in excess of amounts allowed by federal, state, or local standards, laws, codes, rules and regulations; the Federal Environmental Protection Agency (EPA) standards; and/or the Federal Occupational Safety and Health Administration (OSHA) standards, whichever is most restrictive. The Contractor shall provide this written certification as part of submittals under the Section in the Project Manual related to Contract Closeout.

ARTICLE 11 INSURANCE AND BONDS

11.0.1 No Work will be commenced, and no equipment or materials can be shipped, until all requirements of this Article have been satisfied, satisfactory evidence of insurance has been provided, and all insurance is in full force and effect. Contractor shall notify Owner, Program Manager and Architect, in writing, of any proposed nonconformity with these requirements, and shall notify Owner, Program Manager and Architect, in writing, of any insurance changes which occur during the terms required under the Contract Documents. Any deviation from these requirements can only be approved by Owner's Board of Trustees. Any nonconformity may be grounds for termination or modification of the Contract. To the extent that Contractor is unable to procure the insurance designated herein because the insurance is not reasonably available or is cost-prohibitive, then Contractor shall provide written notice to Owner's Board of Trustees. Said lack of insurance may then be grounds for termination or modification of this Contract.

11.0.2 Satisfactory evidence of insurance required by this Article shall be provided to Owner, Program Manager and Architect not later than five (5) business days after execution of the Contract by Contractor. Satisfactory evidence shall include copies of all required insurance policies, declarations, and endorsements themselves. In addition, Contractor shall also provide a duly-executed ACORD Form 25 Certificate of Liability Insurance naming Owner as a certificate holder and additional insured (except as noted in Section 11.0.4) and attaching all endorsements required herein. The Contractor shall furnish Owner all insurance amendments, renewals, notices, cancellations, and additional endorsements, as they are provided to Contractor.

11.0.3 All insurance required herein shall be obtained from a company licensed to do business with the State of Texas by the Texas Department of Insurance, and shall be underwritten by a company rated no less than "A-" X in A.M. Best's Key Rating Guide, Property-Casualty, according to the latest posted ratings available on A.M. Best's website, www.ambest.com, and that permits waivers of subrogation.

11.0.4 ~~All insurance required herein shall name the Owner, its officers, employees, representatives, or agents, as an additional insured, except Contractor's Worker's Compensation insurance.~~ All liability insurance required herein shall name Dallas ISD, it's officers, employees, volunteers, elected officials, Program Managers, Architects and their officers, employees, representatives, risk management consultants, or agents, as additional insureds, except Contractor's Worker's Compensation insurance and Professional Liability insurance.

11.0.5 ~~All insurance required herein shall, by endorsement, be primary and non-contributory insurance with respect to the Owner, its officers, employees, representatives, or agents. All insurance shall be written on an occurrence basis, if available, and shall contain a waiver of subrogation in favor of Owner as provided for in Section 11.3.~~ All insurance required herein shall be primary insurance as respects the additional insured required by 11.0.4. Any insurance maintained by an additional insured shall be in excess of such insurance and shall not contribute with such primary insurance. All insurance shall be written on an occurrence basis where reasonably available, with the exception of professional liability policies, and shall contain a waiver of subrogation in favor of- the Owner, Program Manager, and Architect on all claims arising out of the Project. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, or did not pay the insurance premium directly or indirectly; and whether or not the person or entity had an insurable interest in the property damaged.

11.0.6 Any failure of Contractor to comply with the reporting provision of the policies shall not affect the coverage provided to the Owner, its officers, employees, representatives, or agents.

11.0.7 All workers on the Project must be covered by the required insurance policies of the Contractor or a Subcontractor. Contractor shall be responsible for all policy deductibles and self-insured retentions.

11.0.8 Nothing contained in this Article shall limit or waive Contractor's legal or contractual responsibilities to Owner or others. Contractor will cooperate with Owner or its designated representative to expeditiously resolve claims involving injuries to third parties, damage to the Work, or project delays. This cooperation will include providing Owner with monthly insurance carrier summary reports of builder's risk, general liability, professional liability and pollution liability claims pertaining to the Owner's projects. Contractor will provide Owner with Contractor and insurance carrier contact names and phone numbers. Contractor will be responsible for timely reporting of all claims and regulatory requirements, including MMSEA Section 111.

11.0.9. Maximum Allowable Charges for CMAR CCIP Programs

In the event that the Contractor elects to utilize a Contractor Controlled Insurance Program (CCIP) the maximum to be considered reimbursable costs under this Contract will be 2% of the final Cost of the Work (including general conditions costs) but not including Contractor Fee or CCIP charges and not including the costs of any subcontracts that included the cost of insurance covered by CCIP.

This 2% cost factor will cover all insurance required to be carried by the prime contractor and all applicable subcontractors covered by this Contract (specifically 1% for worker's compensation insurance, and 1% total for general liability insurance, excess liability insurance, and umbrella liability insurance combined).

Any contractor costs incurred in connection with the Contractor's elected CCIP program that exceeds the amount reimbursed by the Owner under the formula in this section, will be considered to be covered by the Contractor's Fee. Note: Contractor will not be reimbursed for any deductible stated in the CCIP policy. The deductible is considered covered by the CCIP percent and/or the Contractor Fee.

11.0.10 Maximum Allowable Charges for CMAR Liability Insurance Required by Contract

For jobs not covered by Owner Controlled Insurance Programs (OCIP) or Contractor Controlled Insurance Programs (CCIP), the amount to be reimbursed to the Contractor for all contractually required liability insurance (professional liability, general liability, umbrella liability, excess liability, and auto liability will be actual costs not to exceed a total of .65% of the net reimbursable Cost of Work (not including liability insurance and not including Contractor Fee.) If the Contractor's cost of contractually required liability insurance is greater than the amount agreed to be reimbursed per this Contract provision, the difference shall be considered to be covered by the Contractor's Fee. For

jobs covered by CCIP or OCIP, the costs of any other liability insurance will be considered to be covered by the Contractor's Fee.

11.0.11 Maximum Allowable Charges for Subcontract Default Insurance provided by CMAR in lieu of Subcontract Performance Bonds

In the event that Contractor elects to utilize a subcontractor default insurance program (sometimes referred to as SUBGUARD), the maximum amount to be considered reimbursable costs under this Contract will be .75% of the total amount of subcontracts enrolled in such an insurance program. Reimbursement for enrollment in any such program will be limited to subcontracts in excess of $~~2~~500,000.

Any Contractor costs incurred in connection with the Contractor's elected subcontractor default insurance program that exceeds the amount reimbursed by the Owner under the formula in this section, will be considered to be covered by the Contractor's Fee. In the event that Contractor elects to bond selected subcontractors rather than enroll them in the subcontractor default insurance program, the net cost to purchase any such bonds will be reimbursed in lieu of the .75%. Note: Contractor will not be reimbursed for any deductible stated in the Subguard policy. The deductible is considered covered by the .75% and/or the Contractor Fee.

In the event that the Contractor elects to provide Subguard or a similar program of subcontractor default insurance, then the program and the coverage provided by the Contractor shall extend to any additional costs incurred by the Contractor to replace or supplement the forces of a subcontractor to provide the Work, and such circumstances shall include, but not be limited to, any partial or full termination of the contract of a subcontractor for convenience or otherwise, unless the Owner specifically directs the Contractor, in writing, to terminate the contract of a subcontractor for convenience.

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor and the Contractor's Subcontractors shall purchase and maintain, in a company or companies with a "Best Rating" of "A minus" or better, and licensed to do business in the State of Texas, ~~-~~such insurance as will protect, the Contractor, ~~-~~them and the Owner, Program Manager and Architect~~the Owner~~, ~~-~~from claims that may arise out of, or result from, the Contractor's operations under the Contract, whether such operations be by Contractor or by any Subcontractor, or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, at a minimum of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in this Section 11.1, in the ~~Agreement~~Contract or elsewhere in the Contract Documents. ~~The Contractor shall purchase and maintain the required~~ Such insurance shall include the following:~~from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.~~

.1 Claims under workers' compensation, disability benefit, and other similar employee benefit acts that are applicable to the Work to be performed, including private entities performing work at the site, and exempt from the coverage on account of number of employees or occupation, which entities shall maintain voluntary compensation coverage at the same limit specified for mandatory coverage for the duration of the Project (see Exhibit A).

.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;

.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;

.4 Claims for damages insured by usual personal injury liability coverage;

.5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;

.6 Claims for damages because of bodily injury, death of a person, or property damages arising out of ownership, maintenance, or use of a motor vehicle;

.7 Claims for bodily injury or property damage arising out of completed operations;

.8 Claims involving contractual liability insurance applicable to the Contractor's obligations under the Contract Documents, including under Section 3.18;

.9 Claims for Products, Premises and Operations; and

.10 Claims for damages to the Work itself, through builder's risk insurance, pursuant to AIA A101-2017, Exhibit A, or AIA A133-2019, Exhibit ~~B~~A.

§ 11.1.2 The insurance required by Subparagraph 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment, and with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.~~The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.~~

~~8. Contractor's Professional Liability, if applicable~~

~~If the Work performed by the Contractor or its subcontractors will include some responsibility for design, the Contractor will purchase or cause to be purchased and maintained a professional liability policy. The limits of coverage will not be less than:~~

~~$1,000,000 each claim and annual aggregate~~

~~Coverage will include:~~
~~A waiver of subrogation in favor of Owner, Program Manager and Architect~~
~~A retroactive date that is the earlier of the start of design or the Work~~
~~Coverage for negligent acts, errors or omissions arising out of design or engineering services~~
~~An extended reporting period of 5 years after final completion~~

9. All Risk Builder's Risk Insurance, if applicable

If Contractor is a Construction Manager-at-Risk, then, as specified in Amendment Number One, in a total amount equal to the Guaranteed Maximum Price; otherwise, in the total amount of the Contract Sum. See Section 11.4 for Builder's Risk Insurance requirements.

11.1.2.1 The Contractor shall furnish separate payment and performance bonds covering faithful performance of the Contract and payment of obligations arising thereunder, each bond to be in a total amount equal to 100% of the Contract Sum or Guaranteed Maximum Price, if the Project is a Construction Manager at Risk project, whichever is applicable. Provided, however, no limitation herein shall limit Contractor's liability under the Contract Documents. Except as provided below, such bond shall be furnished to Owner before any work begins and not later than five (5) business days after execution of the Contract by Owner. (If the Guaranteed Maximum Price is not known at the time that a Construction Manager at Risk contracts is awarded, then the sum of the payment and performance bonds must each be in an amount equal to the Project budget. The Construction Manager at Risk shall deliver the bonds not later than the tenth (10^{th}) day after the date of the Construction Manager at Risk executes the Contract, unless the Construction Manager at Risk furnished a bid bond or other financial security acceptable to the Owner to the District to ensure that the Construction Manager will furnish the required payment and performance bonds when the Guaranteed Maximum Price is established.) All bond shall be issued by a surety company licensed, listed and authorized to issue bonds in the State of Texas by the Texas Department of Insurance, and shall fully comply with Texas Insurance Code Section 3503.001 *et seq*. and Texas Government Code Chapter 2253, or their successors. The surety company shall have a rating of not less than "A-"X according to the latest posted ratings on the A.M. Best website, www.ambest.com. The surety company shall provide, if requested, information on bonding capacity and other projects under coverage and shall provide proof to establish adequate financial capacity for this Project. Should the bond amount be in excess of ten (10%) percent of the surety company's capital and surplus, then the surety company issuing the bond shall certify that the surety company has acquired reinsurance, in a form and amount acceptable to the Owner, to reinsure the portion of the risk that exceeds ten (10%) percent of the surety company's capital and surplus with one or more insurers who are duly authorized and admitted to do business in Texas and that amount reinsured by a reinsurer does not exceed ten (10%) percent of the reinsurer's capitals and surplus. Contractor shall immediately notify the Owner and Architect in writing if there is any change in: the rating; insolvency or receivership in any State; bankruptcy; right to do business in the State; or status of Contractor's sureties at any time until Final Completion.

If the Contract amount is $100,000 or more, the Contractor shall furnish a Performance Bond equal to one hundred percent (100%) of the Contract Sum. If the Contract amount is $25,000 or more, the Contractor shall furnish a Payment Bond equal to one hundred percent (100%) of the Contract Sum. There shall be separate bonds, the terms of which and the sureties of which are satisfactory to the Owner and which comply with Chapter 2253, Texas Government Code, Title 10 (Vernon Supp. 1999), and all other applicable law. Contractor shall furnish a copy of the Payment Bond to each of its Subcontractors upon request. Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall permit a copy to be furnished.

11.1.2.2 Certificates of insurance acceptable to the Owner, Program Manager and Architect shall be filed with the Owner and Architect prior to commencement of the Work. These certificates and the insurance policies required by this Paragraph 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least thirty (30) days' prior written notice has been given to the Owner. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment as required by Subparagraph 9.10.2. Information concerning a fifty percent or greater reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both shall be furnished by the Contractor to the Owner, Program Manager and Architect in writing within five (5) business days of Contractor's information and belief.

Contractor's insurance shall apply separately to each insured against whose claim is made or suit is brought, except with respect to the limits of the insurer's liability

11.1.2.3 ~~2~~ The Contractor shall deliver copies of the required bonds to the Owner and Architect not later than five (5) business days after execution of the Contract by Owner. All bonds will be reviewed by the Architect for compliance with the Contract Documents. In the event that the Architect has any questions concerning the sufficiency of the bonds, the bonds will be referred to the Owner or the Owner's representative with Architect's recommendation.

11.1.2.3 4 All bonds shall be originals. The Contractor shall require the attorney-in-fact who executes the required Bonds on behalf of the Surety to affix thereto a certified and current copy of the power-of-attorney. The name, address, and telephone number of a contact person for the bonding company shall be provided.

11.1.2.5 ~~4~~ Bonds shall guarantee the faithful performance of all of the covenants, stipulations, and agreements of the Contract. Bonds shall be signed by an agent, resident in the State of Texas. If at any time during the continuance of the Contract, the Owner determines that the Contractor is unable to complete the Work in accordance with the Contract Documents, any of the Contractor's bonds become insufficient, the surety becomes insolvent, or the surety's rating drops below the required level, then the Owner shall have the right to require from the Contractor additional and sufficient sureties or other security acceptable to the Owner, which the Contractor shall furnish to the satisfaction of the Owner within ten (10) days after notice to do so. These contractual remedies are in addition to all remedies available by law. In default thereof, all payment or money due to the Contactor may be withheld until the Contractor provides additional surety or security.

11.1.2. ~~5~~ TEXAS WORKERS' COMPENSATION INSURANCE

A copy of a Certificate of insurance, a certificate of authority to self-insure issued by the commission, or a coverage agreement (TWCC-81, TWCC-83, or TWCC-84), showing statutory worker's compensation insurance coverage for the person's or entity's employees providing services on a project is required for the duration of the Project.

Duration of the Project includes the time from the beginning of the Work on the Project until the Contractor's/person's work on the Project is required for the duration of the Project, including any Warranty Period.

Persons providing services on the Project ("subcontractor") in Texas Labor Code 406.096:
includes all persons or entities performing all or part of the services the Contractor has undertaken to perform on the Project, regardless of whether that person contracted directly with the Contractor and regardless of whether that person has employees. This includes, without limitation, independent contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity that furnished persons to provide services on the Project.

Services include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a project. Services do not include activities unrelated to the Project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

The contractor shall provide coverage, based on proper reporting of classification codes and payroll amount and filing of any coverage agreements, which meets the statutory requirements of Texas Code 401.011 (44) for all employees of the contractor providing services on the project for the duration of the Project.

The Contractor must provide a certificate of coverage to the governmental entity prior to being awarded the contract.

If the coverage period shown on the contactor's current certificate of coverage ends during the duration of the project, the contractor must, prior to the end of the coverage period, file a new certificate of coverage with the governmental entity showing that coverage has been extended. The contractor shall obtain from each person providing services on a project, and provide to the governmental entity:

1. A certificate of coverage, prior to that person beginning work on the project, so the governmental entity will have on file certificates of coverage showing coverage for all persons providing services on the project; and

2. No later than seven (7) days after receipt by the Contractor, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project.

The Contractor shall retain all required certificates of coverage for the duration of the project and for one (1) year thereafter.

The Contractor shall notify the governmental entity in writing by certified mail or personal delivery, within ten (10) days after the contractor knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project.

The Contractor shall post on each project site a notice, in the text, form, and manner prescribed by the Texas Workers' Compensation Commission, informing all persons providing services on the project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.

The Contractor shall contractually require each person with whom it contracts to provide services on a project, to:

1. Provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code 401.011 (44) for all its employees providing services on the project for the duration of the project.

2. Provide to the contractor, prior to that person beginning work on the project, a certificate of coverage
showing that coverage is being provided for all employees of the person providing services on the project for the duration of the project;

3. Provide the contractor, prior to the end of the coverage period, a new certificate of coverage showing
extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project:

4. Obtain from each other person with whom it contracts, and provide to the contractor:

a. A certificate of coverage, prior to the other person beginning work on the project; and

b. A new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the project:

5. Retain all required certificates of coverage on file for the duration of the project and for one year

thereafter;

6. Notify the governmental entity in writing by certified mail or personal delivery, within ten (10) days
after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project; and

7. Contractually require each person with whom it contracts to perform as required by items 1-6, with the
Certificates of coverage to be provided to the person for whom they are providing services.

By signing this contract or providing or causing to be provided a certificate of coverage, the contractor is representing to the governmental entity that all employees of the contractor who will provide services on the project will be covered by workers' compensation coverage for the duration of the project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the commission's Division of Self-Insurance Regulation. Providing false or misleading information may subject the contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions. The contractor's failure to comply with any of these provisions is a breach of contract by the contractor that entitles the governmental entity to declare the contract void if the contractor does not remedy the breach within ten (10) days after receipt of notice of breach from the governmental entity.

The coverage requirement recited above does not apply to sole proprietors, partners, and corporate officers who are excluded from coverage in an insurance policy or certificate of authority to self-insure that is delivered, issued for delivery, or renewed on or after January 1, 1996.

28 T.A.C. Section 110.110(i).

11.1.2.6 BUILDER'S RISK INSURANCE

Contractor shall obtain, at its expense, a builder's risk "all-risk" or equivalent insurance policy, including boiler and machinery insurance if applicable, In the amount of the initial Contract Sum, or if applicable, Guaranteed Maximum Price, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Work at the site on a replacement cost basis. Policy shall contain no co-insurance clause. Coverage shall insure against the perils of fire, lightning, wind storm, hurricane, hail, explosion, riot, civil commotion, smoke, aircraft, land vehicles, vandalism, malicious mischief, flood, earthquake, cold testing, collapse, subsidence, sinkhole, damage resulting from faulty workmanship or faulty materials, terrorism for certified and non-certified acts, law and ordinance coverage for renovations, and all other perils, and shall include materials stored on-site, off-site, and in transit. Owner shall be a named insured under the policy, and the insurance shall also include the interests of the Contractor, subcontractors, and sub-contractors. Contractor shall be responsible for maintaining said builder's risk insurance until the date of Substantial Completion

§ 11.1.2.7 ~~.3~~ Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.2.8 ~~.4~~ Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor ~~becomes aware~~knows or should know of an impending or actual cancellation ~~or expiration~~ of any insurance required by the Contract Documents, the Contractor shall provide written notice to the Owner of such impending or actual cancellation ~~or expiration~~. Upon receipt of written notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of written notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage. At least 30 calendar days prior to the date of expiration of any policy required by Section 11.1, Contractor shall provide Owner written notice of the impending expiration.

§ 11.2 Owner's and Architect's InsuranceOwner's Insurance

§ 11.2.1 The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance. The Owner shall be responsible for purchasinge and maintaining property and casualty insurance no later than the date of Substantial Completion and such dates of Owner responsibility shall be documented in the Certificate of Substantial Completion. of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. TheIf Owner occupies or uses any completed or partially-completed potion of the Work at any stage, then such occupancy or use must be consented to by the insurer and authorized by public authorities having jurisdiction over the Work. To the extent of overlap between Owner's property insurance and Contractor's builder's risk insurance, if any, Contractor's builder's risk shall be primary and non-contributory.shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto. Partial occupancy or use shall not commence until the insurance company providing this insurance has consented, in writing, by endorsement or otherwise. Owner and Contractor shall take reasonable steps to obtain such consent and shall take no action without written mutual consent that would cause cancellation, lapse, or reduction of this insurance.

§ 11.2.3 Architect shall be responsible for purchasing and maintaining the Architect's liability insurance, worker's compensation insurance, and errors and omissions insurance as provided in the Owner-Architect AgreementContract Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property. All insurance required herein shall contain a waiver of subrogation in favor of Owner, Program Manager

and Architect on all claims arising out of the Project. The policies shall provide such waivers of subrogation by endorsement or otherwise.

§ 11.3.2 ~~If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.~~ The Owner, as fiduciary, shall have power to adjust and settle any loss arising out of the Work, with insurers regardless of the purchaser of the insurance policy. The Contractor upon receipt of proceeds shall, as a fiduciary, pay all subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements shall require subcontractors to make payment to their sub-subcontractors in similar manner. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor with the insurance proceeds upon issuance of a Notice to Proceed from the Owner.

11.3.3 Partial occupancy or use shall not commence until the insurance company providing this insurance has consented in writing, by endorsement or otherwise. Owner and Contractor shall take reasonable steps to obtain such consent and shall take no action without written mutual consent that would cause cancellation, lapse, or reduction of this insurance.

§ 11.4 Loss of Use~~,~~ and Business Interruption~~, and Delay in Completion~~ Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. ~~The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.~~

~~11.4.3 WAIVERS OF SUBROGATION~~

~~The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors, if any, and any of their subcontractors, sub-subcontractors, agents and employees, and (3) Program Manager for damages caused by fire or other perils to the extent covered by property insurance obtained pursuant to this Section 11.4, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The foregoing waiver afforded the Architect, his agents, and employees, shall not extend the liability imposed by Section 3.18.3. The Owner or Contractor, as appropriate, shall require of the Architect, Separate Contractors, Subcontractors, Sub-subcontractors, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated in this Section 11.4.3. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, any separate contractors, subcontractors, sub-subcontractors, agents, and employees of any of them by appropriate agreements, similar waivers each in favor of the other parties enumerated herein.~~

~~11.4.4 The Contractor shall pay all subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements shall require subcontractors to make payment to their sub-subcontractors in similar manner.~~

~~11.4.5 Contractor's builder's risk insurance shall be endorsed to allow partial occupancy (permission to occupy) by Owner. Contractor shall ensure that such partial occupancy will not cause cancellation, lapse, or reduction of this insurance.~~

§11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the ~~Agreement~~Contract shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of ~~any applicable mortgagee clause and of~~ Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor and Architect of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor and the Architect shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor and/or the Architect do~~es~~ not object, the Owner shall settle the loss and the Contractor and Architect shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor and/or Architect timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's or Owner's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect or Owner, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect or Owner may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor ~~sh~~may~~ll~~ be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 CORRECTION OF WORK

12.2.1 Before Or After Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, ~~the cost of uncovering and replacement,~~ and compensation for the Architect's and Program Manager's services and expenses made necessary thereby, shall be at the Contractor's expense.

12.2.1.1 The Owner may make emergency repairs to the Work or take such other measures necessary under the circumstances, if the Contractor does not promptly respond to a Notice of Defect or nonconforming Work. Contractor shall be responsible to Owner for this cost if the reason for the repairs is attributable to the Contractor. If payments then or thereafter due to the Contractor are not sufficient to cover such costs, then the Contractor shall pay the difference to the Owner on demand

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof ~~or after the date for commencement of warranties established under Section 9.9.1,~~ or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such written notice promptly after discovery of the condition. ~~During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty.~~ If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of written notice from the Owner or Architect, the Owner may correct the Work as provided in 12.2.2.1.1. Nothing contained in this Section 12.2 is intended to limit or modify any obligations under the law or under the Contract Documents, including any warranty obligations, expressed or implied~~it in accordance with Section 2.5.~~

12.2.2.1.1 If the Contractor fails to perform the corrective Work, then Owner may perform corrective Work, at Contractor's cost. If Owner performs corrective Work, then Owner may also remove nonconforming Work and store

the salvageable materials or equipment at Contractor's expense. If the Contractor does not pay all costs incurred by Owner within ten (10) days after written notice, then Owner may, upon ten (10) additional days' written notice, sell the removed materials and equipment in accordance with Owner's policies, and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the Contractor, including compensation for the Architect's services and expenses made necessary thereby. If such proceeds of sale do not cover costs which the Contactor should have borne, then the Contractor shall pay the difference to the Owner.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall be extended by corrective Work performed by the Contractor pursuant to this Section 12.2, but only as to the corrected Work. Any corrective work performed or to be performed under or pursuant to Paragraph 12.2 shall be warranted to the same extent as the Work is warranted hereunder for the greater of the remainder of the applicable warranty (corrective) period or ninety (90) days from the date such corrective work has been completed.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction by the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

12.2.4.1 Where nonconforming Work is found, the entire area of Work involved shall be corrected unless the Contractor can completely define the limits to the Architect's satisfaction. Additional testing, sampling, or inspecting needed to define nonconforming work shall be at the Contractor's expense, and performed by the Owner's testing laboratory if such services are reasonably required by the Architect. All corrected work shall be retested at the Contractor's expense. Reasonable Architectural or Program Manager Services required to analyze nonconforming Work shall be paid for by the Contractor.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work. Nothing contained in this Paragraph 12.2 is intended to limit or modify any obligations under the law or under the Contract Documents, including any warranty obligations, expressed or implied.

12.2.6 Contractor shall replace, repair, or restore any parts of the Project or furniture, fixtures, equipment, or other items placed therein (whether by Owner or another party) that are destroyed or damaged by any such parts of the Work that do not conform to the requirements of the Contract Documents or by defects in the Work.

12.2.7 The provisions of this Section 12.2 apply to Work done by Subcontractors of the Contractor as well as Work done directly by employees of the Contractor. The provision for this Section 12.2.7 shall not apply to corrective work attributable solely to the acts or omissions of any separate contractor of Owner (unless Contractor is acting in such capacities). The cost to Contractor for performing any of its obligations under this Section 12.2.7 to the extent not covered by insurance shall be borne by Contractor.

12.2.8 If, however, Owner and Contractor deem it inexpedient to require the correction of Work damaged or not done in accordance with the Contract Documents, then an equitable deduction from the Contract Sum shall be made by written agreement between Contractor and Owner. Until such settlement, Owner may withhold such sums as Owner deems just and reasonable from moneys, if any, due Contractor. The settlement shall not be unreasonably delayed by the Owner and the amount of money withheld shall be based on estimated actual cost of the correction to Owner.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

13.1.1 ~~The Contract shall be governed by the laws of the State of Texas, and any litigation shall be conducted in state district court. Mandatory and exclusive venue for any disputes shall be in Dallas , county in place whichere the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.~~ The Contract and any disputes related to the Work shall be governed by the laws of the State of Texas. The Contract is deemed performable entirely in Dallas, Dallas County, Texas. Any litigation to enforce or interpret any terms of the Contract, or any other litigation arising out of or as a result of the Contract or the Work, shall be brought in the State District courts of Dallas County, Texas. In the event of litigation, the substantially prevailing party shall be entitled to its reasonable and necessary attorney's fees that are equitable and just.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to the other party hereto and to partners, successors, assigns, and legal representatives of such other party in respect to covenants, agreements, and obligations contained in the Contract Documents. ~~Except as provided in Section 13.2.2, Nneither party to the Contract shall assign the Contract, as ain whole or in part, without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.~~ The Contractor shall not assign the Contract as a whole, or in part, without written consent of the Owner.

§ 13.2.2 The invalidity of any part or provision of the ~~Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the~~ Contract Documents shall not impair or affect in any manner whatsoever the validity, enforceability, or effect of the remainder of the Contract Documents. The Owner may, without consent of the Contractor, assign the Contract in whole or in part. In such event, the assignee shall assume the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignments. ~~The Contractor shall execute all consents reasonably required to facilitate the assignment.~~

§ 13.3 Rights and Remedies

§ 13.3.1 Written notice shall be deemed to have been duly served only if the writing is delivered in person to the office of the party set out ~~O~~on the first page of the Standard Form of ~~Agreement~~Contract Between Owner and Contractor, or to such other address as has been previously clearly identified in writing by the addressee, or sent by registered or certified mail to that address. Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner~~,~~ or Architect~~, or Contractor~~ shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing. The application of a time-is-of-the-essence clause as to any action or duty required of Contractor by the Contract Documents shall not be waived by course of performance or course of dealing by Contractor.

13.3.3 ~~4~~ Neither Contractor nor any of its materialmen, laborers or Subcontractors shall have any lien rights against the Owner's lands, building funds, materials or other property. No materialmen, laborers or Subcontractors of the Contractor shall have any enforceable rights against the Owner on this Contract. Materialmen, laborers and Subcontractors of the Contractor may have rights under any Payment Bond provided by the Contractor, but cannot look to the Owner for any help in enforcement of those rights.

13.3.4 The invalidity of any part or provision of the Contract Documents shall not impair or affect in any manner whatsoever the validity, enforceability or effect of the remainder of the Contract Documents.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made at appropriate times as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities having jurisdiction. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity employed by the Owner for this purpose ~~acceptable to the Owner,~~ or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals which shall be included in the Cost of the Work. Provided, however, per Texas Government Code Chapter 2269, Owner shall bear all costs of construction materials, engineering, testing, and inspection services, and the verification testing services necessary for acceptance of the facility by the Owner. Owner shall bear the normal costs of these services, but not any excess costs attributable to Contractor caused scheduling problems, other Contractor error or retesting. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may observe be present for such procedures. ~~The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded.~~ The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Owner shall provide or contract ~~the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements~~ for such additional testing, inspection, or approval~~, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures.~~ Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense. Architect, Owner, and Contractor shall cooperate for the timely scheduling of such tests and inspections.

§ 13.4.3 If such procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including, but not limited to, those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect, with a copy to the Owner.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5 Interest

Undisputed ~~P~~payments due and unpaid under the Contract Documents shall bear interest from the date payment is overdue at the rate provided by Texas Government Code Section 2251.025~~the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.~~ Any such payment shall be deemed overdue on the thirty-first (31st) day after Owner received Architect's invoice or Contractor's completed Application for Payment for the Architect, whichever is later, if Owner's Board of Trustees meet more than once per month. Any such payment shall be deemed overdue on the forty-sixth (46th) day after Owner receives Architect's invoice or Contractor's Certificate for Payment from the Architect, if Owner's Board of Trustees meet once a month or less frequently. No interest shall be due on sums properly retained by Owner, except ~~expect~~ as provided by law, or on disputed sums unpaid by Owner.

13.6 EQUAL OPPORTUNITY IN EMPLOYMENT

13.6.1 The Contractor and the Contractor's Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, age, disability, sex, national origin, or any class otherwise protected by District policy or law. The Contractor agrees to post in conspicuous places, available to employees and applicants, notices setting forth the Contractor's nondiscrimination policies.

13.6.2 The Contractor and the Contractor's Subcontractors shall, in all solicitations or advertisements for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment

without regard to race, religion, age, disability, sex, national origin, or any class otherwise protected by District policy or law.

13.7 RECORDS

13.7.1 Contractor shall at all times through the date of Final Completion, maintain Job Records, including, but not limited to, invoices, Construction Documents, payment records, payroll records, daily reports, diaries, logs, instructions, drawings, receipts, subcontracts, purchase orders, vouchers, memoranda, other financial data and job meeting minutes applicable to the Project, in a manner which maintains the integrity of the documents. Job Records must be retained by Contractor for a least twelve (12) years, after the date of Final Completion of the Project. Within five (5) days of Owner's request, Contractor shall make such Job Records available for inspection, copying, and auditing by the Owner, Architect, or other respective representatives, at Owner's central office.

13.7.2 If Contractor is a Construction Manager at Risk, then Contractor shall also maintain, in accordance with the provisions of Section 13.7.1, the following: subcontract files, including proposals of successful and unsuccessful bidders, bid recaps, and subcontractor payments; original estimates; estimating work sheets; general ledger entries detailing cash and trade discounts received; insurance rebates and dividends; and any other supporting evidence deemed necessary by the Owner to substantiate charges related to the Contract.

13.7.3 Contractor shall keep a full and detailed financial accounting system and shall exercise such controls as may be necessary for property financial management under this Contract; the accounting and control systems shall be satisfactory to the Owner and shall be subject to the provisions of Section 13.7.1.

13.7.4 Contractor shall keep all Contract Documents related to the Project, subject to the provisions of Section 13.7.1, provided, however, Contractor shall not destroy said documents until Contractor has confirmed with Owner in writing, that Owner has obtained a copy of all as-built drawings.

13.7.5 In the event that an audit by the Owner reveals any errors/overpayments by the Owner, then the Contractor shall refund to the Owner the full amount of such overpayments within thirty (30) days of such audit findings, or the Owner, at its option, reserves the right to deduct such amounts owed to the Owner from any payments due to the Contractor.

13.7.6 Commencement of Statutory Limitation Period, As between the Owner and Contractor: after Final Certificate for Payment.

13.7.7 At any time during the term of this ~~Agreement~~Contract and for a period of ten ~~four~~ (~~4~~10) years thereafter, the Owner or a duly authorized audit representative of the Owner, or the State of Texas, at its expense and at reasonable times, reserves the right to audit the Contractor's records and books relevant to all services provided under this ~~Agreement~~Contract. In the event such an audit by the Owner reveals any errors/overpayments by the Owner, the Contractor shall refund the Owner the full amount of such overpayments within thirty (30) day of such audit findings, or the Owner, at its option, reserves the right to deduct such amounts owing the Owner from any payments due the Contractor.

13.8 NONDISCRIMINATORY EMPLOYMENT

13.8.1 In connection with the execution of this Contract, the Contractor shall fully comply with the District non-discrimination requirement cited below.

"The Dallas Independent School District, as an equal opportunity educational provider and employer, does not discriminate on the basis of race, color, religion, sex, national origin, disability, sexual orientation and/or age in educational programs or activities that it operates or in employment decisions. The District is required by Title VI and Title VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Act, and the Age Discrimination Act of 1975, as amended, as well as board policy not to discriminate in such a manner. (Not all prohibited bases apply to all programs.)"

During the performance of this Contract, the Contractor further agrees as follows:

.1 The Contractor will not discriminate against any employee or applicant for employment because of race, color, sex, religion, national origin or age;

.2 The Contractor will take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their race, color, sex, religion, national origin or age. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the requirements of these non-discrimination provisions.

Submittal to Owner of reasonable evidence of discrimination will be grounds for termination of the ~~Agreement~~Contract.
This policy does not require the employment of unqualified persons.

13.9 CERTIFICATION OF NONSEGREGATED FACILITY

13.9.1 This Subparagraph is applicable to Contracts and Subcontracts exceeding $10,000.00 which are not exempt from the provisions of the Equal Opportunity Clause.

13.9.2 By the signing of this Contract, the Contractor signifies that it does not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. It certifies further that it will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it will not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The undersigned agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this proposed Contract. As used in this certification, the term 'segregated facilities' means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. It further agrees that (except where it obtained identical certifications from proposed consultants for specific time period), it will obtain identical certification from proposed Subcontractors prior to the award of a Contract exceeding $10,000.00 which are not exempt from the provisions of the Equal Opportunity Clause; that it will retain such certifications in its files; and that it will forward the following notice to such proposed Subcontractors (except where the proposed Subcontractors have submitted identical certifications for specific time periods): Notice to Prospective Subcontractors of requirement for certification of non-segregated facilities, as required by the May 19, 1967 Order (32 FR.7439, May 19, 1967) on elimination of segregated facilities, by the Secretary of Labor, must be submitted prior to the award of a Contract exceeding $10,000.00 which is not exempt from the provisions of the Equal Opportunity Clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

Note: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.11.

13.10 PREVAILING WAGE RATES

13.10.1 In compliance with laws of the State of Texas relating to labor Texas Government Code Section 2258.001 *et seq.* the building construction wage rates listed in the Contract Documents have been ascertained and determined by the Owner as the general prevailing rates in the locality of Dallas Independent School District for the classifications listed. The Contractor and each Subcontractor shall pay to all laborers, workers and mechanics employed by them in the execution of this Contract not less than such rates for each craft or type of worker or mechanic needed to execute the Contract. If it becomes necessary to employ any person in a trade or occupation not herein listed, such person shall be paid not less than an hourly rate fairly comparable to the rates shown hereinafter.

13.10.2 This determination of prevailing wages shall not be construed to prohibit the payment of more than the rates named.

13.10.3 In compliance with the above cited law the Contractor shall forfeit, as a penalty to the Owner, Sixty Dollars ($60.00) for each laborer, worker or mechanic employed, for each calendar day, or portion thereof, such laborer, worker or mechanic is paid less than the rates stipulated hereinafter for any work done under this Contract by him or any Subcontractor under him.

13.10.4 Owner reserves the right to receive and review payroll records, payment records, and earning statements of employees of Contractor, and of Contractor's Subcontractors and Sub-subcontractors.

13.10.5 In executing the Work under the Contract Documents, Contractor shall comply with all applicable state and federal laws, including but not limited to, laws concerned with labor, equal employment opportunity, safety and minimum wages.

13.11 CERTIFICATION OF ASBESTOS-FREE PROJECT

13.11.1 Contractor shall submit to the Architect a letter addressed to the Owner certifying that all materials used in the construction shall be asbestos free. The General Contractor shall provide certification for himself, all subcontractors, vendors, suppliers, and other entities, stating that materials and/or equipment used in the construction of the project do not contain asbestos in any form or concentration. Certification letters shall be dated, shall reference this specific Project, and shall be signed by not less than two officers of the construction company.

13.11.2 Final Payment shall not be made until this letter of certification has been received.

13.12 **CERTIFICATION OF LEAD-FREE POTABLE WATER SYSTEM**

13.12.1 Contractor shall submit to the Architect a letter, addressed to the Owner, stating that any components of the potable water system installed by the Contractor are lead-free as defined by the Safe Drinking Water Act Amendment of 1986 and the Lead Contamination Control Act of 1988.

13.13 Responsibility For Contractor's Forces. The Contractor shall be responsible for the actions of Contractor's forces, and Subcontractor's forces to enforce the Owner's drug-free, alcohol-free, and tobacco-free zone. Contractor agrees to abide by Owner's policies prohibiting the use of tobacco, alcohol or illegal drugs in any form on any property owned, operated, or maintained by the Owner. Contractor agrees to require all subcontractors and sub-subcontractors to abide by these policies,. Violation of this provision shall constitute a material breach of this agreement.

13.14 **FAMILY CODE CHILD SUPPORT CERTIFICATION**

By signing this ~~Agreement~~Contract, the Contractor certifies as follows: "Under Section 321.006, Texas Family Code, the vendor or applicant certifies that the individual or business entity named in this contract, bid, or application is not ineligible to receive the specified grant, loan, or payment and acknowledges that this contract may be terminated and payment may be withheld if this certification is inaccurate.

13.15 **NON-COMPENSATION REQUIREMENT**

The Owner may not accept a bid or award a contract that includes proposed financial participation by a person who received compensation from the Owner to participate in preparing the specifications or request for proposals on which the bid or contract is based. The Contractor is described as vendor in the statutory quote below:

"Under Section 2155.004, Government Code, the vendor certifies that the individual or business entity named in this bid or contract is not ineligible to receive the specified contract and acknowledges that this contract may be terminated and payment withheld if this certification is inaccurate."

13.16 ~~8~~ PROPRIETARY INTERESTS AND CONFIDENTIAL INFORMATION

13.16.1 ~~8~~ Neither Architect nor Contractor shall use the image or likeness of Owner's Project or Owner's official logo or emblem and any other trademark, service mark, or copyrighted or otherwise protected information of Owner, without Owner's prior written consent. Contractor and Architect shall not have any authority to advertise or claim that Owner endorses Architect or Contractor's services, without Owner's prior written consent.

13.16.2 Neither Architect nor Contractor shall disclose any confidential information of Owner which comes into the possession of Architect or Contractor at any time during the Project, including but not limited to: pending real estate purchases, exchange, lease, or value; information related to litigation; the location and employment of security devices, security access codes; student likenesses; student record information; employee information; or any other information deemed confidential by law.

13.16.3 The parties acknowledge that, as a public entity in the State of Texas, Owner is subject to, and must comply with, the provisions of the Texas Public Information Act, Texas Government Code Section 552.001, *et seq.*, and the Texas Open Meetings Act, Texas Government Code, Section 551.001. *et seq.*

13.16.4 All information owned, possessed, or used by Owner which is communicated to, learned, developed or otherwise acquired by Contractor in the performance of services for Owner, which is not generally known to the public, shall be confidential and Contractor shall not, beginning on the date of first association or communication between Owner and Contractor and continuing through the term of this ~~Agreement~~Contract and at any time thereafter, disclose, communicate or divulge, or permit disclosure, communication or divulgence, to another or use for Contractor's own benefit or the benefit of another, any such confidential information, unless required by law. Except when defined as part of the Project, Contractor shall not make any press releases, public statements, or advertisement referring to the Project or the engagement of Contractor as an independent contractor of Owner in connection with the Project, or release any information relative to the Project for publications, advertisement or any other purpose without prior written approval of Owner. Contractor shall obtain assurances similar to those contained in this Subparagraph from persons, agents, and subcontractors retained by Contractor. Contractor acknowledges and agrees that a breach by Contractor of the provisions hereof will cause Owner irreparable injury and damage. Contractor, therefore, expressly agrees that Owner shall be entitled to injunctive and/or other equitable relief to prevent or otherwise restrain a breach of this ~~Agreement~~Contract.

.1 Contractor acknowledges and agrees that the Owner has an interest in maintaining and otherwise protecting the image and reputation of the Owner's official logo or emblem and any other trademarks, copyrighted or otherwise protected materials of the Owner (hereinafter referred to as the "Owner's Protected Materials"), and that in order to accomplish this purpose, the Owner must in all cases assure itself that the Owner's Protected Materials are at all times used in a manner consistent with the Owner's policies, administrative regulations, and this ~~Agreement~~Contract.

.2 Contractor agrees that the Owner must, therefore, have the right to examine and approve or disapprove such use in writing in advance of use, the contents, appearance and presentation of any and all advertising, promotional or other similar materials proposed by the Contractor to be used in connection with any advertising or promotion utilizing Owner's Protected Materials.

13.17 ~~8~~ The Contractor shall ~~have~~ bear full responsibility for utilizing means and methods that may result in an overstress of any structure or any part or member of it during construction. The Contractor shall fully check the effect of his
operations in this regard, and shall provide all temporary support and connections required.

13.18 ~~9~~ The Contractor shall protect and be responsible for any damage to or loss of its (his/her) work, tools, equipment, or material, from the date of the Contract until the acceptance of the Work and shall make good without cost to the Owner, any damage or loss that may occur during this period. All material affected by weather shall be covered and protected to keep it from damage while being transported to the site, as well as when it is stored on the site. The Contractor at its (his/her) own expense and option shall employ watchmen or erect fencing at such time as necessary to protect his work, tools, equipment or material by the Contractor and the fact that the Owner has a watchman, if any, shall not mean that the Owner has undertaken, nor does the Owner undertake, to protect work, tools, equipment and materials from theft or mysterious disappearance.

13.19 The Contractor should only take direction on any issues regarding the Project when provided by the Owner's Office of Construction Services or the Program Manager or Architect.

13.20 The Contractor and subcontractor shall ensure that on-site fraternization shall not occur between personnel under the Contractor's or subcontractor's direct or indirect supervision and students, school employees and the general public.

13.21 PARTNERING
Contractor will participate in a partnering process if requested by Owner.

13.22 AS-BUILT DRAWINGS
Prior to issuance of the Certificate of Final Completion by Architect and Program Manager, the Contractor shall submit to Architect a complete set of as-built drawings, with all changes made during construction, including

concealed mechanical, electrical and plumbing items clearly shown. The Contractor shall submit these drawings in a medium acceptable to the Architect. Based upon the as-built drawings received from Contractor, Architect shall, within thirty days after receipt of the as-built drawings from Contractor, complete Record Drawings.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of ninety ~~3~~90 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, under direct or indirect contract with the Contractor, for any of the following reasons, which are the sole grounds for termination under this Subparagraph 14.1.1.~~:~~;

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;

.2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped; or

.3 ~~Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the~~ Owner has not made payment of undisputed sums due on an approved Certificate for Payment within the time stated in the Contract Documents. ~~; or~~

~~.4 The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.~~

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, under direct or indirect contract with the Contractor, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 ~~If one of the reasons described in Section 14.1.1 or 14.1.2 exists, then, after the applicable time period, the Contractor may, upon seven (10) days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, and for proven unrecoverable loss with respect to materials, equipment, tools, and construction equipment and machinery incurred to the date of termination as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination~~If the Work is stopped for ninety (90) consecutive days for any reason described in Subparagraphs 14.1.1 or 14.1.2, the Contractor may, upon fourteen (14) days written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery, including reasonable overhead, profit and damages to date of termination.

14.1.4 If the Work is stopped for a period of ninety (~~6~~90) consecutive days through no act or fault of the Contractor, or a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has ~~repeatedly~~ persistently failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon ~~twenty~~ fourteen (~~20~~14) additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

14.1.5 Notwithstanding anything to the contrary contained herein or in the other Contract Documents, neither the Owner or any other party shall be responsible for damages for loss of anticipated profits on Work not performed on account of any termination described in Subparagraphs 14.1.1, 14.1.2 and 14.1.3.

14.2 Termination by the Owner for Cause

14.2.1 The Owner may terminate the Contract if the Contractor

.1 persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors or ~~s~~Suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or ~~s~~Suppliers;

.3 ~~repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or~~ persistently disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction; or

.4 otherwise is guilty of ~~substantial breach of a provision of~~ a material breach of provision of the Contract Documents;

.5 fails to furnish the Owner, upon written request, with assurances satisfactory to the Owner, evidencing the Contractor's ability to complete the Work in compliance with all the requirements of the Contract Documents; ~~or~~

.6 engages in serious or repeated worker misconduct in violation of Article 3.3.2;

.7 engages in conduct that would constitute a violation of state or federal criminal law, including but not limited to, the laws prohibiting certain gifts to public servants, or engages in conduct that would constitute a violation of the Owner's ethics or conflict of interest policies; or

.8 fails to proceed continuously and diligently with the construction and completion of the Work, except as permitted under the Contact Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, subject to any prior rights of the surety, ~~and upon certification by the Architect that sufficient cause exists to justify such action,~~ the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 ~~Exclude the Contractor from the site and t~~Take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished. Any further payment shall be limited to amounts earned to the date of Contractor's removal.

§ 14.2.4 If the ~~unpaid balance of the Contract Sum exceeds~~ costs of finishing the Work, including compensation for the Architect's and Program Manager's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, exceed the unpaid balance of the Contract Sum or Guaranteed Maximum Price (if the Project is a Construction Manager at Risk project), ~~such excess shall be paid to~~ then the Contractor and/or its Surety shall pay the difference to the Owner. ~~If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner.~~ The amount to be paid to the ~~Contractor or~~ Owner, ~~as the case may be,~~ shall be certified by the Architect ~~the Initial Decision Maker~~, upon application, and this obligation for payment shall survive termination of the Contract.

14.2.5 The parties hereby agree that: 1) if an order for relief is entered on behalf of the Contractor, pursuant to Chapter 11 of the U.S. Bankruptcy Code; 2) if any other similar order is entered under any debtor relief laws; 3) if Contractor makes assignments for the benefit of one or more of its creditors; 4) if a receiver is appointed for the benefit of its creditors; or 5) if a receiver is appointed on account of its insolvency, any such event could impair or frustrate Contractor's performance of the Contract Documents. Accordingly, it is agreed that upon occurrence of any such event, Owner shall be entitled to request of Contractor or its successor in interest, adequate assurance of future performance in accordance with the terms and conditions of the Contract Documents. Failure to comply with such request within ten (10) days of delivery of the request shall entitle Owner to terminate the Contract and to the accompanying rights set forth in Subparagraphs 14.2.1 through 14.2.6. In all events, pending receipt of adequate assurance of performance and actual performance in accordance with the Contract Documents, Owner shall be entitled to proceed with the Work with Owner's own forces or with other Contractors on a time and material or other appropriate basis, the cost of which will be charged against the Contract Sum.

If a Performance Bond has been furnished and the Contractor is declared by the Owner to be in default under the Contract, the Surety shall promptly remedy the default by completing the Contract in accordance with its terms and conditions, or by obtaining a bid or bids in accordance with its terms and conditions. At Owner's election, upon determination by the Owner and the Surety of the lowest responsible bidder, the Surety will complete the Work or will arrange for a Contract between such bidder and the Owner, and make available as Work progresses sufficient funds to pay the cost of completion less the balance of the Contract Sum, but not exceeding the Penal Sum of the bond and other costs and damages for which the Surety may be liable under the bond. The phrase 'balance of the Contract Sum' as used herein shall mean the total amount payable by the Owner to the Contractor under the Contract and amendments thereto less the amount previously paid by the Owner to the Contractor.

14.2.6 As required by Texas Government Code Chapter 2253, if a Performance Bond has been furnished and the Contractor is declared by the Owner to be in default under the Contract, then the Surety shall promptly perform the Work, in full accordance with the plans, specifications, and Contract Documents. Unless otherwise agreed in writing between the Surety and the Owner, the Surety shall complete the Work by the Surety entering into a Contract acceptable to Owner, with a Contractor acceptable to Owners, and shall obtain new Payment and Performance Bonds as required by law.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 ~~The Contract Sum, Guaranteed Maximum Price, and Contract Time shmayll be adjusted, by mutual written agreement, for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit~~. An adjustment shall be made to the Contract Sum calculated under Article 7. No adjustment shall be made to the extent

.1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause. Furthermore, if this Contract is a multi-year contract funded through Owner's current general funds that are not bond funds, then the Owner's Board of Trustees has the right to not appropriate adequate monies for the next fiscal year and to terminate this Contract at the end of each fiscal year during the term of the Contract, without the Owner incurring any further liability to Contractor as a result of such termination.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; and for proven unrecoverable loss with respect to materials, equipment, tools, and construction equipment and machinery incurred to the date ~~costs incurred by reason~~ of ~~the~~ termination~~, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement~~. Such payment shall not cause the Contract Sum, or Guaranteed Maximum Price, if the Project is a Construction Manager at Risk Project, to be exceeded. Such payment shall not include overhead and profit for Work not executed.

14.4.4 Upon determination by a Court of competent jurisdiction that termination of the Contractor pursuant to Section 14.2 was wrongful, such termination will be deemed converted to a termination for convenience pursuant to Section 14.4, and Contractor's remedy for wrongful termination shall be limited to the recovery of the payments permitted for termination for convenience as set forth in Section 14.4.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is ~~any demand or assertion by one of the Contractor parties seeking, as a matter of right, payment of additional compensation under the Contract Documentsmoney, interpretation of the Contract Document terms, a change in the Contract Time;, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the partyContractor making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.~~ any demand or assertion by the Contractor that it should be paid more money than the

Contract Sum or granted more contract time by the Owner because of action or inaction on the part of Owner, any Owner representative, Architect, or any party for whom Owner is responsible, or any party with whom Owner has separately contracted for other portions of the Project, including, but not limited to, any demand or assertion that Contractor's performance has been delayed, interrupted or interfered with, that Contractor's performance has been accelerated, constructively accelerated, or suspended, that Contractor's performance has been wrongfully terminated, that there has been a failure of payment, that Contractor has encountered concealed or unknown conditions, that Contractor has encountered hazardous materials, that actions or omissions of the Owner have been wrongful related in any way to the Work, that a time extension grant was inadequate, that there has been a breach of contract, or that Contractor is entitled to any other relief, on any legal or equitable theory, related to the Work or the Contract. This definition of Claim is not intended to create any right of action where the right of action does not otherwise exist under applicable law or other provisions of this Contract.

§ 15.1.2 Notice Requirement ~~Time Limits on Litigation~~Claims

~~The Owner and Contractor shall commence all Claims~~litigation and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in anythe case of the Owner, not more than 120 years after the date of Final~~Substantial~~ Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2. Within fourteen (14) calendar days of the first occurrence of an event that Contractor has any reason to believe might result in a Claim, or within fourteen (14) calendar days of Contractor's discovery of the first occurrence of an event that Contractor has any reason to believe might result in a Claim if the first occurrence of the event was willfully hidden from the Contractor, the Contractor shall file a written document clearly captioned "Notice of Claim" with Owner, Program Manager and the Architect. The Notice shall clearly set out the specific matter of complaint, and the impact or damages, which may occur or have occurred as a result thereof, to the extent the impact or damages can be assessed at the time of the Notice. If the impact or damages cannot be assessed as of the date of the Notice, the Notice shall be amended at the earliest date that is reasonably possible. It is imperative that Owner have timely, specific Notice of a potential problem in order that the problem can be mitigated promptly.

15.1.2.1 In addition to the Notice required by Subparagraph 15.1.2, the Contractor shall also file a document captioned "Claim" with the Owner, Program Manager and Architect within ninety-one (91), days of occurrence of any event resulting in a Claim for damages, giving notice of the Claim. Contractor agrees that this is a reasonable Notice requirement. Any Claim or portion of a Claim that has not been made the specific subject of a Notice strictly in accordance with the requirements of this section is waived.

§ 15.1.3 ~~Notice of Claims~~ Continuing Contract Performance

After receipt of a Notice of Claim, the Architect shall have fourteen (14) calendar days to render a decision, which shall be stated in writing and delivered to the Contractor, the Owner and the Program Manager via facsimile, regular mail or hand delivery. If the Architect fails to render a decision in writing with the fourteen (14) days, the Claim shall be deemed accepted. Within five (5) calendar days of receipt of the Architect's written decision, Contractor may file a written appeal of the decision to the Program Manager. The Program Manager shall have ten (10) calendar days to render a decision, which shall be stated in writing and delivered to the Contractor, Architect and the Owner via facsimile, regular mail or hand delivery. If the Program Manager fails to render a decision in writing within the ten (10) days, the claim shall be deemed accepted. Within five (5) calendar days of receipt of the Program Manager's written decision, Contractor may file a written appeal of the decision with the Deputy Superintendent of Business Services. Within fourteen (14) calendar days of the receipt of an appeal, an Appeals Board consisting of the Deputy Superintendent of Business Services, Chief Operations Officer, and a representative of the offices of Legal Services shall render a written decision. Any Claim determination requiring a Change Order must be approved by the Board of Trustees. The filing, or rejection of a Claim does not entitle Contractor to stop performance of the Work. The Contractor shall proceed diligently with performance of the Contract during the pendency of any Claim, excepting termination or under Owner's direction to stop the Work. Any Claim that would require expenditure in excess of $10,000.00, or that would require a Change Order, must be reviewed by the Program Manager and the Appeals Board using the appeals process described in this section.

15.1.3.1 Claims by ~~either~~ the ~~Owner or~~ Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by written notice to the ~~other party~~Owner and to the ~~Initial Decision Maker with a copy sent to the~~ Architect~~, if the Architect is not serving as the Initial Decision Maker~~. Claims by Contractor~~either party~~ under this Section 15.1.3.1 ~~shall~~must be

initiated within 21 calendar days after occurrence of the event giving rise to such Claim or within 21 calendar days after the ~~c~~Contractor~~laimant~~ first knew or should have known~~recognizes~~ the condition giving rise to the Claim, whichever is ~~lat~~earlier. Claims must be initiated by written notice titled: "Notice of Claim" ("Notice") and sent to the Architect and Owner's designated representatives. The Notice shall clearly set out the specific matter of complaint, and the impact which may occur or have occurred as result thereof, to the extent that the impact can be assessed at the time of the Notice. If the impact cannot be assessed as of the date of the Notice, then the Notice shall be amended at the earliest date that is reasonably possible. It is imperative that Owner receive timely specific Notice of any potential problem identified by Contractor in order that the problem can be mitigated or resolved promptly. Claims not filed as required by this Section shall be waived.

§ 15.1.3.2 Claims by ~~either~~ the ~~Owner or~~ Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by written notice to the other party. In such event, no decision by the Initial Decision Maker is required.

15.1.3.3 When Owner has an applicable claim for construction defects, Owner shall comply with the provisions of Texas Government Code Chapter 2272 related to the provision of notice of defects and the Contractor's or Architect's opportunity to cure.

§ 15.1.4 ~~Continuing Contract Performance~~ Claims Handling Following Construction

The acceptance of final payment shall constitute a waiver of Claims by the Contractor, which have not previously been identified in a Notice of Claim under 15.1.2 and a Claim under 15.1.2.1 and specifically reserved in the final Application for Payment.

§ 15.1.4.1 Time Limits on Litigation. The Owner and Contractor shall commence all litigation whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the dispute resolution method selected in the Contract and within the period specified by applicable law, but in the case of the Owner, not more than eight (8) years after the date of Final ~~Substantial~~ Completion of the Work, unless extended in accordance with Texas Civil Practice and Remedies Code Section 16.009. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

15.1.4.2 Pre-Litigation Mediation

~~.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7, as amended, and Article 14, as amended, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make undisputed payments for Work performed in accordance with the Contract Documents.~~ Except as to claims for injunctive relief, neither party may commence litigation relating to any Claim arising under this ~~Agreement~~Contract without first submitting the Claim to Mediation. The parties shall share the mediator's fee and any filing fees equally, and the mediation shall be held in Dallas, Texas. ~~Agreement~~Contracts reached in mediation must be approved by the Board of Trustees and shall thereafter be enforceable as settlement agreements in any court having jurisdiction thereof. Mediation shall be conducted by a mediator selected jointly by the Owner and Contractor.

15.1.4.3 ~~The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.~~

§ 15.1.5 Claims For Concealed Or Unknown Conditions. Only if conditions are encountered at the site which are (a) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents, (b) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents or (c) in the case of renovation Work, any condition of the pre-existing construction to be renovated, that is materially different from any of the conditions that could reasonably have been expected to be present in preexisting construction of the age and type encountered on the Project, then Contractor shall be entitled to make a Claim if it can satisfy all of the requirements of Paragraph 15.1.

15.1.5.1 No adjustment in the Contract Time or Contract Sum shall be permitted, however, in connection with a concealed or unknown condition which does not differ materially from those conditions disclosed or which reasonably should have been disclosed by Contractor's (1) prior inspections, tests, reviews and preconstruction services for the Project, or (2) inspections, tests, review and preconstruction services which were given to Contractor

by Owner, Architect or Owner's representative or which Contractor had the opportunity to make or should have performed in connection with the Project.

15.1.6 Calculating Claim Amount

In calculating the amount of any Claim, the following standards will apply:

.1 No indirect or consequential damages will be allowed;

.2 No recovery shall be based on a comparison of planned expenditures to total actual expenditures, or on; Estimated losses of labor efficiency, or on a comparison of planned man loading to actual man loading, or any other analysis that is used to show damages indirectly;

.3 Damages are limited to extra costs specifically shown to have been directly caused by a proven wrong;

.4 The maximum daily limit on any recovery for delay shall be the amount originally estimated by the Contractor for job overhead costs divided by the total number of calendar days of Contract Time called for in the original Contract;

.5 No damages will be allowed for home office overhead or other home office charges, or any Eichlay formula calculation; and

.6 No profit will be allowed on any Claim.

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of ~~cost and of~~ probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and prevented the execution of major items of work on normal working days ~~had an adverse effect on the scheduled construction~~.

15.1.6.3 4 Time extensions may be granted for rain days in any month when the cumulative number of rain days during that month exceeds the number scheduled, provided that the rainfall prevented the execution of major items of work on normal working days. No day will be counted as a rain day when substantial Contractor forces are able to perform Work on the Project for more than fifty percent (50%) of the usual workday or when the stage of the Work on the Project is not adversely impacted. The number of rain days shown in the above schedule for the first and last months of the Contract will be prorated in determining the total number of rain days expected during the period of the Contract. No delays or extensions shall be granted for mud conditions.

15.1.6.4 ~~5~~ No extension of time shall be made to the Contractor because of hindrances or delays from any cause which is the fault of Contractor or Contractor's Subcontractors or under Contractor's control. Claims for extension of time may only be considered because of rain delays, or because of hindrances or delays which are the fault of Owner and/or under Owner's control, but only to the extent that Substantial Completion of the Project is adjusted beyond the original Substantial Completion date. Only claims for extension of time shall be considered because of hindrances or delays not the fault of either Contractor or Owner, but only to the extent that Substantial Completion of the Project exceeds the Substantial Completion date established for the Work. Board approval shall be required for any extension of time. No damages shall be paid for delays. Contractor shall only be entitled to time extensions per the terms of the Contract Documents.

15.1.6.5 ~~6~~ Requests for time extension shall be submitted on a monthly basis and shall specify the time delay, the cause of the delay, and the responsible party for the delay, whether Contractor, Owner, rain day, or other. No claims for damages for delay shall be made by Contractor. Any claim not submitted under the terms of this Section shall be waived.

§ 15.1.7 Waiver of Claims for Consequential Damages

~~The Contractor and Owner waives all Claims against Ownereach other for consequential damages arising out of or relating to this Contract, including, but not limited to, any amount owed as compensation for the increased cost to perform the Work as a direct result of Owner-caused delays or acceleration. This mutual waiver includes~~

.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

15.1.8 Injury Or Damage To Person Or Property

If either party to the Contract suffers injury or damage to persons or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party as provided herein. The Notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 15.2 Initial Decision Resolution of Claims and Disputes

§ 15.2.1 Claims by the Contractor against the Owner, includingexcluding those alleging an error or omission by the Architect, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initially Decision Maker for initial decision. to tThe Architect for written recommendationwill serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If An initial recommendation by the Architect shall be required as a condition precedent to mediation or litigation of all Claims by the Contractor arising prior to the date final payment is due, unless decision has not been rendered within 30 days have passed after the Claim has been referred to the Architect with no recommendation having been rendered by the Architectafter the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Architect shall Initial Decision Maker will review Claims and within ten (10) days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the Contractorclaimant or a response with supporting data from the other party, or (2) make a written recommendation to the Owner, with a copy to the Contractor. reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the ArchitectInitial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the ArchitectInitial Decision Maker in making a written recommendationrendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 Owner, Architect, or their respective agents, within five (5) working days of request by Owner, Architect, or their respective agents. Job records must be retained by Contractor and all subcontractors for a least twelve (12) years after the date of Final Completion of the Project. If the ArchitectInitial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the ArchitectInitial Decision Maker 1when the response or supporting data will be furnished, or (3) advise the ArchitectInitial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision

~~Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution~~ Following receipt of the Architect's written recommendation regarding a Claim, the Owner and Contractor shall attempt to reach agreement as to any adjustments to the Contract Sum or Guaranteed Maximum Price and/or Contract Time. If no agreement can be reached, then either party may request mediation of the dispute pursuant to Section 15.3.

§ 15.2.6 Upon receipt of a Claim against the Contractor or at any time thereafter, the Architect or the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Architect or the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy ~~Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.~~

§ 15.2.6.1 ~~Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.~~

§ 15.2.7 ~~In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.~~

§ 15.2.8 ~~If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.~~

§ 15.3 ~~Mediation~~Alternative Dispute Resolution

§ 15.3.1 ~~Claims arising out of or related to the Contract, except those waived shall, be subject to mediation~~ Owner and Contractor expressly agree that mediation shall be a condition precedent to the initiation of any litigation out of such Claims. Claims for injunctive relief shall not be subject to this Section.

§ 15.3.2 ~~The parties shall endeavor to resolve their Claims by mediation Requests for mediation shall be filed in writing, with the other party to the Contract.Mediation shall be subject to and in accordance with Chapter 154 of the Texas Civil Practice & Remedies Code. Mediation shall be conducted by a mutually-agreed-upon mediator. In the event that the parties are unable to agree on a mediator, then the parties shall jointly request the appointment of a neutral mediator by a District Judge in the county in which the Project is located~~

§ 15.3.3 ~~The parties shall share the mediator's fee equally and, if any filing fee is required, shall share said fee equally. Mediation shall be held within the county where the Owner's main administrative office is located, unless another location is mutually agreed upon by the parties. Agreements reached in mediation shall be reduced to writing, considered for approval by the Owner's Board of Trustees, signed by the parties, if approved by the Board of Trustees, and if signed, shall thereafter be enforceable as provided by the laws of the State of Texas.~~

§ 15.3.4 Any claim not resolved in mediation shall be subject to litigation pursuant to Section 13.1.

§ 15.4 No Arbitration

§ 15.4.1 Notwithstanding anything to the contrary in the Contract Documents or in any document forming a part hereof, there shall be no mandatory arbitration for any dispute arising hereunder.

§ 15.4.1.1 ~~A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.~~

§ 15.4.2 ~~The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.~~

§ 15.4.3 ~~The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.~~

§ 15.4.4 ~~Consolidation or Joinder~~

§ 15.4.4.1 ~~Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).~~

§ 15.4.4.2 ~~Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.~~

§ 15.4.4.3 ~~The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.~~

15.5 Contractor stipulates that Owner is a political subdivision of the State of Texas, and, as such, enjoys immunities from suit and liability provided by the Constitution and laws of the State of Texas. By entering into this Contract, Owner does not waive any of its immunities from suit and/or liability, except as otherwise specifically provided herein and as specifically authorized by law.

15.6 In any adjudication under this Contract, reasonable and necessary attorneys' fees may be awarded to the prevailing party.

ARTICLE 16 CONTRACTOR ACCOUNTS, RECORDS, AND INSPECTION

16.1 Contractor, and all subcontractors, shall at all times maintain job records, including, but not limited to, invoices, payment records, payroll records, daily reports, logs, diaries, and job meeting minutes, applicable to the project. Contractor, and all subcontractors, shall make sure reports and records available to inspection by the Owner, Architect, or their respective agents, within five (5) working days of request by Owner, Architect, or their respective agents. Job Records must be retained by Contractor and all subcontractors for at least twelve (12) years after the date of Final Completion of the Project.

16.2 Contractor~~'s~~ and all subcontractors' records, which shall include but not be limited to accounting records (hard copy, as well as computer readable data if it can be made available), written policies and procedures; subcontract files (including proposals of successful and unsuccessful bidders, bid recaps, etc.); original estimates; estimating work sheets; correspondence; back charge logs and supporting documentation; general ledger entries detailing cash and trade discounts earned; bond and insurance rebates and dividends; and any other supporting evidence deemed necessary by the Owner to substantiate charges related to any matters related to the Contract (including interviews with Contractor's personnel and Subcontractor's personnel) shall be open to inspection and subject to audit and/or reproduction by Owner's agent or its authorized representative to the extent necessary to adequately permit evaluation and verification of (a) Contractor compliance with Contract requirements, (b) compliance with Owner's business ethics policies, and (c) compliance with provisions for pricing or claims submitted by the Contractor or any of its payees. The Owner or its designee shall be afforded access to all of the Contractor and all subcontractors'~~s~~ records pursuant to the provisions of this Article throughout the term of this Contract and for a period of twelve (12) years after final payment or longer if required by law.

ARTICLE 17 BUSINESS ETHICS

17.1 During the course of pursuing contracts, and the course of Contract performance, Contractor and its Subcontractors and vendors will maintain business ethics standards aimed at avoiding real or apparent impropriety or conflicts of interest. No substantial gifts, entertainment, payments, loans or other considerations beyond that which would be collectively categorized as incidental shall be made to any personnel of the Owner, its Program Managers, or its Architects, or to family members of any of them. At any time Contractor believes there may have

been a violation of this obligation, Contractor shall notify Owner of the possible violation. Owner is entitled to request a representation letter from Contractor, its Subcontractors or vendors at any time to disclose all things of value passing from Contractor, its Subcontractors or vendors to Owner's personnel, its Program Managers and its Architects

17.2 The Owner may, by written notice to the Contractor, cancel the Contract for Construction without liability to the Contractor if it is determined by the Owner that gratuities, in the form of entertainment, gifts, or anything of monetary value, were offered or given by the Contractor, or any agent, or representative of the Contractor, to any officer or employee of the Dallas Independent School District with a view toward securing a contract or securing favorable treatment with respect to the awarding, amending, or making of any determinations with the respect to the performing of such a contract. In the event the Construction ~~Agreement~~Contract is cancelled by the Owner pursuant to this provision, Owner shall be entitled, in addition to any other rights and remedies, to recover or withhold the amount of the cost incurred by the Contractor in providing such gratuities.

Executed this day of , .

OWNER:	CONTRACTOR:
	By:
Title:	Title:

DALLAS INDEPENDENT SCHOOL DISTRICT	**GENERAL CONTRACTOR NAME**
OWNER *(Signature)*	CONTRACTOR *(Signature)*
Dwayne Thompson, Chief Business Officer	GC Signer's Printed Name, Title
(Printed name and title) Date	*(Printed name and title)* Date

Approved As To Form:

SCHOOL ATTORNEY *(Signature)* Date

SECTION 00 55 00 – NOTICE TO PROCEED FORM

Name of Contractor	

The following form will be used by the District as a formal notice to proceed with pre-construction and construction activities, respectively.

The “Notice to Proceed” is the authorization to proceed with the work in accordance with said Construction Contract and the Contract Documents. This form shall be executed after issuance of the executed contract and purchase order.

NOTICE TO PROCEED

Date

GENERAL CONTRACTOR FULL NAME OF COMPANY
General Contractor Rep.
Address
City, State Zip

PROJECT: School Name, TEA Org#, associated with CSP Package #

OWNER: Dallas Independent School District

ATTENTION:

This notice shall be your authorization to proceed with the work in accordance with the terms and conditions as referenced in the Construction Contract and the Contract documents as enumerated therein.

Furthermore, the date of (fill in date here) is hereby established as day “0” (zero) of the stated Construction Schedule and establishes (fill in substantial completion date here), as the date of Substantial Completion unless modified in accordance with the General and Supplementary Conditions of the Contract.

FOR DALLAS INDEPENDENT SCHOOL DISTRICT

By _____

Title _____

BOND NO. _____

TEXAS STATUTORY PERFORMANCE BOND
(PUBLIC WORKS)

THE STATE OF TEXAS)
COUNTY OF DALLAS)

KNOW ALL BY THESE PRESENTS

That, _____
(Legal Name of Contractor)

(hereinafter called the Principal), as Principal, and

_____
(Legal Name of Surety)

a corporation organized and existing under the laws of the State of _____, with its principal office in the city of _____, licensed to do business in the State of Texas and admitted to write bonds, as surety, (hereinafter called the Surety), are held and firmly bound unto the Dallas Independent School District, (hereinafter called the Obligee), in the amount of

$_____
(Numeric)

(_____**)**
(Words)

for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee, dated the

_____ of _____, 20____, generally described as:

_____

_____

_____

_____

_____

(List Project Description From Agreement)

to do and perform certain construction work as provided in said contract and the related plans, specifications, general conditions and other contract documents, all of which are by reference made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, the conditions of this Obligation is such that if the Principal shall faithfully perform all of the work in accordance with the plans, specifications, general conditions and contract documents, and shall faithfully perform each, every and all other obligations incumbent upon him under the terms of said written contract referred to, and shall fully indemnify and save harmless the Obligee from all costs, expense and damage which it may suffer or incur because of Principal's default, or failure so to do, then this obligation shall be void, otherwise it shall remain in full force and effect.

BOND NO. _____

In the event Principal shall default in the faithful performance of the work called for by said written contract, plans, specifications and contract documents, the Surety shall within 15 days of the determination of default (determined as provided in said contract, general conditions and contract documents) take over and assume completion of said contract, or within such 15 day period make other arrangements satisfactory with the Obligee for completion of the contract, and said Surety shall become entitled thereupon to the payment or benefit of the balance of the contract price as the same matures according to its terms.

The Surety, for the protection of the Obligee herein, waives notice of, and hereby consents to any subsequent modification or alteration both in the work to be performed by the Principal, and the consequent price or sums to be paid by the Obligee, as well as any other change, or amendment, addition or deletion in the contract documents during the progress of the work, including but not limited to all extensions of time or other indulgences permitted the Principal.

Notwithstanding any other provision; the liability of the Surety on this bond shall never exceed the penal sum stated in first paragraph.

This Performance Bond is given in compliance with the terms and provisions of Chapter 2253 of the Texas Government Code as amended by the Acts of Legislature, and all liabilities on this bond shall be determined in accordance with the provisions of said Chapter, to the same extent as if it were copied at length herein. This bond and all of the provisions herein contained shall be solely for the protection of the named Obligee which has awarded the contract referred to.

The undersigned, corporate Surety, does by the execution of this Bond solemnly warrant and represent that it is duly authorized to do business in Texas.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this ____ day of _____, 20_____.

CONTRACTOR AS PRINCIPAL:

_____
Name of Company (Please print or type)

Seal: *(if any)*

_____
Signature of Authorized Company Representative

_____
Name & Title of Authorized Company Representative (Please print or type)

_____
Witness

_____
Attest

SURETY:

_____
Name of Company (Please print or type)

_____
Signature of Attorney-In-Fact

_____
Name & Title (Please print or type)

BOND NO. _____

(Performance Bond Continued from Page 2)

NOTE:

1) This Performance Bond applies to all contracts in excess of $100,000.00 involving a contract for construction, alteration or repair of any public building or the completion or prosecution of any public work.

2) This bond must be payable to the awarding authority, Dallas Independent School District, as the named Obligee, and it must be approved as to form by such awarding authority.

3) This bond must be furnished before any work is commenced.

4) Surety must be a corporate surety duly authorized to do business in Texas.

5) This PERFORMANCE BOND must be in the full amount of the contract which it secures.

6) Power of Attorney from Corporate Surety must be attached to this Performance Bond.

BOND NO. _____

TEXAS STATUTORY PAYMENT BOND
(PUBLIC WORKS)

THE STATE OF TEXAS)
COUNTY OF DALLAS)

KNOW ALL BY THESE PRESENTS

That, _____
(Legal Name of Contractor)

(hereinafter called the Principal), as Principal, and

_____
(Legal Name of Surety)

a corporation organized and existing under the laws of the State of _____, with its principal office in the city of _____, licensed to do business in the State of Texas and admitted to write bonds, as surety, (hereinafter called the Surety), are held and firmly bound unto the Dallas Independent School District, (hereinafter called the Obligee), in the amount of

$_____
(Numeric)

(_____**)**
(Words)

for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee, dated the

_____ of _____, 20____, generally described as:

_____

_____

_____

_____

_____

(List Project Description From Agreement)

to do and perform certain construction work as provided in said contract and the related plans, specifications, general conditions and other contract documents, all of which are by reference made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, the conditions of this Obligation is such that if the Principal shall promptly make payment to all claimants supplying labor and material (as hereafter defined) in the prosecution of the work provided in said contract, the related plans, specifications, general conditions and contract documents, then this obligation shall be void, otherwise it shall remain in full force and effect.

BOND NO. _____

This Payment Bond is given in compliance with the terms and provisions of Chapter 2253 of the Texas Government Code as amended by the Acts of Legislature, and all liabilities on this bond shall be determined in accordance with the provisions of said Chapter, to the same extent as if it were copied at length herein. The claimants referred to in this bond are those defined by such Chapter 2253, and this bond shall be solely for the protection of all such claimants supplying labor and material as defined in such Chapter, in the prosecution of the work provided for in said contract, and shall be for the use of such claimant and none other.

The undersigned, corporate Surety, does by the execution of this Bond solemnly warrant and represent that it is duly authorized to do business in Texas.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20_____.

CONTRACTOR AS PRINCIPAL:

_____
Name of Company (Please print or type)

Seal: *(if any)*

_____
Signature of Authorized Company Representative

_____
Name & Title of Authorized Company Representative (Please print or type)

_____
Witness

_____
Attest

SURETY:

_____
Name of Company (Please print or type)

_____
Signature of Attorney-In-Fact

_____
Name & Title (Please print or type)

(Payment Bond Continued from Page 2)

NOTE:

1) This Payment Bond applies to all contracts in excess of $25,000.00 involving a contract for construction, alteration or repair of any public building or the completion or prosecution of any public work.

2) This bond must be payable to the awarding authority, Dallas Independent School District, as the named Obligee, and it must be approved as to form by such awarding authority.

3) This bond must be furnished before any work is commenced.

4) Surety must be a corporate surety duly authorized to do business in Texas.

5) This PAYMENT BOND must be in the FULL amount of the contract which it secures.

6) Power of Attorney from Corporate Surety must be attached to this Payment Bond.

DALLAS INDEPENDENT SCHOOL DISTRICT CONSTRUCTION MINIMUM SAFETY PROGRAM GUIDELINES MANUAL

Construction Services
Minimum Safety Program Guidelines

2023 Revision

1. Table of Contents

1. Table of Contents 1
2. FOREWORD 6
3. POLICY STATEMENT 6
4. PROGRAM OBJECTIVES 7
4.1 Active Participation of All Contractors 7
5. LOSS CONTROL RESPONSABILITIES 8
5.1 Local Laws and Requirements 8
5.2 Dallas ISD Safety Orientation and Badging 9
5.3 Campus Readiness 10
5.4 Protecting the General Public 10
5.5 Work Performed Near Existing District Right-of-Way 11
5.6 General Contractors 11
5.7 Site-Specific Safety Plan 13
5.8 Work Areas 13
5.9 Site-Specific Safety Orientation 13
5.10 Jobsite Trailer Postings 13
5.11 General Contractor Project Manager 14
5.12 General Contractor Safety Representative 14
5.13 General Contractor Site-Superintendent 15
5.14 Subcontractor Competent Person 16
5.15 Safety Committee 17
5.16 Bond Safety Committee Meeting 17
5.17 Weekly Site-Safety “Toolbox Talk” Meetings 18
5.18 First Aid and Medical Treatment 18
5.19 Incident Investigations 19
5.20 Substance Abuse 19
5.21 Site Visitors and Group Tours 20
6. MINIMUM CONSTRUCTION SAFETY GUIDELINES 22
6.1 Safe Plan of Action (SPA) Guidelines 22
6.2 Repeating Scopes of Work 23
6.3 Job Hazard Analysis 23
6.4 Personal Protective Equipment 24
6.5 Hazard Communication 25
6.6 Respiratory Protection 26
6.7 Fire Prevention 26
6.8 Housekeeping 27

6.9 Silica Control 28
6.10 Sanitation 28
6.11 Demolition and Site Clearance 28
6.12 Demolition Safe Plan of Action (SPA) 29
6.13 Confined Space Entry 29
6.14 Confined Space Safe Plan of Action (SPA) 29
6.15 Trenching and Excavations 30
6.16 Trenching and Excavation Safe Plan of Action (SPA) 31
6.17 Pier Drilling 32
6.18 Pier Drilling Safe Plan of Action (SPA) 33
6.19 Locating Utilities 33
6.20 Utility and Electrical Shutdowns 34
6.21 Utility and Electric Shutdown Safe Plan of Action (SPA) 34
6.22 Electrical Work 35
6.23 Lockout/Tagout (LOTO) 35
6.24 Electrical Power Lines 36
6.25 Fall Prevention and Protection 36
6.26 Elevated Work Safe Plan of Action (SPA) 37
6.27 Roofing 38
6.28 Melting Kettles 38
6.29 Scaffolding 39
6.30 Floor and Wall Openings 40
6.31 Stairways and Ladders 41
6.32 Crane Operations 42
6.33 Crane Operations Safe Plan of Action (SPA) 43
6.34 Steel Erection 44
6.35 Steel Erection Safe Plan of Action (SPA) 47
6.36 Aerial Crane Operations 47
6.37 Aerial Crane Operations Safe Plan of Action (SPA) 48
6.38 Hot Work 50
6.39 Welding and Cutting 50
6.40 Compressed Gas Cylinders 51
6.41 Earth Moving Equipment and Powered Industrial Trucks 51
6.42 Haul Routes 52
6.43 Traffic Control 52
6.44 Environmental and Hygiene 53

6.45 Spill Prevention and Response 53
6.46 Portable Relocation 53
7. INCIDENT NOTIFICATION GUIDELINES 54
7.1 DISD Incident/Crisis Notification Flowchart 56
7.2 Incident Investigations 57
7.3 Incident Follow-up Guidelines 57
7.4 Contributing Factors to Consider 58
8. CONSTRUCTION SAFETY FOR STUDENTS 58
8.1 Introduction 58
8.2 Separation of Construction Activities 58
9. CRISIS COMMUNICATION 60
9.1 Suggested Steps for Crisis Situations 60
9.2 EMERGENCY TELEPHONE NUMBERS 60
9.3 Emergency Planning 61
10. CONTRACTOR SAFETY AUDITS 61
10.1 Purpose 61
10.2 Jobsite Safety Inspections 61
10.3 Inspections by Regulatory Agencies 62
11. GREENFIELD PROJECTS 62
11.1 Greenfield Shutdown Guidelines 63
11.2 Greenfield Badging 63
12. UNMANNED AIRCRAFT SYSTEM (DRONE) POLICY 64
12.1 Operating Requirements 64
12.2 Pre-Operation Procedure 64
EXHIBITS 65
EXHIBIT A – Campus Readiness Form 66
EXHIBIT B – Job Hazard Analysis (JHA) 67
EXHIBIT C – Demolition SPA Cover Letter 71
EXHIBIT D – Confined Space SPA Cover Letter 72
EXHIBIT E – Trenching and Excavation SPA Cover Letter 73
EXHIBIT F – Pier Drilling SPA Cover Letter 74
EXHIBIT G – Utility Shutdown SPA Cover Letter 75
EXHIBIT H – Electrical Shutdown SPA Cover Letter 76
EXHIBIT I – Shutdown Authorization Form 77
EXHIBIT J – Elevated Work SPA Cover Letter 78
EXHIBIT K – Crane Operation SPA Cover Letter 79
EXHIBIT L – Steel Erection SPA Cover Letter 80

EXHIBIT M – Aerial Crane Operation SPA Cover Letter 81
EXHIBIT N – Hot Work Permit 82
EXHIBIT O – Incident Investigation Report 83
EXHIBIT P – Safety Inspection Checklist 84
EXHIBIT Q – Contractor Acknowledgement Statement 90
ATTACHMENTS 91
Dallas ISD Orientation Location and Schedule 92
Site-Specific Safety Plan Guidelines 93
Crisis Communications Poster 95
Visitor's Release and Hold Harmless Agreement 96
Shutdown Notification Guidelines 97
Water Shut-off Guidelines 97
Gas Shut-off Guidelines 98
Sanitary Sewer Guidelines 98
Electrical Shutdown Guidelines 99
SWPPP Oversight Flowchart 100
Greenfield Shutdown Authorization Request Guidelines 101
Intruder Detection 102
Campus Security Reminders 103
Safety Meeting Sign-in Sheet 104
Geotechnical Soil Sampling Safety Guidelines 105
Inclement Weather Plan of Action 106

DALLAS ISD DISCLAIMER

The purpose of the Construction Minimum Safety Program Guidelines Manual, developed for the Dallas Independent School District, is to assist in the development and implementation of appropriate safety standards. This manual is prepared for use as a minimum guideline for safety during the construction, renovation, and expansion activities to be completed by independent contractors. The program is based on applicable government regulations; insurance related safety/risk management requirements, accepted safety practices within the construction industry and common sense.

The maintenance of safe premises, operations and equipment, protection of the faculty, students, and community, and the avoidance of unsafe conditions and practices (during all construction phases) are the responsibility of the General Contractors and Subcontractors performing the construction work. The Program Manager will provide safety oversight of the Contractor's Safety Program. While mandatory, compliance with the provisions of this Construction Minimum Safety Program Guidelines Manual will not guarantee or ensure compliance with the requirements of the Department of Labor, Occupational Safety and Health Act (29 CFR 1926 and 29 CFR 1910). This manual is intended to provide a working, uniform minimal level of program guidelines to assist or provide direction to the Contractors. This manual is not intended to replace the need for each Contractor to establish and maintain a proper Illness and Injury Prevention Program as required by the Department of Labor, Occupational Safety and Health Act (29 CFR 1926 and 29 CFR 1910) and the State of Texas.

The Dallas Independent School District, and its Agents, Consultants, etc., assume no liability for the manual's contents or for any safety related service(s) that may be provided during the course of the project.

This Manual is intended to provide a working, uniform minimal level of program guidelines to assist or provide direction to Contractors. This Manual is not intended to replace the need for each Contractor to establish and maintain a proper Illness and Injury Prevention Program as required by the Department of Labor, Occupational Safety and Health Act (29 CFR 1926 and 29 CFR 1910) and the State of Texas.

References to "Bond Program" must refer to the Dallas Independent School District 2020 and 2015 Bond Programs and other projects managed by the Dallas Independent School District's Construction Services Department as appropriate for the project for which work is to be performed.

Note: If a situation arises that is not covered by the Contractor's Safety Manual or the Construction Minimum Safety Guidelines Manual, please discuss it with your project manager and/or call the Owner's Representative. For additional information regarding the guidelines set forth within this manual, please contact:

Dallas ISD Bond Program Safety Manager, Alvaro Meza
Direct (972) 925-7219 | Mobile (214) 435-2204 | Email almeza@dallasisd.org

2. FOREWORD

This Manual has been compiled to present Loss Control activities and guidelines. Contractors are expected to meet or exceed these minimum guidelines.

The information and suggestions summarized in this Manual were compiled from sources believed to be reliable. It cannot be assumed that this material includes every loss potential, code violation or exception to good practice and, therefore, we cannot guarantee its completeness.

It is solely the Contractor's responsibility to conform to the provisions of this Manual and standards set forth under the William-Steiger Occupational Safety and Health Act of 1970 and, as amended, other Federal Regulations, Environmental Nuisances Considered Hazardous as they apply to state, and local regulations. The General Contractor must ensure that each of its Subcontractors comply with the requirements of this Manual.

We should also emphasize that, as with all other aspects of the work, the Contractor's selection of means and methods is his own, and that any and all suggestions contained in this Manual are only representative of the types of techniques and practices which the Contractor may choose to employ on this project.

3. POLICY STATEMENT

The principles of safety and loss control reflect a determination by Dallas Independent School District to prevent injuries to the general public and workers, as well as to prevent damage to property and equipment.

The District considers no phase of construction or administration of greater importance than accident prevention and asserts that accidents which result in personal injury and damage to property and equipment represent needless waste and loss. It must be the policy of the District for Contractors to conduct all operations safely and thereby prevent injuries to persons and damage to property.

Planning for safety must start with the design and continue through purchasing, fabrication, and construction in all phases of the Bond Program. All practical steps must be taken to maintain a safe place to work. The Contractor must accept the responsibility for safety and loss prevention and must be responsible for thorough safety and loss control training and instruction of its employees.

The objective of this policy is to establish throughout the entire Dallas Independent School District Bond Program Construction Projects the concept that the prevention of accidents and protection of property is most important and, therefore, must receive top priority, support, and participation.

4. PROGRAM OBJECTIVES

The Dallas Independent School District Construction Minimum Safety Program Guidelines Manual has been created to supplement the General Contractor's own program to eliminate or reduce hazards and risks associated with the construction projects, prevent accidents, reduce employee injury, prevent damage to property, promote maximum efficiency and effective savings by the reduction of unplanned business interruption.

4.1 Active Participation of All Contractors

Supervisory staff and employees must make the program not only effective, but also successful by coordinating the participants' efforts in performing the following tasks:

a) Provide a safe environment for employees to perform high quality work.
b) Use safety planning as a tool to reduce bodily injury and property damage.
c) Provide inspections to locate and abate unsafe conditions and practices.
d) Protect the public and property immediately adjacent to all construction sites.
e) Educate and train employees through:
    (1) New hire orientation
    (2) Safety meetings
    (3) Safety training, i.e., hazard communication, trenching safety, confined space, etc.
    (4) Mandatory personal protective equipment programs
    (5) Injury reporting and record keeping up to date
    (6) Incident tracking and trends analysis
    (7) Using accident investigation information to abate deficiencies and eliminate any additional losses
f) Contractors of any tier must comply with all Federal, State, and local laws, ordinances, regulations, and the National Fire Protection Association (NFPA) Standards including the Life Safety Code.

NOTE: The Construction Minimum Safety Program Guidelines Manual is to work in conjunction with the Contractor's individual Safety Program. All Contractors are required to implement their own written Safety Program and/or the Construction Minimum Safety Program Guidelines Manual prior to construction activities.

5. LOSS CONTROL RESPONSABILITIES

The effectiveness of this program depends upon the active participation and cooperation of all Engineers, Project Managers, Inspectors, Supervisors, General Contractors, their employees, and Subcontractors. The primary goals of this program are to increase safety awareness, raise safety standards in the work environment, and increase management involvement in the safety process.

5.1 Local Laws and Requirements

Each contractor and each Subcontractor of any tier must comply with the most stringent OSHA, City, County, or Federal regulations governing where the project site resides.

NO FELONY CONVICTION REPRESENTATION

All contractors of any tier must comply with the following:

Sec 44.034, Subsection (a) of the Texas Education Code subparagraph (a) requires that a person or business entity that enters a contract with a school district must give advance notice to the district if the person or an owner or operator of the business entity has been convicted of a felony. The notice must include a general description of the conduct resulting in the conviction of a felony.

A school district may terminate a contract with a person or business entity if the district determines that the person or business entity failed to give notice as required by Subsection (a) or misrepresented the conduct resulting in the conviction. The district must compensate the person or business entity for services performed before the termination of the contract. This section does not apply to a publicly held corporation.

All contracts must comply with the requirements for criminal background checks. All vendors must give advance notice to the District if the person or an owner or operator of the business entity has been convicted of a felony. The notice must include a general description of the conduct resulting in the conviction of a felony. The district may terminate any resulting agreement if the District determines that the person or business entity failed to provide notice as required by this paragraph or misrepresented the conduct resulting in the conviction. This paragraph requiring advance notice does not apply to a publicly held corporation. This paragraph is required by state law, and exceptions permitted in this advance notice do not limit the following requirements.

All vendors will obtain criminal background history record of information that relates to an employee, applicant for employment, or agent of the contractor or consultant if the employee, applicant, or agent has or will have continuing duties related to the contracted services: and the duties are or will be performed on school property or at another location where students are regularly present. The General Contractor or consultant must certify to the District before beginning work and at no less than an annual basis thereafter that criminal history record information has been obtained. General Contractors or consultants must assume all expenses associated with the background checks and must immediately remove any employee or agent who was convicted of a felony, or misdemeanor involving moral turpitude, as defined by Texas law, from District property or other location where students are regularly present.

The District must be the final decider of what constitutes a "location where students are regularly present." General Contractors' or consultants' violation of this section must constitute a substantial failure under any resulting agreement and be grounds for termination.

Unless waived in writing by the Superintendent of Schools or designee, all District vendors must be identified by a photographic identification badge, issued by a District-approved third-party company at the vendor's expense. The third-party company, as detailed in the Purchasing and Financial Activities Manual, must verify the criminal record history information, and may be used to verify compliance with the federal Drug Free Workplace Act of 1988 or its successor, and the federal Education Department General Administrative Regulations, current edition, in its testing and review process.

Employee or agent includes as example, but not by way limitation, persons providing services on the project including all persons or entities performing all or part of the services the General Contractor has undertaken to perform on the project regardless of whether that person has employees. This includes, without limitation, independent contractors, Subcontractors, owner-operators, employees of any such entity, or employees of any entity that furnishes persons to provide services on the project.

Services include, without limitation, providing the hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a project. Services do not include activities unrelated to the project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets. The District must have sole discretion to determine what constitutes a "location where students are regularly present." General Contractor's violation of this section must constitute a default under the General Terms and Conditions of the contract.

5.2 Dallas ISD Safety Orientation and Badging

Prior to working on any Dallas ISD property/project, all General Contractors and Subcontractor employees of any tier must obtain a Dallas ISD Bond Program Photographic Identification badge issued by a District approved third-party company at the General Contractor's or Subcontractor's expense. Any replacement for a lost badge should be obtained by the issuing third-party company.

A Dallas ISD Bond Program Safety Orientation Sticker (to be placed on the I.D. badge) required prior to working on any Dallas ISD property/project. The Safety Orientation sticker is obtained after completion of the required Dallas ISD Bond Program's Safety Orientation provided by the Bond Program's Safety Department. Replacement of the safety orientation sticker must be requested through the Dallas ISD Bond Safety Director or designee. Please see Attachment I for the Dallas ISD Orientation location and schedule.

5.3 Campus Readiness

Campus Readiness is a checkpoint/documented safety inspection that must be completed prior to the start and/or return of campus staff and students to ensure the sustainability of proper separation of all areas and conditions affected by construction activities.

The effectiveness of this checkpoint depends heavily upon the active participation and cooperation of all General Contractors, their employees, engineers, project managers, inspectors, supervisors, and Subcontractors of any tier.

The General Contractor must submit a completed copy of the Campus Readiness Form as EXHIBIT A to the Owner's Representative one (1) working day prior to the return or arrival of campus staff and students, as made part of the Construction Minimum Safety Program Guidelines. Campus Readiness Forms must include photographs as confirmation of existing site-conditions. Guidelines for ensuring a consistent approach to this checkpoint are as follows:

(1) Ensure all areas affected by construction are properly separated from staff, students, and the general public.
(2) A completed copy of the Campus Readiness Form, along with photographs of each affected area must be provided to the Owner's Representative one (1) working day prior to the return of staff and students.
(3) Communicate the significance of adequate separation of construction activities to all contractors of any tier.
(4) A follow-up inspection must be conducted to ensure proper separation of construction activities remain constant.

5.4 Protecting the General Public

Every precaution must be taken to prevent injury to pedestrians or damage to the property of others. The public must be considered as any person not employed by the General Contractor or Subcontractor of any tier.

Among the precautions to be taken are the following:

a) Work must be performed in a public area only when specified by the Contract or the District in writing
b) Every step necessary must be taken to protect and maintain work areas that interface with public sidewalks, building entrances (lobbies, corridors, aisles, etc.), stairways, and roadways.
c) This protection must include but not be limited to installing and maintaining the appropriate barricades, fences, guardrails, overhead protection, partitions, signs, shields, which must be adequately visible. Protection against any additional harmful exposure must also be provided.
d) All travel ways, access, emergency exits, and egress points must always be maintained clear of obstructions.
e) Warning signs are to be conspicuously positioned and a flag person must be assigned when moving equipment that may encounter pedestrians or private vehicles.

f) Overhead protection must be in accordance with the laws of the jurisdiction where the project resides.

g) Each project work area must be protected by a fence constructed of wood or metal and stand at least six (6) feet high to prevent incidental public entry.

h) Fences from construction areas should separate all playgrounds.

i) All fencing must be inspected daily, and repairs made where necessary to prevent unauthorized access.

j) Guardrails must be made of rigid materials and comply with OSHA regulations.

k) Barricades for the general public and/or public roadways must always be secured against accidental displacement and in place, except when temporary removal is required. At such times, a trained flag person must be assigned to control the unprotected area.

l) Should a permanent sidewalk require obstruction or removal, a temporary alternative pedestrian walkway must be provided. Guardrails must be installed on both sides of any temporary walkway that has a fall exposure.

m) When emergency exits must be re-routed, the General Contractor must provide the necessary signs, maps etc. that will show where the nearest emergency exits are located.

5.5 Work Performed Near Existing District Right-of-Way

For any construction equipment (such as cranes, concrete pump trucks, and back hoes) that could encroach on the District's operating right-of-way, the General Contractor must submit and obtain approval from the District for a plan describing the use of such equipment, and the necessary precautions to be taken to preclude any accidental encroachment on the right-of-way.

5.6 General Contractors

The Contractor is responsible for accident prevention and job-site safety. The extent to which these program objectives are met depends upon active management promotion and support of the Construction Minimum Safety Program Guidelines and the complete cooperation of Subcontractors, job site supervisors, and construction personnel in carrying out the following basic procedures:

a) All work must be pre-planned to minimize personal injury, property damage, and loss of production time.

b) General Contractors must maintain a system of prompt detection and correction of unsafe practices and conditions.

c) All Contractor and Subcontractor employees of any tier must successfully complete a site-specific orientation and indoctrination program as described in Section 5.9 of this manual.

d) Site records must be maintained to assure compliance with all OSHA, Federal, and State Regulations and the Construction Minimum Safety Program Guidelines. Site records must include, but not be limited to, the following:

(1) Weekly Toolbox Talk Meeting Agenda/Sign-in Sheets
(2) Incident Investigations
(3) Corrective Action Plan
(4) Worker Training Documentation
(5) Hazard Communication Program
(6) Fire Prevention Plan
(7) Silica Control Plan
(8) Campus Readiness
(9) OSHA 300 Logs
(10) Safety Inspection Reports
(11) Substance abuse program
(12) Site-Specific Orientation
(13) Daily Job hazard analysis (JHA)
(14) Daily Sign-in Sheets

e) General Contractor and Subcontractor safety representatives of any tier must attend at minimum one (1) documented monthly safety committee meeting.

f) Each General Contractor must send a company representative to attend monthly safety committee meetings, or more frequently, as may be required for unusual circumstances and situations.

g) General Contractors must ensure all Subcontractors of any tier comply with the established policies and procedures to ensure adequate compliance with all applicable Federal and/or State Laws and Standards.

h) The General Contractor must maintain a paper copy of the "Construction Minimum Safety Program Guidelines Manual" at each project site.

i) In the event of a conflict and/or ambiguity between various statutes or safety provisions, the stricter provision must apply.

j) The General Contractor must provide additional training when necessary for all its employees and must assure that each Subcontractor provides additional training when necessary for all of its employees. All training must be documented.

k) General Contractors must maintain a Daily Sign-in Sheet for the tracking of its construction workers in and out of the project each day.

NOTE: No requested advice from the representatives of Marsh Inc., Architect, Engineer, or the District must in any way relieve, alter, change, or amend any of the General Contractor's expressed, implied, or inherent legal and/or contractual obligations. Furthermore, the authority vested in the District and its designated representatives, including Marsh Inc. to act on matters regarding safety, must not in any way reduce the General Contractor's responsibility for safety and accident prevention. The District and its representatives, including Marsh Inc. are obligated only to notify the General Contractor of observed instances in which the General Contractor failed to fulfill their own obligations.

5.7 Site-Specific Safety Plan

Within fourteen calendar (14) days after the Notice of Award, but not later than the Preconstruction Conference, the General Contractor must submit a copy of the Site-Specific Safety Plan together with a letter of Management's Statement of Policy, signed by an officer of the company in relation to its contract, to the Owner's Representative and include all applicable criteria as listed in Attachment II (Site-Specific Safety Plan Guidelines) of this manual.

5.8 Work Areas

The General Contractor must provide a safe work area for its employees, Subcontractors of any tier, campus occupants, and the general public. The General Contractor may seek the District's assistance to resolve complex construction safety problems.

5.9 Site-Specific Safety Orientation

Prior to the start of work, each General Contractor and Subcontractor employee of any tier must receive a Site-Specific Safety Orientation. This orientation must be conducted by the General Contractor's Safety Representative and include project-specific safety requirements, protection of school children, public safety, proper use of personal protective equipment, and safe work practices.

a) Site-specific orientations must be no less than thirty **(30) minutes**.
b) To verify that the employee has received and understands this indoctrination, the employee must sign a "sign-in sheet", which the General Contractor must keep on file.
c) It is the responsibility of the General Contractor to ensure that non-English speaking employees receive these same instructions in a language they understand.

5.10 Jobsite Trailer Postings

On a weekly basis, the General Contractor must plan and execute its work with the utmost care and in coordination with the campus principal to not endanger the students' safety and to provide its Subcontractors with the most up to date project information available. To this end, the below items must be updated weekly and posted for Subcontractor's ready reference:

(1) The number of weeks remaining until Substantial Completion must be posted on the door.
(2) The Project Team's Contact List (phone numbers and email) must be posted on the door.
(3) A complete copy of the Operations Parameters must be posted on the wall.
(4) A colored copy of the General Contractor's GPR Report must be Posted on the wall and redlined anytime changes to utility locations are made.
(5) A Site Map showing the location of each utility shutdown valve must be posted on the wall.
(6) A copy of the project 's Baseline Schedule must be posted on the wall.
(7) A copy of the Three (3) Week Lookahead Schedule must be posted on the wall.
(8) A copy of the project's Phasing Plan must be posted on the wall.
(9) A hard copy of the last OAC Hand Outs must be posted on the wall.

(10) The Construction Drawings must be posted at the jobsite trailer and red lined weekly.

(11) A copy of the DISD Crisis Communication Guidelines Poster (Attachment III) must be posted on the wall.

5.11 General Contractor Project Manager

Responsibilities of the Project Manager must include, but are not limited to:

a) Plan and execute all work to comply with the stated objectives of the Construction Minimum Safety Program Guidelines Manual.

b) Comply with all the provisions of the contract dealing with safety and accident prevention requirements.

c) Require project and job superintendents, safety representatives, and project foremen to enforce the federal, state, and local safety codes and regulations.

d) Cooperate with the Owner's Representative.

e) Authorize necessary action to correct sub-standard safety conditions reported or observed.

f) Review and take necessary action with respect to safety matters through directives or personal interviews with superintendents, project foreman, and/or Subcontractors' management.

g) Share project related experiences (i.e., insight, questions, incidents, etc.) with other participants and attendees present at monthly Bond Safety Committee Meetings.

5.12 General Contractor Safety Representative

At the General Contractor's discretion, the Site-Superintendent or Project Foreman may serve in the capacity of Safety Representative if the individual selected to serve can perform the minimum criteria listed below for Safety Representative.

The designated Site Safety Representative must hold an OSHA 30hr (within five (5) years of completion) and a valid First Aid/CPR certification, and minimum of 3 years of experience managing on site safety responsibilities. The Site Safety Representative must not have any other duties than monitor all Subcontractor's compliancy with Federal, State, Local ordinances, in addition to the Minimum Construction Safety Guidelines and the Contractor's Safety Manual. Moreover, the Site-safety Representative must ensure all non-compliant conditions or unsafe behavior is immediately corrected.

NOTE: If the person designated is not able to successfully perform the minimum criteria listed for safety representative, an on-site full-time site safety may be required.

Responsibilities of the designated Safety Representative must include, but are not limited to:

a) Ensure that the Construction Minimum Safety Program Guidelines are carried out.
b) Monitor employee compliance with all jobsite rules and regulations and ensuring that the rules are improved as necessary.
c) Make daily safety inspections of jobsites and take necessary immediate corrective action to eliminate unsafe acts and conditions.
d) Ensure the OSHA 300 Form Accident Report is properly completed and distributed.
e) Review and assist when necessary, accidents and incidents to ensure that injured employees follow proper reporting procedures, and that Accident Investigation Reports are completed accurately. Where appropriate, recommend immediate corrective action to the project manager or superintendent.
f) Provide project foremen with appropriate material for use in conducting weekly "toolbox" safety meetings.
g) Periodically attend project foreman's "toolbox" safety meetings and evaluate their effectiveness.
h) Implement safety-training programs, for supervisors and employees as they apply to their specific responsibilities where the Safety Representative identifies a need.
i) Encourage programs for recognition of individual employee's safety efforts and their contribution toward improved work methods.
j) Responsible for the control and availability of the necessary safety equipment, including employee's personal protective equipment.
k) Coordinate safety activities with those of the District's personnel, the Safety Representatives of Subcontractors, and the Owner's Representative.
l) Share project related experiences (i.e., insight, questions, incidents, etc.) with other participants and attendees present at monthly Bond Safety Committee Meetings.

5.13 General Contractor Site-Superintendent

It is the responsibility of superintendents to provide constant and thorough supervision of ongoing activities including safety of its employees and the employees of all Subcontractors. The Contractor's Superintendent must hold an OSHA 30hr (within five (5) years of completion) and a valid First Aid/CPR certification.

Responsibilities of the Superintendent include, but are not limited to:

a) At minimum, one General Contractor representative who has been designated as Competent Person must be present while contractors of any tier are on-site.
b) Planning and executing all work as to comply with stated objectives of the Minimum Safety Program Guidelines Manual, and work with the Safety Representative to assure the effectiveness of the program.
c) Plan all work far enough in advance so that proper safety procedures and equipment can be provided before work begins.

d) Ensure that no unsafe conditions are created, i.e., poor housekeeping, removal of guardrails, etc.
e) Take immediate action to eliminate, correct, or resolve any unsafe conditions or unsafe acts, which are observed or discovered.
f) Ensure that periodic inspections of safety equipment and personal protective equipment is conducted and enforce the use of such equipment.
g) Ensure that injured employees obtain prompt medical attention.
h) Participate in the completion of supervisory accident investigation of all accidents and suggest ways to prevent similar accidents.
i) Periodically attend foreman's weekly “toolbox” safety meetings and evaluate their effectiveness.
j) Share project related experiences (i.e., insight, questions, incidents, etc.) with other participants and attendees present at monthly Bond Safety Committee Meetings.

5.14 Subcontractor Competent Person

Subcontractor Foremen/Competent Person(s) are an integral part of an effective safety program and the amount of effort they put into accident prevention on their daily assignments helps determine whether or not a good accident record is maintained. The Subcontractor’s designated Competent Person must hold an OSHA 10hr (within five (5) years of completion) and a valid First Aid/CPR certification.

In accordance with 29 CFR 1926.32(f), a "Competent Person" is defined as "one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has **authorization** to take prompt corrective measures to eliminate them."

Responsibilities of the Subcontractor Competent Person shall include, but are not limited to:

a) At minimum, one Subcontractor representative who has been designated as Competent Person must be present while work is being performed (work includes self-performing and/or its contractors of any tier).
b) Instruct employees, under their supervision, on safe work practices and work methods at the time of work assignments.
c) Competent Person(s) must be trained and certified in First Aid/CPR and possess an OSHA 10-hour certification within 5 years of the issuing date.
d) Report immediately to the Safety Representative and superintendent of any violations of project safety that cannot be immediately corrected.
e) Supply and enforce the use of proper protective equipment and suitable tools for the project.
f) Verify that no unsafe practices or conditions are allowed on any part of their job.
g) Acquaint their workers with all applicable safety requirements and enforce them.
h) Set a good example for their workers. Lead by example.

i) Participate in the investigation of accidents and incidents to determine facts necessary to take corrective action.

j) Supply information for completion of the Accident Report and Investigation Form (directed by the General Contractor's Safety Representative and/or project Superintendent).

k) See that prompt first aid is administered to injured employees.

l) Hold weekly "Toolbox Talk" safety meetings with their employees

m) Weekly "toolbox" safety meetings must include:

   (1) Discuss observed unsafe work practices or conditions and corrective action taken to prevent a similar incident or condition.

   (2) Review the accident experience of their crew.

   (3) Encourage safety suggestions from their employees and report them to the Safety Representative.

   (4) All safety meetings are to be documented and kept in job trailer for review if requested.

n) Share project related experiences (i.e., insight, questions, incidents, etc.) with other participants and attendees present at monthly Bond Safety Committee Meetings.

5.15 Safety Committee

Under the direction of the District, a safety committee will be appointed from the selected company safety representatives and management. This committee will meet on a monthly basis for review of any safety issues needing attention as well as for investigation of serious accidents that result in loss of life, injury to several workers or pedestrians, or a major property loss. All employees of any tier must cooperate when necessary with any safety committee investigation. The committee will submit a report to the District at the conclusion of the investigation.

5.16 Bond Safety Committee Meeting

Bond Safety Committee Meetings are held monthly at the Dallas ISD Bond Office and must consist of the General Contractor's Project Manager, Superintendent, Safety Representative, Insurance Carriers' Representative (when available), and a Safety Representative from each Program Manager and Contractor currently working on the Bond Program.

The purpose of the meetings must be to create awareness, improve communications, encourage feedback, and solve problems. The Contractor's Safety Representative must share project related experiences (i.e., insight, questions, incidents, etc.) with other participants and attendees present at such meetings.

5.17 Weekly Site-Safety "Toolbox Talk" Meetings

Toolbox talks are weekly project safety meetings used to reinforce safety basics, focus on high-risk scenarios, and to inform workers about changes to the jobsite and working conditions that may have occurred. General Contractors must discuss any near miss, accidents, or injuries that have occurred and how they could have been prevented.

a) The General Contractor and all Subcontractors are required to hold a minimum of **one 15-minute site-safety Toolbox Talk meeting per week**.
b) All workers on the project site, including site Project Management team members, must attend a weekly safety Toolbox Talks, which must be presented in English and all other languages that are natively spoken at the project.
c) The General Contractor's safety representative may deliver each talk to the entire project population or each Subcontractor's safety representative may deliver individual meetings to their specific trade and/or group.
d) The General Contractor's safety representative must periodically participate and review individual meetings to ensure effectiveness.
e) The General Contractor must collect and maintain copies of all sign-in sheets for every meeting.
f) Meetings must address appropriate topics for the current and future work operations and current site conditions. In addition, the General Contractor must communicate information discussed during the Monthly Bond Safety Committee Meeting, inspection results, and other project safety-related topics.

5.18 First Aid and Medical Treatment

Emergency "911" telephone number must be used for all accidents requiring the response of Emergency Medical Services, Fire Department or Police.

"First Aid" can be defined as the immediate or temporary care given to a person who is ill or who has been injured. Any person trained in first aid should be able to recognize life (or other physical) threatening conditions and take some effective action to help keep the victim alive and in the best possible condition until professional medical help arrives. CFR-1926.50

For each shift of operation, all General Contractors must have on-site supervisors who are formally trained and current on basic first aid and CPR. These supervisors will be expected to provide emergency medical first aid on their jobs for all employees but in no case will be designated as the "First Responder" for the project

a) First aid supplies must be readily accessible on each project site. The first aid cabinet/kit must always be adequately stocked.
b) All injuries are to be reported to the immediate supervisor, no matter how minor. Treatment will be administered, and a report made of the injury. The employee's supervisor is responsible for making arrangements to transport the employee to and from the closest medical clinic/hospital.

c) Under no circumstances must the employee be allowed to drive him or herself to the medical clinic/hospital. All seriously injured personnel will be transported by ambulance to the nearest hospital.
d) All employees must notify their supervisor prior to leaving the site because of illness or injury.
e) If any employee obtains medical treatment without prior notification to the superintendent, the employee must notify the superintendent at the start of the next scheduled workday.
f) Prior to returning to work after treatment by a physician for a work-related injury, the employee must present a return-to-work form from the treating physician.

5.19 Incident Investigations

When an accident or near miss with major potential for a loss occurs, the supervisor of the crew(s) involved must perform an accident investigation. After the root cause has been identified and recommendations for corrective action have been determined, a procedure may be implemented to prevent a similar incident from occurring again.

5.20 Substance Abuse

Dallas Independent School District (Dallas ISD) is committed to the establishment and maintenance of a safe and efficient work environment for all personnel, free from the effects of alcohol, illegal drugs, and other controlled substances.

5.20.1 Policy:

District prohibits on their property, the use, possession, concealment, transportation, promotion, or sale of any of the following:

(1) Alcoholic beverages.
(2) Marijuana and other illegal drugs
(3) Look-a-likes and designer drugs
(4) Drug paraphernalia
(5) Controlled substances such as medications when usage is abused or when the substance is possessed without proper prescription labeling.

All person(s) directly or indirectly involved with the 2015 or 2020 Bond program, must not be under the influence of any of the above substances while on Dallas ISD property or to use, possess, conceal, transport, promote or sell any of the above substances will be grounds for disciplinary action, up to and including removal from the Bond program.

5.20.2 Other Controlled Items

Dallas ISD prohibits the use, possession, concealment, transportation, promotion, or sale of the following controlled items:

(1) Firearms, weapons, and ammunition (except when authorized for security reasons)
(2) Switchblades

(3) Unauthorized explosives including fireworks

(4) Stolen Property

5.20.3 General Contractor Requirements

General Contractors, including its Subcontractors of any tier, must employ a workforce free of the influence or possession of illegal drugs or alcohol while on District's property.

a) As a condition of employment, employees must submit to substance abuse screening (five-panel drug screening) and breath alcohol testing for Pre-employment, Post-accident/Incident, Just-cause, Random selection, and Return to work.

b) The Contractor must pay for all costs associated with a NIDA-approved laboratory to conduct substance abuse testing and breath alcohol testing.

c) All General Contractors and Subcontractors are responsible for reporting to the Bond Program Safety Manager any incidents in violation of the substance abuse program and the disposition of the violation. The Owner or its designee must reserve the right, but not the obligation, to order the Contractor to send a worker home for the day, or to remove a worker from any Bond Program Project, for his/her failure to comply with anti-substance abuse policies, and the Contractor must promptly comply with all such orders.

d) General Contractors and Subcontractors of any tier must declare one (1) or more employees to be its designated Competent Person.

e) The designated Competent Person must be dedicated to the Project for on-site safety responsibilities and must be on the project site when any part of the applicable General Contractor's or Subcontractor's work is being performed.

5.20.4 Definitions:

Property must refer to all land owned by the District, to all property thereon; buildings, structures, facilities, platforms, fixtures, tunnels, installations, and to all project vehicles, stationary or mobile equipment, whether owned or leased. This definition may also include other work locations while in the scope and course of employment on the District's Construction Projects.

5.21 Site Visitors and Group Tours

Normally there are no tours during a construction project. However, it is particularly important that a high degree of protection be afforded to all persons on authorized tours of construction worksites.

In the event a tour is authorized, the following instructions must be complied with, as applicable, by the General Contractor and those responsible for arranging such tours:

a) Tours must be scheduled prior to the start or after the end of the workday.

b) In all cases, the Program Manager and the Owner's Representative must be advised of any tour in a timely manner prior to the tour taking place.

c) Group tours must be cleared through the District, allowing maximum advance notice and in compliance with the District's policies and procedures. The District will coordinate the tour arrangements.

d) The General Contractor will coordinate the following with the individual or organization requesting the tour:

(1) Clothing: Visitors will be required to wear pants or slacks, shirt or blouse, and leather or work shoes. Sneakers, high-heeled shoes, and open toed shoes are prohibited.

(2) Minors: Persons under 18 years of age are not permitted on project tours.

(3) Protective Equipment: Hard hats, eye protection, earplugs, and other protective devices will be required, as necessary.

(4) Release and Hold Harmless Agreement: Each visitor must be required to sign a release and hold harmless agreement prior to the commencement of the tour. A sample Visitor's Release and Hold Harmless Agreement is contained in this Manual as Attachment IV.

(5) All visitors must comply with Contractor safety requirements.

(6) All visitors must be escorted by the job-site superintendent, Bond Program Safety Director, or their designated representatives.

e) Designated escorts must familiarize their group(s) with the hazards to be encountered on the tour prior to entering the project site.

f) District representatives, who visit or escort technical and official visitors in hazardous work areas, must notify the General Contractor in advance and must comply with all established construction safety procedures.

6. MINIMUM CONSTRUCTION SAFETY GUIDELINES

6.1 Safe Plan of Action (SPA) Guidelines

A Safe Plan of Action (SPA) is a site-specific comprehensive safety program which outlines what methods, procedures, and equipment will be used when engaged in any of the following nine (9) critical phases of work:

(1) Excavation
(2) Elevated Work
(3) Crane Operations
(4) Steel Erection
(5) Confined Space
(6) Pier Drilling
(7) Demolition
(8) Utility Shutdown
(9) Electrical Shutdown

It is critical that Contractors understand the importance of developing an effectively functioning Safe Plan of Action (SPA) that is pro-active and addresses the potential hazards and exposures to their employees, campus occupants, the public, and other trades within the affected areas.

a) SPA Documentation must be submitted to the Owner's Representative within **5-7 days** of any planned critical phases of work.
b) The General Contractor must assemble all criteria as listed on the SPA Cover Letter checklist for all critical phases of work.
c) The SPA Cover Letter checklist and its supporting documentation must be combined into a single PDF so that it is an exact electronic version of the physical document that must kept on-site.
d) The General Contractor Safety Manager must review, evaluate, and approve of the SPA for adherence to all applicable federal regulations and the DISD Construction Safety Program Guidelines prior to submitting a copy to the Owner's Representative and the commencement of work.
e) The Owner's Representative may review and respond. Any issues or deficiencies will require the General Contractor to revise and resubmit the document. If no deficiencies are noted, The General Contractor must then schedule the Pre-Work SPA Meeting.
f) The Pre-Work SPA Meeting will be a final review of the complete Cover Letter checklist criteria before proceeding with any planned work. SPA Pre-Work Meetings must be held in-person and on-site. At a minimum, the following persons must be present:
    (1) Sub-Contractor Competent Person
    (2) General Contractor Safety Representative
    (3) Owner's Representative [Optional]

6.2 Repeating Scopes of Work

For repeating types of work that have already gone through the SPA review process, a separate submittal and review will not be required **ONLY** if **ALL** the following conditions have been met:

(1) The General Contractor Safety Manager has reviewed and approved the safety plan
(2) The work performed will be substantially similar to the scope of work as previously approved
(3) The Competent Person(s) listed on the documents has not changed
(4) The Sub Contractor crew list, training records, and certifications have not changed or expired

6.3 Job Hazard Analysis

Planning for the safety of personnel and equipment being used must begin with each phase of construction and continue through project completion. Contractors must plan the safety procedures to be followed for each phase of construction.

a) JHA's must be implemented on any task which may cause bodily injury, damage to property, or equipment e.g., crane lifts, redirecting of foot and or vehicle traffic, use of scaffolding, use of mobile aerial work platforms, and or any other task which pose a high risk.
b) A Job Hazard Analysis (JHA) is required prior of starting any work shift, equipment, or procedure that poses a significant potential for bodily injury and/or property damage.
c) The Job Hazard Analysis must be written by the performing Contractor and submitted to the General Contractor for approval.
d) Contractors must use EXHIBIT B (Job Hazard Analysis Worksheet) or its approved equivalent.
e) The General Contractor's Safety Representative in conjunction with the job site Supervisor is directly responsible for the development and implementation of Job Hazard Analysis (JHA).
f) Daily JHA Meetings must include the General Contractor and/or Subcontractors, their responsible job site supervisors (including the craft supervisor and craft Safety Representative), and any other responsible party who may contribute to the safety of the operation.
g) Employees involved with the project must be instructed of the hazards involved and methods required in eliminating those hazards, including emergency actions to be taken in the event of an accident.
h) Employees must be made aware of the procedures to be used and requirements of the JHA.
i) The JHA serves as an operating procedure and living documents that must be available to all personnel performing the work.
j) The General Contractor and Subcontractor's Safety Representative must retain a copy of all JHAs.

6.4 Personal Protective Equipment

Personal Protective Equipment (PPE) must be required for all persons on any construction site. The construction site is defined as any area within the project perimeter fence and interior renovation areas, excluding offices and office trailers.

PPE includes but is not limited to:

6.4.1 Hard Hats

All persons working, walking, or transiting the construction site must always wear an ANZI-Z-89 approved hardhat. Bump caps are prohibited. Any operation that requires an employee to wear face protection does not preclude the use of head protection. The face protection must be selected so that it can be used in conjunction with the required head protection.

6.4.2 Safety Vest

High visibility vests or high visibility upper body clothing (equivalent to ANSI Class 2 or greater as applicable) must be worn in the construction area. Primary work activities such as traffic control, excavations, rigging from ground level, exterior work at ground level or sub-ground level, earth moving operations, may require ANSI Class 3.

6.4.3 Eye Protection

Employees must wear ANZI Z-87 approved eye protection must be required when construction activities present a potential eye injury from flying debris, physical, chemical, or radiation agents.

6.4.4 Face protection

Face protection must be required when construction activities present a potential face injury from flying debris, physical, chemical, or radiation agents. Any operation that requires an employee to wear face protection does not preclude the use of eye protection. The eye protection must be selected so that it can be used in conjunction with the required face protection.

Any person working near or observing operations requiring additional or specialty eye protection must be equipped with the same type of eye protection that is required for that operation.

6.4.5 Hearing Protection

All contractors of any tier must implement a hearing conservation program when noise exposure is at or above 85 decibels averaged over 8 working hours, or an 8-hour time-weighted average.

6.4.6 Footwear

All employees and vendors in active work areas must wear substantial leather work shoes or work boots. Tennis shoes, sneakers, or other athletic footwear, flipflops, heels (1" +) or any open toe shoes are not acceptable footwear.

6.4.7 Clothing

All employees must be required to wear such additional protective clothing or equipment as required by the hazards involved with the tasks being performed.

a) All clothing should be in good repair, and not loose fitting or dragging in such a manner to pose a hazard from becoming entangled in equipment or machinery.
b) All button shirts will be buttoned or t-shirts with at least 4" sleeves must be worn at all times while on the jobsite. Tank tops, mesh shirts, sweatpants, shorts nor clothing displaying pornographic, or profanity will be allowed.
c) Long hair will be neatly kept under a hardhat as to prevent serious injury caused by entanglement.

6.4.8 Jewelry

No dangling jewelry must be permitted on work sites. Necklaces will be kept inside shirts to prevent possible entanglement in moving equipment and rotating machinery.

6.5 Hazard Communication

The General Contractor's Hazard Communication (Haz-Com) Program must be submitted to the Owner's Representative and made part of the General Contractor's Construction Safety Program and maintained on-site.

a) Contractors must provide all required training, control methods, personal protective equipment, and medical surveillance for its employees as required by OSHA 1926 Subpart Z. Training programs must ensure all employees can at a minimum:
    (1) Understand the program and can identify with hazardous chemicals.
    (2) Understand product-warning labels.
    (3) Know where Safety Data Sheets (SDS) are kept and can interpret them.
b) The General Contractor must maintain copies of Safety Data Sheets (SDS) for all chemicals to be used, stored, and/or maintained on any DISD Project prior to arrival or use.
c) All hazardous materials must be properly labeled per GHS and stored in accordance with applicable laws.
d) Contractors are responsible for proper disposal of hazardous waste in accordance with applicable laws and Environmental Requirements.
e) The General Contractor is responsible for ensuring work zones and potentially affected occupied areas are properly monitored for exposure to toxic and hazardous substances that workers or building occupants may be exposed to. Some examples include but are not limited to the following:
    (1) Asbestos
    (2) Lead
    (3) Hexavalent chromium
    (4) Beryllium
    (5) Silica
    (6) Mold

NOTE: It is the General Contractor's responsibility to monitor for these substances and to communicate with and protect building occupants if exposure is possible.

6.6 Respiratory Protection

When respirators are deemed necessary, the Contractor must have a respiratory program that complies with OSHA regulations. A copy of the Contractor's Respiratory Program must be submitted to the Owner's Representative and made part of the General Contractor's Construction Safety Program and maintained on-site.

a) Contractors of any tier must take all actions necessary to ensure air quality standards are met on the project and in its work areas. The employer shall evaluate emissions caused by their work processes (e.g., welding, running vehicles, etc.) and/or by the materials used.
b) When deemed necessary, employees must be fitted for and instructed in the proper use of respirators that will afford them the maximum protection for the environmental hazard in which they are working. Because of the extensive use of waterproofing, fireproofing, paints and welding processes, these areas may require constant monitoring

6.7 Fire Prevention

All Dallas ISD Schools Are Smoke and Tobacco Free.

The Fire Prevention and Protection Program will be determined for each project by the size and conditions at each project. The project superintendent must be responsible for the proper implementation and administration of the program giving due consideration to the availability of public Fire Departments and the type of work to be performed on the job.

The General Contractor's Site Fire Prevention and Protection Program must be submitted to the Owner's Representative made part of the General Contractor's Construction Safety Program and maintained on-site.

a) Ignition sources are not permitted in areas where flammable or explosives are stored or may be present and must be conspicuously posted: "NO SMOKING, MATCHES OR OPEN FLAMES."
b) Examples of ignition sources include, but are not limited to:
    (1) Smoking
    (2) Electrical cords that are damaged
    (3) Welding, torch cutting, and brazing
    (4) Vehicle engines and electric motors
    (5) Asphalt kettles
    (6) Hotplates
c) Fire Extinguishers of the appropriate type (A: B: C) must be provided, be placed conspicuously and sign posted.
d) Fire extinguishers will be maintained and inspected as required by Federal, State, and local regulations.

e) Fires and open flame devices must not be left unattended. Open burning for personal warming or trash disposal is prohibited.
f) All temporary heating devices must comply with all requirements of CFR 1926.154
g) All flammable liquids, e.g., gasoline, diesel, mixed gas, etc., must be labeled, stored, and dispensed from U.L. approved safety cans. The use or storge of plastic fuel containers is strictly prohibited.
h) Compressed gas cylinders, when not in use, will be secured in an upright position. Fuel and nonfuel cylinders must be separated by a minimum of 20 feet.
i) Flammables or Combustible liquids must not be stored in areas used for exits, stairways, or normally used for the safe passage of people.
j) Outdoor Flammable Storage areas must not be within 20 feet of any building. Minimum distance will also be maintained between storage areas, property lines, streets, alleys, or public ways.
k) Outdoor Portable Tanks must not be stored within 20 feet of any building.
l) Each tank must be labeled: "(Contents of Tank) – Flammable, No Smoking"
m) At least one portable fire extinguisher will be located no less than 25 feet, and no further than 75 feet, from any flammable liquid storage area located outside.
n) All areas of the project must be kept free of accumulations of wood scraps, paper, and other combustible debris.
o) Trash dumpsters must be maintained a minimum of 50 feet away from buildings or other structures.
p) In areas where welding, torching, or any open flame activity is being conducted, a trained fire watch will be posted, and he/she will have no other duties. The fire watch will remain in the hot work location for a minimum of 30 minutes after hot work activities are completed to ensure that no hot areas are present.

6.8 Housekeeping

Housekeeping is a basic requirement to construction safety and must be of primary concern to every superintendent, supervisor, and foreman on the project. The maintenance of a safe, clean work area contributes not only to worker safety, and the elimination of fire hazards, but also to efficient low-cost production.

a) All General Contractor and Subcontractor employees of any tier must collect trash, construction debris, and dispose of daily.
b) All trash and debris must be placed in proper containers, properly stacked, or removed from the jobsite daily.
c) Walking aisles, roadways, and high foot-traffic areas must be kept clear at all times.
d) All welding leads, electrical cords, and torch hoses must be strung a minimum of 7 feet high or positioned so as not to create a tripping hazard.
e) Oily rags and any flammable debris must be placed in closed covered containers at the end of each shift, or otherwise properly disposed of.
f) Tools and materials must not be left where they will create a hazard for others.

g) Spilled liquids should be cleaned up immediately.
h) Toilets, wash-up facilities, and drinking water dispensers are to be kept clean and sanitary.
i) Protruding nails must be bent down or removed from boards, plywood, construction materials, etc.
j) Surplus materials must be returned to storage areas.

6.9 Silica Control

Contractors must reduce unacceptable dust levels either through engineering controls or other means. In either case, the Contractor must provide maximum protection for those exposed to dust. Contractors of any tier are responsible for controlling dust that:

(1) Might endanger the health of children, school staff, and employees.

(2) Creates a nuisance to the general public

6.10 Sanitation

The General Contractor is responsible for obtaining and maintaining an adequate number of portable toilets on the project, as well as areas for hand washing.

a) The total number and gender of all employees working on the jobsite must determine the number of portable toilets required.
b) The General Contractor must also provide or require its Subcontractors to provide potable water.
c) Toilets, wash-up facilities, and drinking water dispensers are to be kept clean and sanitary at all times.

6.11 Demolition and Site Clearance

The General Contractor must ensure the establishment of a written Demolition Procedure that adheres to OSHA, Federal, State, and local regulations. A copy of this procedure must be submitted to the Owner's Representative, made part of the Contractor's Construction Project Safety Manual as EXHIBIT C, and maintained on-site.

a) Prior to commencement of work, a competent person must conduct an engineering survey. This written survey will be considered the basis for an operational work plan.
b) All structures needing support must be braced.
c) All utilities including gas, water, electricity, etc. must be shut down. All pipe work must be purged of any hazardous materials, e.g., flammable, explosive, toxic, etc.
d) All debris chutes will be manufactured of appropriate materials and must be adequately guarded and/or protected.
e) Removal of asbestos, lead, and PCBs must only be conducted by licensed contractors.
f) Remediation activities must adhere to all OSHA, Federal, State, and local regulations.

6.12 Demolition Safe Plan of Action (SPA)

A Demolition Safe Plan of Action (SPA) is a site-specific comprehensive Demolition Program which outlines what methods, procedures, and equipment will be used in its program. This evaluation and program must be in writing and must be submitted to the Owner's Representative prior to any demolition activity. Review and acceptance by the General Contractor Safety Manager is required prior to submission, the start of work, or any demolition activity.

a) General Contractor must coordinate and conduct an on-site Demolition SPA pre-work meeting one week prior to any planned demolition activity. The Cover Letter (EXHIBIT C) must be submitted along with a Safe Plan of Action (SPA). The safety plan must be evaluated and approved by the General Contractor Safety Manager prior to submission.
b) The Demolition SPA pre-work meeting agenda must include discussion about the scope and review of any conditions that may pose a hazard to workers and/or campus occupants as it relates to the planned demolition activity.
c) To hold a Demolition SPA pre-work meeting, at a minimum, the following parties must be present:
    (1) Sub-Contractor Competent Person
    (2) General Contractor Safety Representative
    (3) Owner's Representative [Optional]

6.13 Confined Space Entry

General Contractors must ensure the establishment of a written Confined Space Entry Procedure (when applicable) that adheres to OSHA Regulations. A copy of this procedure (when applicable) must be submitted to the Owner's Representative, made part of the Contractor's Construction Project Safety Manual as EXHIBIT D, and maintained on-site.

a) All personnel connected with any confined space operation must be adequately trained and confirmation of this training must be documented.
b) Confined Space Entry Permits must be used where necessary.
c) Air monitors, rescue tripods, full body harnesses, ventilation equipment, etc. must be available and used when deemed necessary by the General Contractor.

6.14 Confined Space Safe Plan of Action (SPA)

A Confined Space Safe Plan of Action (SPA) is a site-specific comprehensive Confined Space Entry Program which outlines what methods, procedures, and equipment will be used in its program. This evaluation and program must be in writing and must be submitted to the Owner's Representative prior to any confined space entry. Review and acceptance by the General Contractor Safety Manager is required prior to submission, the start of work, or any confined space entry.

a) The General Contractor must coordinate and conduct an on-site Confined Space SPA pre-work meeting 5-7 days prior to any planned confined space entry. The Cover Letter (EXHIBIT D) must be submitted along with a Safe Plan of Action (SPA). The safety

plan must be evaluated and approved by the General Contractor Safety Manager prior to submission.

b) The Confined Space SPA pre-work meeting agenda must include discussion about the scope and review of any conditions that may pose a hazard to workers and/or campus occupants as it relates to the planned confined space work.

c) To hold a Confined Space SPA pre-work meeting, at a minimum, the following parties must be present:

   (1) Sub-Contractor Competent Person

   (2) General Contractor Safety Representative

   (3) Owner's Representative [Optional]

6.15 Trenching and Excavations

The General Contractor must ensure the establishment of a written Trenching and Excavation Procedure that adheres to OSHA Regulations. A copy of this procedure must be submitted to the Owner's Representative, made part of the Contractor's Construction Project Safety Manual as EXHIBIT E, and maintained on-site.

a) The General Contractor must ensure trenching and/or excavation activities are not performed during regular school hours or near occupied school areas.

b) Prior to any excavation activity, the General Contractor Safety Representative or Superintendent must ensure the following:

   (1) Contact Texas811 (1-800-344-8377) for confirmation number.

   (2) Ground penetrating radar (GPR) **and** review of exiting plans must be performed as part of the underground utility locating methods. GPR reports must include an Underground Utility Location Survey/Utility Map which shows the positioning and identification of underground utilities in relation to any planned excavation activity.

   (3) Potholing/hand digging is required within three (3) horizontal feet of "located" centerlines, and in areas where knowledge is lacking.

c) The review of existing plans and any other reasonable efforts must be made to determine if any underground utilities (power lines, water lines, fuel lines, etc.) are present within the boundaries of the proposed work area.

d) As the excavation work approaches the location of any known utilities, the lines must be uncovered, using extreme caution not to disturb the lines, and adequate measures must be taken to protect the lines from damage while the work progresses.

e) All utilities known but not identified must be exposed by hand.

f) All excavation must be inspected daily by a competent person, or after heavy rain, or other change that may have caused a change in ground stability conditions. Any excavation greater than 20 feet must be designed by an engineer and a copy forwarded to the Bond Program Safety Manager for review.

g) Any personnel at the edge of a well, pit, shaft, and similar excavation six (6) feet or more in depth must be protected from falling by guardrail systems, barricades, or covers.

h) Where a guardrail system or barricade is infeasible, the use of personal fall arrest systems are required.

i) Any disturbed areas must be returned to existing and safe condition prior to departure.

j) If the Contractor must make a cut, cavity, trench, or depression in the Earth's surface formed by earth removal, it must comply with the applicable OSHA Regulations.

k) General Contractors must train, or require to be trained, those employees who will work in and around the excavation about the hazards, as required by OSHA, in the areas of daily inspections, soil testing, soil classifications, and protective or support systems.

6.16 Trenching and Excavation Safe Plan of Action (SPA)

A Trenching and Excavation Safe Plan of Action (SPA) is a site-specific comprehensive Trenching/Excavation Program which outlines what methods, procedures, and utility strike prevention efforts will be used in its program. This evaluation and program must be in writing and must be submitted to the Owner's Representative prior to any Trenching/Excavation work. Review and acceptance by the Contractor Safety Manager is required prior to submission and the start of work.

a) General Contractor must coordinate and conduct an on-site Trenching and Excavation SPA pre-dig meeting one week prior to any planned excavation or trenching (hand digging included). The Cover Letter (EXHIBIT E) must be submitted along with a Safe Plan of Action (SPA). The safety plan must be evaluated and approved by the General Contractor Safety Manager prior to submission.

b) The Trenching and Excavation SPA pre-work meeting agenda must include discussion about the scope and review of the existing underground utilities as it relates to the planned trenching/excavation. At the pre-dig meeting, the General Contractor must present a contingency plan regarding any utility struck during execution of such work.

c) To hold a Trenching and Excavation SPA pre-work meeting, at a minimum, the following parties must be present:

   (1) Sub-Contractor Competent Person

   (2) General Contractor Safety Representative

   (3) Owner's Representative [Optional]

NOTE: As defined by OSHA, an excavation as any man-made cut, cavity, trench, or depression in the Earth's surface formed by earth removal. A trench is defined as a narrow excavation (in relation to its length) made below the surface of the ground.

6.17 Pier Drilling

The General Contractor must ensure the establishment of a written Pier Drilling Procedure that adheres to OSHA Regulations. A copy of this procedure must be submitted to the Owner's Representative, made part of the Contractor's Construction Project Safety Manual as EXHIBIT F, and maintained on-site.

a) The Contractor must at no time perform any pier drilling activities during regular school hours or near occupied school areas.

b) Prior to any pier drilling activity, the General Contractor Safety Representative or Superintendent must ensure the following:

   (1) Contact Texas811 (1-800-344-8377) for confirmation number.

   (2) Ground penetrating radar (GPR) **and** review of exiting plans must be performed as part of the underground utility locating methods. GPR reports must include an Underground Utility Location Survey/Utility Map which shows the positioning and identification of underground utilities in relation to any planned excavation activity.

   (3) Potholing/hand digging is required within three (3) horizontal feet of "located" centerlines, and in areas where knowledge is lacking.

c) The review of existing plans and any other reasonable efforts must be made to determine if any underground utilities (power lines, water lines, fuel lines, etc.) are present within the boundaries of the proposed work area.

d) As the excavation work approaches the location of any known utilities, the lines must be uncovered, using extreme caution not to disturb the lines, and adequate measures must be taken to protect the lines from damage while the work progresses.

e) All utilities known but not identified must be exposed by hand.

f) Any personnel at the edge of a well, pit, shaft, and similar excavation six (6) feet or more in depth must be protected from falling by guardrail systems, barricades, or covers.

g) Where a guardrail system or barricade is infeasible, use of personal fall arrest systems are required.

h) Pier Drilling equipment must remain barricaded at all times and NOT be operated in occupied school areas.

i) Any disturbed areas must be returned to existing and safe condition prior to departure.

j) If the Contractor must make a cut, cavity, trench, or depression in the Earth's surface formed by earth removal, it must comply with the applicable OSHA Regulations.

k) General Contractors must train, or require to be trained, those employees who will work in and around the pier drilling operation about the hazards, as required by OSHA, in the areas of daily inspections, soil testing, soil classifications, and protective or support systems.

6.18 Pier Drilling Safe Plan of Action (SPA)

A Pier Drilling Safe Plan of Action (SPA) is a site-specific comprehensive Pier Drilling Program which outlines what methods, procedures, and utility strike prevention efforts will be used in its program. This evaluation and program must be in writing and must be submitted to the Owner's Representative prior to any Pier Drilling work. Review and acceptance by the General Contractor Safety Manager is required prior to submission and the start of work.

a) When working adjacent to any Pier six (6) feet in depth or greater, an appropriate means of fall protection must be provided.
b) General Contractor must coordinate and conduct an on-site Pier Drilling SPA pre-work meeting one week prior to any planned pier drilling. The Cover Letter (EXHIBIT F) must be submitted along with a Safe Plan of Action (SPA). The safety plan must be evaluated and approved by the General Contractor Safety Manager prior to submission.
c) The Pier Drilling SPA pre-work meeting agenda must include discussion about the scope and review of the existing underground utilities as it relates to the planned pier drilling operation. At the pre-work meeting, the General Contractor must present a contingency plan regarding any utility struck during the pier drilling of such work.
d) To hold a Pier Drilling SPA pre-work meeting, at a minimum, the following parties must be present:
    (1) Sub-Contractor Competent Person
    (2) General Contractor Safety Representative
    (3) Owner's Representative [Optional]

6.19 Locating Utilities

Prior to any underground work being performed, all utilities within the area of work must be located. Safety representative must ensure that Texas811 (1-800-344-8377) has been notified, and Ground Penetrating Radar (GPR) **and** review of exiting plans is be performed as part of the underground utility locating methods and a confirmation number has been issued prior to any excavation.

a) The General Contractor must coordinate with the Program Manager Network or the Architect to have all utilities within the area of work located.
b) The contract specifications and drawings must be reviewed by the General Contractor for notations of utility companies that may not be a member of an underground service alert group. Those not members of an underground service alert group must be contacted directly.
c) All calls to the utility companies must be logged and retained by the General Contractor.
d) The General Contractor must visually check the area for signs indicating the possibility of recent underground relocation work by an outside entity.
e) The General Contractor must take all necessary steps to protect the utilities from damage.
f) Ground penetrating radar (GPR) must be performed as part of the underground utility locating methods prior to any excavation activity.

g) GPR reports must include an Underground Utility Location Survey or Utility Map which shows the positioning and identification of underground utilities in relation to any planned excavation activity.

h) "Potholing" and/or hand digging must be required within three (3) horizontal feet of "located" centerlines, and in areas where knowledge is lacking, prior to any planned excavation activity.

6.20 Utility and Electrical Shutdowns

Prior to any type of shutdown, re-energizing, re-pressurizing, or tie-in activities, the General Contractor is responsible for completing the Shutdown Notification Guidelines as outlined in Attachment V, along with the applicable safety submittal requirements outlines in this section.

a) The General Contractor or Subcontractor of any tier must at no time perform any type of power or other utility shutdown activities during regular school hours. Shutdowns are to be scheduled during weekends or extended breaks.

b) **10-Day Notice of Shutdown** – General Contractor must provide Dallas ISD with notification of power or other utility shutdown no less than ten (10) calendar days in advance of the shutdown. Notification includes Dallas ISD Central Maintenance Office, A/E, Program Manager, and the Principal at each affected school.

c) Shutdown Authorization Form (EXHIBIT I) must be submitted to the Dallas ISD Bond Program Manager and Dallas ISD Project Manager for signatures of approval.

d) The General Contractor must ensure confirmation of readiness from affected Dallas ISD Departments (Including but not limited to HVAC, Kitchen, Fire Suppression, etc.) prior to any power or other utility shutdown activities.

e) When adding HVAC units, the General Contractor must notify the Project AE for approval of increased load

f) Prior to relocating any utility, Dallas ISD Sustainability Department must be notified.

6.21 Utility and Electric Shutdown Safe Plan of Action (SPA)

A Utility or Electrical Shutdown Safe Plan of Action (SPA) is a site-specific comprehensive Shutdown Program which outlines what methods, procedures, and contingency efforts will be used in its program. This evaluation and program must be in writing and must be submitted to the Owner's Representative prior to any power or other utility shutdown activities. Review and acceptance by the General Contractor Safety Manager is required prior to submission, and utility shutdown activities.

a) General Contractor must coordinate and conduct an on-site Shutdown pre-work meeting prior to any planned Utility or Electrical Shutdown. The applicable Cover Letter (EXHIBIT G **or** EXHIBIT H) must be submitted along with a Utility or Electrical Shutdown SPA. The safety plan must be evaluated and approved by the General Contractor Safety Manager prior to submission.

b) The Utility or Electrical Shutdown SPA pre-work meeting agenda must include discussion about the scope and review of any existing or potential hazards and contingency efforts as it relates to the planned shutdown.

c) To hold an Electrical or Utility Shutdown SPA pre-work meeting, at a minimum, the following parties must be present:
    (1) Sub-Contractor Competent Person
    (2) General Contractor Safety Representative
    (3) Owner's Representative [Optional]

6.22 Electrical Work

All electrical work for and throughout the course of any construction project must be provided and performed in accordance with the National Electric Code (NEC), and OSHA, 29 CFR 1926 Subpart K, 29 CFR 1926 Subpart V, NFPA 70E and NFPA 70.

a) All 120-volt single-phase 15 and 20 ampere receptacle outlets on construction sites, which are not a part of the permanent wiring of the building or structure and which are in use by employees, must have approved ground fault circuit interrupters (GFCI) for personal protection.
b) Receptacles on a two-wire single-phase portable or vehicle-mounted generator rated not more than 5 kw, when the circuit conductors are insulated from the generator frame and all other grounded surfaces, need not be protected with ground fault circuit interrupters.
c) Employees must be instructed to visually inspect each cord set, plug, and receptacle of cord sets, temporary lighting and all equipment connected by the cord and plug before each day's use for external defects and/or damage. When there is evidence of damage, the damaged item must be taken out of service, tagged until tested, and required repairs made or the item is replaced.
d) No work must not be performed on any energized electrical circuit, busbars, equipment, or panels unless an approved written work plan in accordance with NFPA 70E and submittal for review prior to performance of work. If energized work is required during commissioning, troubleshooting, and/or maintenance work must be performed under an energized electrical permit and the requirements of NFPA 70E.
e) Panel Covers must be kept in place whenever any panel is energized.
f) All Electrical Systems must be inspected and maintained on a regular basis.

6.23 Lockout/Tagout (LOTO)

A Lockout/Tagout procedure must be in place in accordance with OSHA 29 CFR 1926.417 and 1910.147 whenever performing inspections, maintenance, repairs, and modifications to equipment, machinery or electrical systems where unexpected release of energy or stored energy could create an injury. A Site LOTO log must be maintained and posted within the GC trailer and/or jobsite officing area.

Electrical box panels, even during breaks, must not be left exposed. Exposed boxes must be physically covered with the panel cover, and areas must be protected with barricades if necessary.

6.24 Electrical Power Lines

All electrical power line must be considered energized until the person owning such line or operating official of the electrical utility supplying the line assures that it is not energized, and it has been visibly grounded.

a) Operations adjacent to power lines are prohibited unless at least one of the following conditions is satisfied:
   (1) Power has been shut off and positive means taken to prevent the lines from being energized (Lock out/Tag out).
   (2) Equipment, or any part, should not have the capability of coming within the minimum clearance of energized overhead lines. As specified in OSHA Regulations, the equipment must be positioned and blocked to ensure no part, including cables, can come within the minimum clearances. A notice of the minimum required clearance must be posted at the operator's position.

6.25 Fall Prevention and Protection

General Contractors are responsible for implementing the requirements to achieve fall protection in accordance with all OSHA, Federal, State, and local regulations, this Manual, and must ensure each Subcontractor meets those requirements. A copy of this procedure must be submitted to the Owner's Representative, made part of the Contractor's Construction Project Safety Manual as, EXHIBIT J and maintained on-site.

a) All personnel regardless of craft working at a height of six (6) feet or greater above a lower level, and not protected by standard guardrails or other means must use an appropriate means of fall protection. The fall protection system selected should provide the employees the best means of protection while allowing the employees as much mobility as possible.
b) All employees working where there is a danger of falling must use approved fall protection equipment or devices. Fall protection is required.
c) The employer must prepare a written training program to ensure that each employee who might be exposed to a fall hazard is knowledgeable of the Fall Protection Program requirements. Training documentation must be retained and kept on file at the jobsite.
d) The Fall Protection Program must detail in writing when fall protection is required and exactly how this protection is to be provided. Sketches may be used to assist in the fall protection definition. This written program is required for any General Contractor or Subcontractor of any tier exposing workers to falls six (6) feet or greater above a lower level.
e) Employees must also be trained on the proper wearing, use, and limitations of personal Fall Protection and Arresting Device Systems. Training documentation must be retained and kept on file at the jobsite.
f) Fall arrest systems must be rigged such that an employee can neither free fall more than six (6) feet, nor contact any lower level.
g) Connecting two snap hooks together, as the possibility of a "roll-out" exists, must not be used to lengthen lanyards.

h) All harnesses and lanyards must be inspected frequently by the General Contractor and/or Subcontractor Competent Person. Regular inspections for wear, damage, or corrosion is a daily requirement. Damaged or defective equipment must be removed from service by the responsible Contractor or General Contractor and be destroyed to eliminate the possibility of using at a later date.

i) The employer must assure that a Competent Person, qualified in the following areas, has trained each employee as necessary:

   (1) Complete understanding of all Federal, State, and Local Fall Protection Regulations.

   (2) The nature of fall hazards in the work area.

   (3) The correct procedures for erecting, maintaining, disassembling, and inspecting fall protection systems to be used.

   (4) The use and operation of guardrail systems, personal fall arrest systems, safety net systems, warning line systems, safety monitoring systems, controlled access zones, and other protection to be used.

   (5) The role of each employee in the safety monitoring system (when this system is used).

6.26 Elevated Work Safe Plan of Action (SPA)

An Elevated Work Safe Plan of Action (SPA) is a site-specific comprehensive Fall Protection Program which outlines what methods, procedures, and equipment will be used in its program. This evaluation and program must be in writing and must be submitted to the Owner's Representative prior to any employee exposure at an elevation of six (6) feet or greater. Review and acceptance by the General Contractor Safety Manager is required prior to submission, the start of work, or employee exposure.

a) General Contractors must coordinate and conduct an on-site Elevated Work SPA pre-work meeting one week prior to any planned elevated work six (6) feet or more from a lower level. The Cover Letter (EXHIBIT J) must be submitted along with an Elevated Work SPA. The safety plan must be evaluated and approved by the General Contractor Safety Manager prior to submission.

b) The Elevated Work SPA pre-meeting agenda must include discussion about the scope and review of any existing and/or potential fall hazards as it relates to the planned elevated work.

c) To hold an Elevated Work SPA pre-work meeting, at a minimum, the following parties must be present:

   (1) Sub-Contractor Competent Person

   (2) General Contractor Safety Representative

   (3) Owner's Representative [Optional]

6.27 Roofing

No roofing work, regardless of the extent, is to be done over an occupied area. No other work will be allowed over an occupied area if it requires access to the roof. This includes, but is not limited to coring, drilling, or installation of electrical and plumbing pipe, Roof blocking, curb construction or reconstruction, flashing etc.

The intent is to restrict the activity that may cause a hazard to the occupants below. Inspections and maintenance activities are allowed as long as it does not involve significant work that might fall into the realm of the aforementioned hazard.

NOTE: An Elevated Work SPA (EXHIBIT J) may be required for roof work six (6) feet or grater in height or above a lower level.

6.28 Melting Kettles

Before firing a kettle (following the manufacturer's instructions), employees must check hoses, gauges, fuel tanks, bumpers, and other equipment for defects and make sure the lid fits tightly. Burners should not be ignited near fuel or flammable materials. All kettles must be equipped with after-burner devices.

a) Other workers who may be working on the roof should keep clear of the kettle workers and their equipment.
b) Work areas where melting kettles are in use will be barricaded off at a minimum distance of twenty-five (25) feet from other work areas.
c) No combustible materials, including insulation and bitumen, should be stored near the kettle.
d) Kettles should not be placed directly on combustible roofs. When it is necessary to place a kettle on such roofs, noncombustible surfaces must be placed under the kettle.
e) Heating devices or melting kettles should be placed on a level, firm foundation and protected against traffic, accidental tipping, or similar hazards.
f) A minimum of three (3) 20 lb. (A: B:C) dry chemical fire extinguishers must be provided for each kettle and tanker operation, each open flame torching operation, and each work crew using mechanical equipment, power tools, hot bitumen, or flammable liquids.
g) Travel distance from the kettle work area to the nearest fire extinguisher must be located within twenty-five (25) feet, on opposite sides of the kettle. These extinguishers shall be readily accessible at all times in case of an emergency.
h) Hot kettles should never be left unattended, **even during lunch periods**. The kettle covers should be readily available and fit tightly. All kettle workers should know how to put out a kettle fire.
i) Before refueling, burners and engines must be safely shut down and allowed to cool.
j) A non-combustible surface must be available on which to put a burner when removed from the kettle.
k) Enclosed areas in which hot substances are being heated or applied should be properly ventilated.

l) Hoisting equipment should be used to raise bitumen to the roof. Hot bitumen should never be carried up ladders. The hoisting equipment must be strong enough to hoist the load and be properly secured.

m) Employees must know the proper way to pick up a bucket and not jerk or kick a bucket that is stuck to a roof.

n) At the conclusion of work, roofing mops should be “fanned out” onto a noncombustible surface to minimize the chance of spontaneous ignition.

6.29 Scaffolding

The erection, alteration or moving, of any scaffolding system or work platform must be performed under the direction of a designated "Competent Person."

a) Guardrails, mid-rails, and toe-boards must be installed on all open sides of scaffolds. This guardrail system should be constructed from components furnished by the manufacturer.

b) Unauthorized personnel must not alter scaffolds or work platforms.

c) Guardrails are required for all scaffolding greater than six (6) feet in height. All employees working on scaffolds 6 ft. or higher must have adequate means of fall protection.

d) Where uplift may occur, scaffold planks must be cleated or secured and must extend over the end supports by at least 6 inches but not by more than 12 inches.

e) A competent person must visually inspect all scaffold members before each use. Damaged scaffold members must be removed from service immediately.

f) Access ladders must be provided for each scaffold in accordance with OSHA 1926.450.

g) Adequate mudsills and/or base plates or other rigid footing, capable of withstanding the maximum intended load, must be provided.

h) Scaffolds must be tied off to the building or structure at intervals in accordance with OSHA 1926.450.

i) Scaffolds must not be overloaded. Materials shall be brought up as needed. Excess materials and scrap must be removed from the scaffold when work is completed.

j) Barrels, boxes, kegs, horses, ladders, loose tile blocks, loose piles of bricks, or other unstable objects must not be used as work platforms or mounted on top of other work platforms.

k) Where persons are required to work or pass under a scaffold, a screen of 18 gauges, 1/2-inch wire mesh or equivalent protection is required between the toe boards and the guardrail.

l) Overhead protection is required if employees working on scaffolds are exposed to overhead hazards.

NOTE: An Elevated Work SPA (EXHIBIT J) may be required for scaffolding systems six (6) feet or grater in height or above a lower level.

6.30 Floor and Wall Openings

As defined by OSHA, a hole constitutes as any gap or void two (2) inches or more in its least dimension, in a floor, roof, or other walking/working surface. Hole covers must be capable of supporting without failure, at least twice the weight of employees, equipment, and materials that may be imposed on the cover at any one time.

6.30.1 General

a) All floor holes and openings into which persons can accidentally walk or fall through must be guarded by a physical barrier or cover, secured, and labeled, "HOLE COVER – DO NOT REMOVE", or protected by a standard guardrail system.

b) Wall openings, from which there is a drop of more than 6 feet, and where the bottom of the opening is less than 42 inches above the working surface, must be guarded with a top rail, mid-rail, and toe board.

c) A standard guardrail system or perimeter cable must guard every open-sided floor or platform 6 feet or more above the adjacent floor or ground level.

d) When it is necessary to work inside the barricade around a floor opening, or building edge, workers must wear and use a Personal Fall Arrest System, which must be tied off.

6.30.2 Guardrails

a) Top rails and mid-rails protecting all work areas 4 feet or more in height must be smooth surfaced throughout their length and have a vertical height of 42 inches. Midrails must be halfway between the toprails and the floor, platform, runway, or ramp. Synthetic or natural fiber ropes must not be used as top-rails or mid-rails.

b) Wire rope, when used as top-rails or mid-rails, must be free of sharp edges, burrs, or projections which may be a hazard. The maximum deflection of the top rail when a load of 200 pounds is applied in any direction at any point on the top rail must not exceed 3 inches in one direction, which includes the free hanging sag in the wire rope. Support posts must not be positioned more than eight (8) feet apart.

c) Wood top railing must be at least 2 x 4-inch stock or equivalent. Wood railing posts must be of at least 2 x 4-inch lumber spaced not to exceed 8 feet. Mid-rails must be at least 1 x 6-inch stock or equivalent. Toe boards must be 1 x 4-inch lumber or equivalent and securely fastened.

d) When materials are piled to such a height that a standard toe board does not provide protection, paneling, or screening from the floor to top-rail or mid-rails must be provided.

e) All guardrails and handrails must be inspected daily and repaired immediately, as needed.

6.31 Stairways and Ladders

6.31.1 Ladders

a) Manufactured ladders must be at minimum Type 1A rated (300lb.)
b) Portable aluminum ladders shall be prohibited.
c) All job-made wooden ladders and stairs, regardless of height, must be constructed according to OSHA and ANSI specifications.
d) Extension ladders must not exceed forty-four (44) feet in length.
e) Stepladders must not exceed twenty (20) feet in length.
f) Single cleat ladders must not exceed thirty (30) feet in length.
g) Double cleat ladder must not exceed a maximum length of twenty-four (24) feet.
h) Workers must maintain three points of contact, with the ladder, while ascending or descending and always face the ladder; Hands must be free of tools and materials.
i) Fixed Ladders: Fall protection must be provided for employees climbing or working from fixed ladders above twenty-four (24) feet. A fixed ladder is a ladder that cannot be readily moved or carried because it is an integral part of a building, structure, or scaffolding system.

6.31.2 Stairways

a) Stairs having 4 or more risers must have its sides protected by a standard handrail system.
b) All job-made wooden ladders and stairs, regardless of height, must be constructed according to OSHA and ANSI specifications.
c) On temporary stairways, for every 12 feet of vertical riser, there must be a landing platform, and:
    (1) Stairs must be at least 24 inches wide and equipped with treads and handrails.
    (2) Temporary stairs must have a 30-inch-wide landing for every 12 feet of vertical rise.
    (3) Stairs must be properly illuminated (5 footcandles).
    (4) Stairways, ramps, or ladders must be provided at all points where a break in elevation of 19 inches or more occurs in a frequently traveled passageway, entry, or exit.
d) Where permanent stairways are not installed, concurrently with the construction of each floor, a temporary stairway must be provided to the work level. Joints must be locked together by lock pins, bolts, or equivalent fastenings.
e) Handrails must be of construction similar to a standard guardrail. All handrails and railings must be provided with a clearance of approximately 3 inches between the handrail or railing and any other object.
f) Handrails must be not more than 37 inches or less than 30 inches from upper surface of handrail to surface of tread. Handrails must also be in line with the face of the riser, or to the surface of the ramp.

6.32 Crane Operations

A Crane Operations Safe Plan of Action (SPA) pre-operational meeting is required to review the appropriate lift plan prior to making any Critical lift, Major lift, or Standard lift. It should never be assumed that any member of the crew is aware of all aspects of the lift, and therefore all aspects of the lift plan should be reviewed.

a) The General Contractor must ensure that its Subcontractors meet the requirements set forth by ASME B30.5.2011 and OSHA 29 CFR Subpart CC.

b) The following documentation must be available inside of the cab, before crane is placed into service:

   (1) current monthly inspection

   (2) Manufacturer’s load chart

   (3) Manufacturer’s operating manual.

c) All cranes must receive regular, thorough, and periodic inspections, in accordance with the manufacturer's recommendations or applicable governing standards. All defects noted during any crane inspection must be corrected, prior to use.

d) All cranes must be used in accordance with manufacturer guidelines.

e) Cranes must never be operated in excess of its rated capacity.

f) Contractors must not use a crane to lift/lower and/or suspend personnel in man baskets or work platforms. Any exception to this rule must be cleared through the Contractor's project manager or superintendent.

g) All rigging equipment (i.e., slings, softeners, bridles, blocking cables, etc.) must be inspected prior to use and documented monthly.

h) The General Contractor must ensure that crane and wire rope inspections are performed and that daily, monthly, quarterly, and annual logs are maintained. Crane Inspection Record is included as EXHIBIT K (equivalent form(s) may be utilized).

i) All rigging must be kept in good condition, working load limit capacities properly identified, and properly stored when not in use.

j) All Rigging work must only be done by qualified riggers.

k) Booms and/or suspended loads must not be allowed to pass over playground or other school property when students and/or staff are present in these areas.

l) Safety hooks must be used on all operations where loads are being handled.

m) All suspended loads must be controlled by tag lines of enough length to control the load.

n) All signal persons must:

   (1) Receive proper signaling training.

   (2) Never allow a suspended load to pass over or come within ten (10) feet of power lines.

   (3) Never allow a suspended load to pass over, nor any individual to pass under, a suspended load.

   (4) Be in constant view and communication with the crane operator. Constant communications include proper hand signals and/or radio communications.

(5) Make daily general inspections of the crane prior to use and maintain a log of these inspections. The Operator, or other qualified person may also conduct the daily inspection.

o) All crane operators must:
   (1) Be thoroughly trained and must have related experience,
   (2) Be familiar with safe crane practices and procedures.
   (3) Have a complete understanding of all manuals, including maintenance and operating instructions provided for the specific crane in use.
   (4) Have no physical, visual, or mental reactions or impairments that will affect the safe operations of the assigned crane.

p) The crane operator and crew must not engage in any practice such as cell phone usage during crane operations that could divert their attention.

q) For all Dallas ISD property that lies within an Airport Control Zone (within 5 miles of any airport) the General Contractor will ensure that the crane's boom lighting, flagging, raising, and lowering comply with FFA rules.

r) To provide clearance for air traffic, all booms must be below 175 feet above ground level (AGL) during the hours of sunset to sunrise. However, if this is not possible and temporary construction cranes are left up during this time period or utilized in support of construction activities, then all cranes must have lighting in accordance with FFA Advisory Circulation 70/7460-1, "Obstruction Marking and Lighting."

6.33 Crane Operations Safe Plan of Action (SPA)

A Crane Operations Safe Plan of Action (SPA) is a site-specific comprehensive crane lift plan which outlines what methods, procedures, and equipment will be used in its plan. This evaluation and program must be in writing and must be submitted to the Owner's Representative prior to any crane activity. Review and acceptance by the General Contractor Safety Manager is required prior to submission.

a) Any changes in site conditions that could affect the safe operation of the crane must be evaluated and included within the SPA; this plan must be approved by a qualified person.

b) General Contractor must coordinate and conduct an on-site Crane Operations SPA pre-work meeting one week prior to any planned crane activity. The Cover Letter (EXHIBIT K) must be submitted along with a Crane Operations SPA. The safety plan must be evaluated and approved by the General Contractor Safety Manager prior to submission.

c) Prior to any crane activity, the General Contractor must submit, to the Bond Program Safety Director, or designee:
   (1) A copy of the crane certification and documentation of the most recent annual inspection prior to crane use.
   (2) Crane certificate of insurance
   (3) A copy of the annual crane inspection as well as current maintenance reports.
   (4) Crane Operator certification
   (5) Crane Operator medical card

(6) Crane Location plan that identifies known hazards for underground and overhead crane operations, and where the crane is approved or not approved to operate.

(7) Any changes in site conditions that could affect the safe operation of the crane; this plan must be approved by a qualified person.

(8) Rigger and/or Signal Person's training records

(9) Job Hazard Analysis

d) To hold a Crane Operations SPA pre-work meeting, at a minimum, the following parties must be present:

(1) Sub-Contractor Competent Person

(2) General Contractor Safety Representative

(3) Owner's Representative [Optional]

6.34 Steel Erection

Structural stability must be maintained at all times during the steel erection process. The General Contractor must ensure the establishment of a written Steel Erection Procedure that adheres to OSHA, Federal, State, and local regulations. A copy of this procedure must be submitted to the Owner's Representative, made part of the Contractor's Construction Project Safety Manual as EXHIBIT L, and maintained on-site.

6.34.1 Site Layout and Construction Sequence

General Contractors must provide erectors with a site layout/map which includes, but is not limited to:

(1) Pre-planned routes for hoisting loads

(2) Pre-planned routes for delivering material, equipment, etc.

(3) Material staging area(s)

(4) Known hazards that may affect underground and/or overhead operations.

6.34.2 Structural Steel Assembly

In addition to the items listed in this section, all contractors of any tier must comply with all federal, state, and local requirements, including those in other sections of this safety manual. All contactors must be required to comply with all parts of these requirements based on their scope of work.

a) Contractors of any tier must not erect steel until receiving a written certification of proper curing of the concrete in the footings, piers, walls, etc. is of sufficient strength to support the loads imposed during steel erection.

b) Prior to the erection of any column, the General Contractor must provide written notification to the steel erector if there has been any repair, replacement, or modification of the anchor rods (anchor bolts) of that column.

6.34.3 Hoisting and Rigging

Contractors of any tier must use qualified riggers during hoisting activities for assembly and disassembly work (29 CFR 1926.1404(r)(1)). Additionally, qualified riggers are required

whenever workers are within the fall zone and hooking, unhooking, or guiding a load, or doing the initial connection of a load to a component or structure (29 CFR 1926.1425(c)).

a) All Rigging and Signal person(s) must be properly trained in accordance with all Federal, State, and local regulations.
b) Free rigging is the practice of attaching ropes, chains, or slings to a telehandler/forklift tine(s) for the purpose of lifting and moving. Free rigging must not be permitted without the telehandler/forklift manufacturer's letter of approval.
c) Exposure to overhead loads must be minimized through pre-planned routes for hoisting loads and/or other contracting personnel who may be transiting the jobsite.
d) Any procedure(s) for multiple rigging lifts (Christmas-treeing) is prohibited.
e) General Contractors must pre-plan site-specific work practices regarding safely landing loads while maintaining proper protection from fall hazards.

6.34.4 Column Anchorage and Double Connections

Columns must be set on level finished floors, pre-grouted leveling plates, leveling nuts, or shim packs which are adequate to transfer the construction loads.

a) All columns must be evaluated by a competent person to determine whether guying or bracing is needed; if guying or bracing is needed, it must be installed.
b) All columns must be anchored by a minimum of 4 anchor rods (anchor bolts).
c) Anchor rods (anchor bolts) must not be repaired, replaced, or field-modified without the approval of the project structural engineer of record.
d) When two structural members on opposite sides of a column web, or a beam web over a column, are connected sharing common connection holes, at least one bolt with its wrench-tight nut must remain connected to the first member unless a shop-attached or field-attached seat or equivalent connection device is supplied with the member to secure the first member and prevent the column from being displaced (See Appendix H of 29 CFR 1926 subpart R for examples of equivalent connection devices).

6.34.5 Falling Object Protection

a) All materials, equipment, and tools, which are not in use while aloft, must be secured against accidental displacement.
b) The General Contractor must bar any construction processes below steel erection activities unless overhead protection for the employees below is provided.

6.34.6 Fall Protection

Each employee engaged in any steel erection activity who is on a walking/working surface with an unprotected side or edge more than six (6) feet above a lower level must be protected from fall hazards by guardrail systems, safety net systems, personal fall arrest systems, positioning device systems, or fall restraint systems.

a) A safety railing of 1/4-inch wire rope, or equal, must be installed approximately 42 inches high, around the periphery of a temporary planked or metal deck floor during structural steel erection. This wire rope must be flagged every six (6) feet.

b) Wire rope should be securely fastened yet allow for temporary removal in order to land materials.

6.34.7 Controlled Decking Zone (CDZ)

A controlled decking zone may be established in the area of the structure over fifteen (15) feet and up to thirty (30) feet above a lower level where metal decking is initially being installed and forms the leading edge of a work area. In each CDZ, the following must apply:

a) Each employee working at the leading edge within a CDZ must be protected from fall hazards six (6) feet or greater above a lower level.
b) Access to a CDZ must be limited to only those employees engaged in leading edge work.
c) The boundaries of a CDZ must be designated and clearly marked. The CDZ must not be more than ninety (90) feet wide and ninety (90) feet deep from any leading edge. The CDZ must be marked by the use of control lines or the equivalent. (Examples of acceptable procedures for demarcating CDZ's can be found in Appendix D of 29 CRF 1926 subpart R).
d) Each employee working in a CDZ must have completed CDZ training in accordance with 29 CFR 1926.761.
e) Unsecured decking in a CDZ must not exceed three thousand (3,000) square feet.
f) Safety deck attachments must be performed in the CDZ from the leading edge back to the control line and must have at least two attachments for each metal decking panel.
g) Final deck attachments and installation of shear connectors must not be performed in the CDZ.

6.34.8 Training

Each employee engaged in any steel erection activity who is on a walking/working surface with an unprotected side or edge more than six (6) feet above a lower level must be trained and instructed, but not limited to, the following areas:

a) Have completed connector training in accordance with 29 CFR 1926.761
b) Each employee working in a CDZ must have completed CDZ training in accordance with 29 CFR 1926.761.
c) The recognition and identification of fall hazards in the work area.
d) The use and operation of protective systems, such as guardrail systems, personal fall-arrest systems, positioning-device systems, fall- restraint systems, safety-net systems, and other protection to be used.
e) The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used.
f) Procedures for protection from falls to lower levels and into holes and openings in walking/working surfaces and walls.

6.35 Steel Erection Safe Plan of Action (SPA)

A Steel Erection Safe Plan of Action (SPA) is a comprehensive site-specific steel erection plan which outlines key erection elements such as methods, procedures, and equipment that will be utilized during all phases of the steel erection operation. This evaluation and plan must be in writing and must be submitted to the Owner's Representative prior to any steel erection activity. Review and acceptance by the General Contractor Safety Manager is required prior to submission, the start of work, or any employee engagement with this activity.

a) General Contractors must coordinate and conduct an on-site Steel Erection SPA pre-work meeting one week prior to any engagement of steel erection activities. The Cover Letter (EXHIBIT L) must be submitted along with a Steel Erection SPA. The safety plan must be evaluated and approved by the General Contractor Safety Manager prior to submission.
b) The Steel Erection SPA pre-meeting agenda must include discussion about the scope and review of any existing and/or potential hazards as it relates to the planned scope of work.
c) To hold a Steel Erection SPA pre-work meeting, at a minimum, the following parties must be present:
    (1) Sub-Contractor Competent Person
    (2) General Contractor Safety Representative
    (3) Owner's Representative [Optional]

6.36 Aerial Crane Operations

The General Contractor must ensure the establishment of a written Aerial Crane Procedure that adheres to all applicable regulations of the Federal Aviation Administration (FAA) 14 CFR – Part 77, and the Occupational Safety and Health Administration (OSHA) 29 CFR 1926.551 – Subpart N, in addition to applicable State and local regulations. A copy of this procedure must be submitted to the Owner's Representative, made part of the Contractor's Construction Project Safety Manual as EXHIBIT M, and maintained on-site.

Every precaution must be taken to provide protection against flying objects in the rotor downwash. All loose objects within one hundred (100) feet of any areas susceptible to rotor downwash must be secured or removed prior to any Aerial Crane Lift.

a) Aerial Crane Operations must not be performed during regular school hours or near occupied areas.
b) No unauthorized person(s) must be allowed to approach within fifty (50) feet of the helicopter when the rotor blades are turning.
c) Open flames, hot work, or any other spark producing activities must not be permitted in an area that could result in fires being spread by the rotor downwash.
d) Ground personnel must be properly trained when required for safe helicopter loading and unloading operations.
e) Constant reliable communication must be provided between the pilot, and a designated employee of the ground crew who acts as a signalman during the period of loading and unloading. This signalman must be distinctly recognizable from other ground personnel.

f) When visibility is reduced by dust or other conditions, ground personnel must exercise special caution to keep clear of main and stabilizing rotors. Precautions must also be taken by the General Contractor to eliminate any conditions of reduced visibility.

g) Personal protective equipment for ground persons receiving the load shall consist of complete eye protection and hard hats secured by chinstraps.

h) The helicopter operator is responsible for size, weight, and manner in which loads are connected to the helicopter. If, for any reason, the helicopter operator believes the lift cannot be made safely, the lift shall not be made. The weight of any external load must not exceed the manufacturer's rating.

i) When Contractors are required to perform work under hovering craft, a safe means of access must be provided for workers to reach the hoist line hook and engage or disengage cargo slings. Employees must not perform work under hovering craft except when necessary to hook or unhook loads.

j) Static charge on the suspended load shall be dissipated with a grounding device before ground personnel touch the suspended load, or protective rubber gloves must be worn by all ground personnel touching the suspended load.

k) Loads shall be properly slung, and tag lines shall be of a length that will not cause them to be drawn up into rotors.

l) Electrically operated cargo hooks must have the electrical activating device designed and installed to prevent inadvertent operation. In addition, these cargo hooks must be equipped with an emergency mechanical control for releasing the load. The hooks must be tested prior to each day's operation to determine that the release functions properly, both electrically and mechanically.

6.37 Aerial Crane Operations Safe Plan of Action (SPA)

An Aerial Crane Operations Safe Plan of Action (SPA) is a site-specific comprehensive aerial lift plan which outlines what methods, procedures, and equipment will be used in its plan. This evaluation and program must be in writing and must be submitted to the Owner's Representative prior to any aerial crane activity. Review and acceptance by the General Contractor Safety Manager is required prior to submission.

a) Any changes in site conditions that could affect the safe operation of the aerial lift must be evaluated and included within the SPA. This plan must be approved by a qualified person.

b) General Contractor must coordinate and conduct an on-site Aerial Crane Operations SPA pre-work meeting one week prior to any planned crane activity. The Cover Letter (EXHIBIT M) must be submitted along with a Crane Operations SPA. The safety plan must be evaluated and approved by the General Contractor Safety Manager prior to submission.

c) This briefing shall set forth the plan of operation for the pilot and ground personnel. A copy of this procedure must be made part of the Contractor's Construction Project Safety Manual as EXHIBIT M and maintained on-site.

d) Prior to any aerial crane activity, the General Contractor must submit, to the Dallas ISD PM and Bond Program Safety Manager the following minimum elements of an Aerial Crane Operations SPA:
    (1) Lift Plan (scope of work, travel path, ground level and ariel hazards or obstructions)
    (2) Site Set-Up (map of staging areas, sequence of operation, primary and alternate emergency area locations, and potential drop zones in relation to occupied areas)
    (3) Material to be lifted (method of attachment, rigging to be used, configuration, and load capacities)
    (4) Roles and responsibilities (communication methods for ground crew, roof crew, and operator)
    (5) Competent Person Designation form (must identify areas of competency along with proof of training)
    (6) Rigger and signal person training records
    (7) JHA (include hazard assessment, equipment, and PPE needed to safely perform this task)
    (8) Emergency Action Plan (including emergency contact information and medical facility)
    (9) Standard Airworthiness Certificate
    (10) Congested Area Plan Request to FAA
    (11) FAA Registry of Aircraft
    (12) FAA Airman Detail Report
    (13) Notification of Dallas City Officials
    (14) Certificate of Aircraft liability insurance (insurance limit must be $10 million, per contract amount)
    (15) Evidence of additional insured and waiver of subrogation endorsement

e) To hold an Aerial Crane Operations SPA pre-work meeting, at a minimum, the following parties must be present:
    (1) Sub-Contractor Competent Person
    (2) General Contractor Safety Representative
    (3) Owner's Representative [Optional]

NOTE: The District's Safety Department must receive acceptance of Certificate of Insurance (COI) from the District's insurer prior to any Aerial Crane Activity.

6.38 Hot Work

All work that includes an open flame, burning, welding, or spark producing of any type must be defined as “hot work” and must require the presence of a fire extinguisher, at least one fire watch, and a Hot Work Permit.

6.38.1 General

In addition to strictly following the provisions of OSHA and NFPA, each Contractor must also comply with the following:

a) No hot work must be conducted during occupied hours
b) A Hot Work Permit issued by the Fire Marshal must be Posted within the General Contractor’s trailer or on-site officing area.
c) A Hot Work Permit must be completed for each task using EXHIBIT N or equivalent.
d) Fire extinguisher(s) used for “Hot Work” must be placed within this immediate vicinity of each task operation and must be of proper size and type for the activity, fully charged, and inspected prior to use. Extinguisher location must be kept clear and accessible at all times.
e) A fire watch must be present during all hot work operations and remain at the work area 30 minutes after work is completed. All fire watch personnel must be trained in fire extinguisher safety.

6.39 Welding and Cutting

a) All welding operations must provide appropriate screening measures, erected in advance, to contain the high energy light. Welding operations must not be allowed to present an opportunity for flash burn exposures to the eyes of any workers in the vicinity.
b) Shielding, or welding curtains must be placed around established work areas to protect other workers from flash and sparks.
c) Ventilation must be provided to adequately remove harmful fumes and gasses.
d) The unused stubs of welding electrodes “rod butts” must be collected and placed in proper disposal containers as soon as each one is expended. Whenever an operation is idle, the welding electrode must be removed from stinger/electrode holder.
e) Workers must receive training on the proper use, inspection, and limitations of all welding and cutting equipment and Personal Protective Equipment, as it pertains to the operation.
f) Regulators for fuel gas and oxygen cylinders must be inspected before each use and be maintained in good working order.
g) Anti-flashback arrestors must be properly installed on all cutting torches so that they prevent ignition of any gas sources upstream from the torch.
h) Acetylene cylinder valve key must be kept with the cylinder at all times. Valve keys must be kept in position while in use.

6.40 Compressed Gas Cylinders

Contractor must store oxygen cylinders separate from fuel gas cylinders. This separation must be either a minimum distance of 20 feet or by a fire resistive wall/partition with a one-half hour fire rating and a minimum of five (5) feet in height. All compressed gas cylinders must be properly secured from movement – in an upright (vertical) position.

a) All cylinders must be stored in the upright position, especially acetylene. When an acetylene cylinder is stored on its side, the acetylene may separate from the acetone, becoming unstable, and cause an internal explosion.
b) Valves of the empty cylinders must be in the closed position.
c) Cylinders must not be moved by tilting and rolling them on their bottom edges.
d) When not in use, cylinders must have their protective caps in place and be hand tightened.
e) Workers must be trained in the safe handling, storage and use of compressed gas cylinders.
f) Workers must be trained in the proper use and handling of fuel gas and O2 cylinders

6.41 Earth Moving Equipment and Powered Industrial Trucks

A Powered Industrial Truck (PIT) is defined by any mobile, power-pulled truck used to carry, push, pull, lift, stack, or tier materials, whether ridden by the operator or controlled by a walking operator.

a) All earth moving equipment and PIT must be maintained in a safe working condition and must be appropriate and adequate for the intended use. Excavation activities must not be conducted during occupied hours.
b) Only authorized personnel must operate equipment. Operators of equipment, machinery, vehicles, or PIT must be qualified and properly authorized for the operation involved.
c) Equipment and PIT operators must perform a pre-shift walk around safety inspection of their equipment, and any conditions that may affect safe operation will be corrected before use.
d) Equipment must not be operated unless all required safety devices are in place and functioning properly.
e) Careless, reckless, or otherwise unsafe operation or use of equipment must result in discipline and may constitute grounds for dismissal.
f) Equipment maintenance is to be performed only by qualified mechanics.
g) When equipment is serviced or repaired the operator must dismount until the service or repair is completed. Prior to remounting, operators must perform a complete walk-around safety inspection of the equipment.
h) Before performing any service or repair work, all equipment must:
    (1) Be stopped and positively secured against movement or operation.
    (2) locked and tagged out of service, unless it is designed to be serviced while running, following the manufacturer's instructions.

i) All bi-directional earth moving equipment, PIT, and motor vehicles with an obstructed view to the rear must be equipped with a warning horn and an automatic back-up (reverse) alarm that can be heard above and distinguished from the surrounding noise level.

j) All off-highway earth moving equipment and trucks such as loaders, dozers, scrapers, motor graders, rock trucks, tractors, rollers, and compactors will be equipped with roll-overprotective structures (ROPS) and seat belts, per OSHA standards.

k) Seat safety belts, when required by the manufacturer, must be used by all operators of equipment.

l) Mobile equipment must not be left unattended unless parked securely to prevent movement, with all ground engaging tools lowered to the ground, brakes set, and the engine off.

m) Equipment parked at night will be illuminated, barricaded, or otherwise clearly marked where exposed to potential traffic.

n) Personnel must not be transported or ride on any equipment or vehicles that are not equipped with seats for passengers.

o) When fueling equipment or vehicles with gasoline or liquefied petroleum gas (LPG) the engine must be shut off.

p) All equipment and vehicles must be equipped with appropriate fire extinguishers or fire suppression system.

q) Equipment, tools, and materials hauled on pickups and flatbed trucks must be secured to prevent them from falling onto the road.

6.42 Haul Routes

Haul roads must be designed, constructed, and maintained for safe operation consistent with the type of haulage equipment in use. Standard traffic control signs must be used where necessary.

a) Elevated roadways must have axle high beams or guards maintained on their outer banks.

b) Equipment, pickups, and passenger vehicles must be parked well away from the work area to reduce congestion and avoid collision.

c) Vehicle and equipment speed limit while traversing school property must be a maximum of five (5) miles per hour during school hours and/or when children are present.

6.43 Traffic Control

a) All General Contractors, Subcontractors, and employees must comply with local city ordinances when work interfaces with traffic of the general public.

b) Vehicle and equipment speed limit while traversing school property must be a maximum of five (5) miles per hour during school hours and/or when children are present.

c) All materials and equipment deliveries should be coordinated with General Contractors as to prevent traffic congestion around peak school hours for children being dropped off or picked up from school.

6.44 Environmental and Hygiene

General Contractors and Subcontractors of any tier must comply with all applicable federal, state, and local statutes, laws, rules, regulations, ordinances, codes, and any amendments relating to the environment, hazardous substances or exposure to hazardous substances, including without limitation the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), the Superfund Amendments and Reauthorization Act of 1986 (SARA), the Hazardous Material Transportation Act (HMT A), Resource Conservation and Recovery Act (RCRA), the Toxic Substances Control Act (TSCA), the Clean Water Act (CWA), the Clean Air Act (CAA), the Oil Pollution Act (OPA) and the Safe Drinking Water Act (SDW A).

The General Contractor is responsible for the implementation and management of its Storm Water Pollution Prevention Plan (SWPPP) and SWPPP Oversight as Attachment VI of this manual.

Where necessary, The General Contractor must provide, and the General Contractor's Safety Representatives must be trained and capable of, properly operating industrial hygiene equipment as required by any Federal, State, and local regulations. Tests must be performed as often as necessary to afford protection to employees and the general public.

6.45 Spill Prevention and Response

When utilizing hazardous and non-hazardous substances that could cause a negative impact when released on land, water, and\or the atmosphere, the General Contractor must exercise extreme caution by developing and implementing a site-specific spill prevention and spill response procedure in accordance with OSHA, Federal, State, and local regulations.

No Contractor must omit or discharge any substance into the environment in violation of the Environmental Protection Agency (EPA), OSHA or other regulatory agencies. Where necessary, the General Contractor's Safety Representative must be responsible for all environmental monitoring and testing.

6.46 Portable Relocation

Prior to commencement of work, the Controlling Contractor is responsible for obtaining the Disconnection Form provided by the Moving Contractor for each portable to be relocated. The Controlling Contractor must provide a completed copy of the Disconnection Form along with applicable safety submittal documentation to the Owner’s Representative prior any relocation, demolition, or disconnection of portables.

a) The relocation of portables must be coordinated around peak hours of school traffic, i.e., morning drop off of children and afternoon pick-ups.
b) All relocation activities (including haul routes) must remain properly separated from occupied areas. Barriers for outdoor areas affected by construction must consist of six (6) foot chain link fencing.
c) Haul routes must be designed, constructed, and maintained for safe operation consistent with the type of haulage equipment in use. Standard traffic control signs must be used where necessary.

d) Equipment, pickups, and passenger vehicles must be parked well away from the work area to reduce congestion and avoid collision.
e) Vehicle and equipment speed limit while traversing school property must be a maximum of five (5) miles per hour during school hours and/or when children are present.
f) The Moving Contractor and/or General Contractor must field verify the safe relocation of portables from site "A" to site "B" and inspect the safe passage of established haul routes.
g) portable classrooms and ADA approved ramps, decks, steps, etc. must meet the specifications contained in the RFP, Contract Award Doc, and applicable Federal, State, and local requirements.

NOTE: Contractors are responsible for submitting moving permit applications to the City and are responsible for communication with the city of Dallas to resolve all action items related to the moving permit.

7. INCIDENT NOTIFICATION GUIDELINES

The District's objective is an injury and incident-free project, with a focus on project safety that must not be compromised to achieve any other business objective. The General Contractor must structure an effective and systematic safety management approach that emphasizes **continuous safety process improvement.**

The District recognizes that the General Contractor and Subcontractors may have existing safety management programs with established safety policies, processes, procedures, and work practices. The District will support these where they prove to be as effective and meet the intent and purpose of this Section.

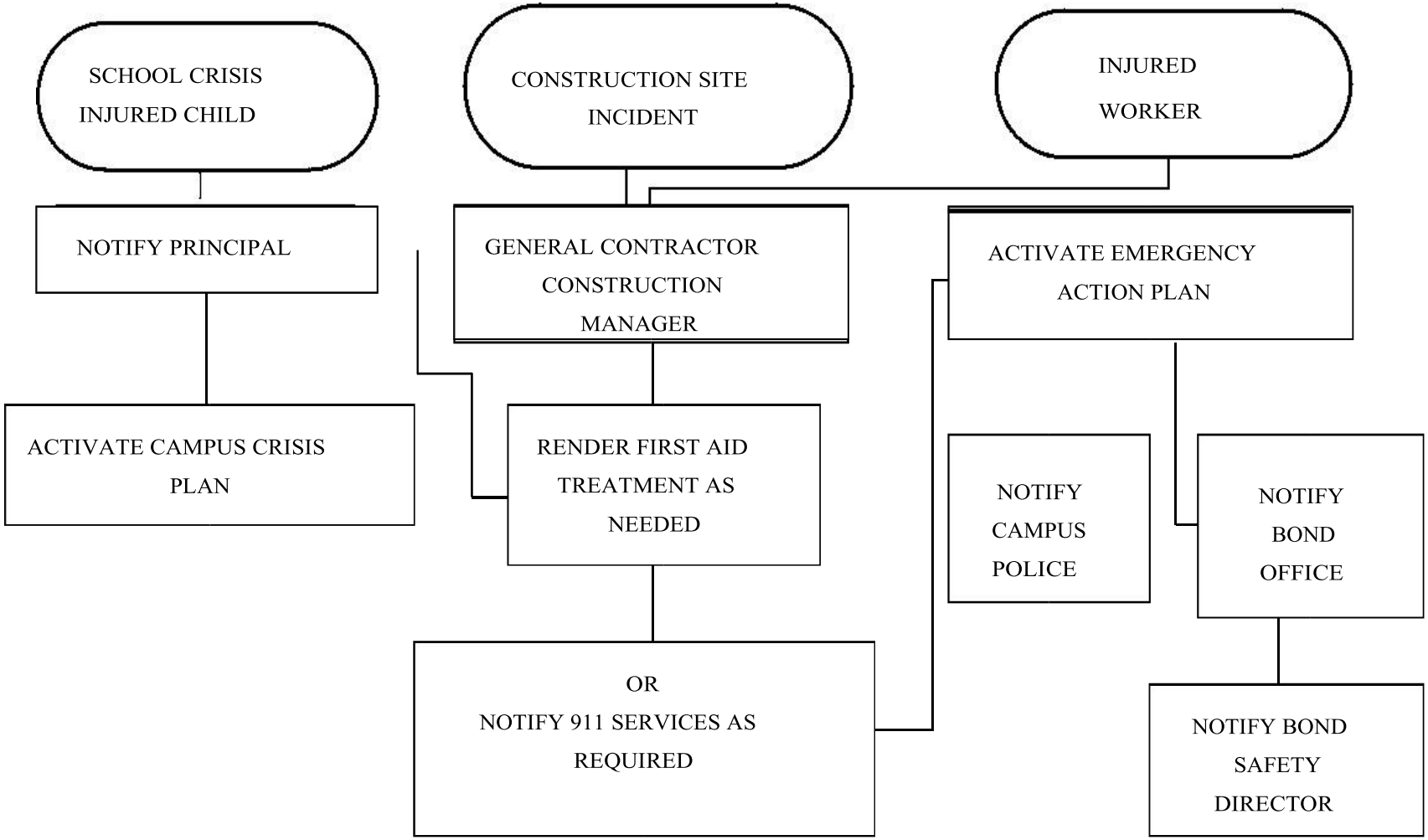
a) General Contractors and Subcontractors of any tier must instruct all workers to immediately report every incident to their supervisor, even if there is no obvious injury or property damage. Supervisors must immediately notify the General Contractor, who must immediately notify the Owner's Representative of any incident.
b) The Bond Program Safety Manager and others as directed must be included in the incident notification process. Depending on potential severity of the incident, notifications may be in written and/or verbal form as directed.
c) Upon request of the Owner's Representative, the General Contractor and/or Subcontractors of any tier must promptly produce and provide copies of any required documents related to project safety or property damage.
d) Where opportunities for improvement are identified, the General Contractor and Subcontractors of any tier must work collaboratively with the Owner's Representative in making appropriate revisions to progress toward an injury and incident-free workplace.
e) The General Contractor's Safety Representative must generate a formal incident report using EXHIBIT O, or equivalent company accident report forms, in the manner and time as directed by the Owner's Representative.
f) The General Contractor's Safety Representative, accompanied by the Owner's Representative, must perform a site inspection immediately following any near miss,

property damage, fire, hazardous chemical spill, or accident involving construction equipment that results in injury to a worker, student, school employee, or visitor to the site.

g) Contractors must review the filed copy of the pre-construction Site-specific Safety Plan and/or Safe Plan of Action (SPA) that was performed prior to commencement of any construction activity.

[Notification Flow Chart is located on the next page]

7.1 DISD Incident/Crisis Notification Flowchart



7.2 Incident Investigations

When an accident or near miss with major potential for a loss occurs, the supervisor of the crew(s) involved must perform an accident investigation. The General Contractor and involved Subcontractors must tailor the magnitude and depth of the investigation effort to correspond to the potential, rather than the actual outcome of the incident.

a) Investigation team members must include safety personnel, project management, line management, affected workers, and consultants as the circumstances dictate. The Owner's Representatives reserves the right to participate in any incident investigation.
b) Upon request of the Owner's Representative, the General Contractor and/or Subcontractors of any tier must provide a Root Cause Analysis as outlined in Section 7.4 of this manual or its equivalent.
c) Once a root cause has been identified and recommendations for corrective action have been determined, a procedure may be implemented to prevent a similar incident from occurring again.

7.3 Incident Follow-up Guidelines

All near miss incidents, first Aid injuries, high risk safety inspection observations, and other such incidents must be investigated. The General Contractor's Safety Manager must lead the efforts and follow a structured incident investigation program that emphasizes **continuous safety process improvement.**

The General Contractor and involved Subcontractors must tailor the magnitude and depth of the investigation effort to correspond to the potential, rather than the actual outcome of the incident. The Bond Program Safety Manager and/or designee reserves the right to participate in any incident investigation.

a) Investigation team members must include, at minimum:
    (1) General Contractor and Subcontractor Safety Representatives
    (2) General Contractor and Subcontractor Project Management
    (3) Designated Competent Person (Front Line Management)
    (4) Affected workers, and consultants as the circumstances dictate.
b) The General Contractor must develop a Root Cause Analysis report that summarizes the incident, identifies the underlying contributing factor(s), determines which process element(s) failed to control the incident, determines which process element(s) will be implemented or improved, and the time needed to take sustainable corrective action(s).
c) The General Contractor must conduct and submit an incident investigation report that supports the Root Cause Analysis in the manner and time as directed by the Owner's Representative. The Bond Program Safety Manager and/or designee reserves the right to determine the acceptability of the findings.
d) The General Contractor must prepare and submit reports that will allow the Bond Program Safety Director, designee, and Subcontractors to understand findings and any planned changes to the operating procedure(s) based on those findings.

7.4 Contributing Factors to Consider

The Root Cause Analysis investigation should thoroughly address the following:

(1) Was the incident controlled and limited so that all workers and the project were made safe post-incident? If so, what was done?

(2) Explain what happened (facts and circumstances) that resulted in the incident.

(3) Are there other work areas or tasks where this type of incident could occur again?

(4) What processes were in place to prevent the incident? (Identify processes that failed)

(5) What processes could've been implemented or improved that might have prevented this incident?

(6) What processes will be improved or implemented to reduce risk of recurrence?

8. CONSTRUCTION SAFETY FOR STUDENTS

8.1 Introduction

The aim of Program Managers, General Contractors, and Subcontractors of any tier is to carry out their work activities in a safe and efficient manner to complete each project in a timely manner.

The safety of the children is of the utmost importance, and every effort must be made to see to it that in those projects that are concurrent with school activities, each job done be evaluated for child safety.

Our children are totally dependent on us to create a safe place for them to learn, study and play. Any work related or work generated condition deemed to be unsafe must be corrected immediately, because children do not see the world as we do. Children are often attracted by what is new and alien to them and will try to gain access to what may seem to be great places to play and have fun.

Therefore, it is the responsibility of everyone to control the potentially dangerous areas that exist on any construction project. All, regardless of the trades involved, must make this effort. In other words, the responsibilities of each person working in occupied areas become that much larger or expanded due to child safety conditions. Remember, it is for the children that construction is underway.

8.2 Separation of Construction Activities

Should any part of an occupied and operational school facility be shut down for construction work, then the General Contractor must erect appropriate construction barricades to completely eliminate access for non-construction personnel to the work area.

General Contractors must ensure safety inspections are conducted in all work areas regularly and periodically throughout the work shift to ensure proper elimination, mitigation, and/or safeguarding of hazards which may result as contributing factors that may lead to any exposure, injury, or property damage. **All unsafe conditions must be corrected immediately.**

a) Construction work areas must be kept segregated from school operations, staff, and students at all times. Separation may include, but is not limited to fencing, privacy fencing, bulkheads, and coordination of planned construction activities.
b) Barriers for indoor construction must be made of 3/4" plywood, and must extend from floor to ceiling, wall to wall. The temporary barrier must have a door that can be locked. This barrier will remain until work in the specified area is completely finished. Proper signage should be displayed near the temporary barrier, according to safety regulations.
c) Barriers for outdoor areas affected by construction must consist of six (6) foot chain link fencing.
d) Doors and/or gates must remain secured/closed when they open directly into occupied areas. A security service may be utilized if necessary.
e) The requirements of NFPA 101, Life Safety Code for Occupied Schools must be maintained during construction. **Separate atmospheres must be maintained between the school areas in full occupancy and the areas under construction**. Construction activities must not interfere or interrupt the normal teaching schedules.
f) Means of egress for the school occupancy must be maintained free of obstructions, clean and properly lighted. While this may be a function of the school custodian, no construction related operations must be allowed to cause an impairment of the normal means of egress.
g) All components and/or combinations of existing life safety systems (smoke detection, fire alarms, fire suppression, communication, alarm systems, intrusion control, etc.) must be maintained during construction.
h) School entrances and exits must not be blocked until school officials have been notified and re-routing has been established.
i) Appropriate warning and directional signage must be maintained at all times.
j) Dust and noise must be properly controlled to ensure the school maintains its teaching schedules without interruptions. General Contractors must respond to complaints and immediately establish control measures.
k) All deliveries (heavy equipment, tools, materials, etc.) must be coordinated around peak hours of school traffic, i.e., morning drop off of children and afternoon pick-ups.
l) Electrical box panels, even during breaks, must not be left exposed. Exposed boxes must be physically covered with the panel cover, and areas must be protected with barricades if necessary.
m) Construction debris and/or material must not be left in areas occupied by students and staff.
n) All construction debris must be removed before the end of each work shift and must not be left overnight.
o) Nails and screws must not be left protruding from lumber or other materials. All nails and screws must be removed or bent over.
p) Compressed gas cylinders must never be left unattended or overnight in occupied areas. Cylinders must remain secured in upright position; caps on and regulators disconnected when not in use.
q) Tools and equipment must not be left unattended.

9. CRISIS COMMUNICATION

A crisis is an emergency event that usually requires police, fire, or EMS response and could attract media or public attention. A crisis on a construction site might involve a fire, hazardous chemical spill, or accident involving construction equipment that results in injury to a worker, student, school employee, or visitor to the site.

a) The General Contractor must instruct all construction employees not to discuss the incident with reporters. All media inquiries must be referred to an official Dallas ISD spokesperson.

b) The Dallas ISD spokesperson must be the only person authorized to release live or pre-recorded video or written statements to the media. All Contractors of any tier must cooperate with the Dallas ISD spokesperson for all media arrangements as directed.

c) Should a crisis, serious emergency, or incident occur (requiring the presence of an ambulance, Fire Department or Police) the Contractor must immediately implement the Crisis Communication Guidelines and contact by phone the Bond Program Safety Director, **including nights, weekends, and holidays.**

9.1 Suggested Steps for Crisis Situations

(1) Evaluate the situation and extent of damage or injuries.

(2) If students are present, immediately contact the principal or school office.

(3) Call **9-1-1** if necessary. Be prepared to give the dispatcher details of the accident and injuries, the exact address and where emergency crews should enter the site.

(4) Assign someone to meet emergency crews at the gate.

(5) Call Dallas ISD Communications at **(972) 925-3917**. Be prepared to provide as much information as possible.

(6) Call Dallas ISD Police at **(214) 932-5627**.

(7) Call Construction Services at **(972) 925-7200**.

(8) Call the Safety Manager at **(214) 435-2204**.

(9) Do not speak to reporters or photographers. Refer them to Dallas ISD Communications.

9.2 EMERGENCY TELEPHONE NUMBERS

Dallas ISD Police	DISD Police	(214) 932-5627
District Spokesperson	Robyn Harris	(972) 925-3917
DISD Bond Safety Manager	Alvaro Meza	(214) 435-2204

9.3 Emergency Planning

On a regular basis, the General Contractor must review and update, when necessary, its Emergency Procedures for maximum effectiveness.

The updated procedures must be submitted to the Owner's Representative for review in accordance with the safety guidelines outlined in this manual and all applicable OSHA, Federal, State, and local regulations and maintained on-site.

The following provisions must be included in the emergency procedure:

a) The highest-ranking supervisor automatically becomes responsible for handling any emergency that occurs during working hours and may call upon the assistance of any available employee.
b) Following an emergency, ranking personnel must:
    (1) Secure the area as expediently as possible.
    (2) Provide access and an account of the emergency to authorized representatives of the District and specific government agencies. Questions from the media must be referred to the Dallas ISD spokesperson.
c) To ensure prompt emergency services, the General Contractor must:
    (1) Determine who is responsible for making emergency calls (preferably the highest-ranking supervisor present).
    (2) Conspicuously post a list of emergency phone numbers, along with information to be transmitted.

10. CONTRACTOR SAFETY AUDITS

10.1 Purpose

The effectiveness of this program depends upon the active participation and cooperation of all Engineers, Project Managers, Inspectors, Supervisors and General Contractors, their employees, and Subcontractors. The primary goals of this program are to increase safety awareness, raise safety standards in the work environment, provide incentives to make the workplace safer, and increase management involvement in the safety process.

General Contractors must ensure safety inspections are conducted in all work areas regularly and periodically throughout the work shift to ensure proper elimination, mitigation, and/or safeguarding of hazards which may result as contributing factors that may lead to any exposure, injury, or property damage. **All unsafe conditions must be corrected immediately.**

10.2 Jobsite Safety Inspections

a) The General Contractor must ensure that its Safety Representative conducts inspections of the project as needed (including storage areas, office areas, barriers, separation of activities, work areas, etc.) to ensure compliance with the District and OSHA requirements.
b) Contractors may utilize the Construction Safety Inspection Checklist EXHIBIT P, or its equivalent. Safety deficiencies that are noted during the inspection must be recorded on

the form and those deficient items must be communicated to his/her project manager/superintendent in a timely manner.

c) The project manager and/or superintendent must be responsible for implementing corrective action.

d) The General Contractor's Safety Representative will follow up and note the status of each safety deficiency until the deficiency has been abated, but until abatement takes place, each previously noted deficiency should be recorded during each subsequent site inspection.

e) In addition to performing jobsite safety inspections, the General Contractor's Safety Representative must cooperate with designated District Representatives who conduct jobsite inspections (i.e., Insurance Carrier Loss Control personnel).

10.3 Inspections by Regulatory Agencies

The General Contractor must immediately notify the Owner's Representative of the arrival of any representative of a Regulatory Agency (OSHA Compliance Officer, TCEQ Representative, Law Enforcement Officer, etc.), and provide the Owner's Representative with a copy of any published findings or citations issued to any employer and must ensure that statutory posting requirements are met. The General Contractor must provide the Owner's Representative with a copy of any employer's response to the same findings or citations. No Contractor of any tier must prohibit the entry of an OSHA Compliance Officer onto Dallas ISD property.

11. GREENFIELD PROJECTS

Greenfield Project must refer to as any DISD property that does not have students and/or Staff present during the duration of the Project. If, during the project, staff or students are present or any District/school operation is active, it is not considered a Greenfield job site.

Property must refer to all land owned by the District, to all property thereon; buildings, structures, facilities, platforms, fixtures, tunnels, installations, and to all project vehicles, stationary or mobile equipment, whether owned or leased. This definition may also include other work locations while in the scope and course of employment on the District's Construction Projects.

Worker must refer to any employee or agent included as example, but not by way of limitation, persons providing services on the project including all persons or entities performing all or part of the services the General Contractor has undertaken to perform on the project regardless of whether that person has employees. This includes, without limitation, independent contractors, Subcontractors, owner-operators, employees of any such entity, or employees of any entity that furnishes persons to provide services on the project.

11.1 Greenfield Shutdown Guidelines

Prior to conducting any type of permanent or temporary shutdown, the General Contractor is responsible for completing the Greenfield Utility Authorization Request Guidelines as outlined in Attachment VII, along with the applicable safety submittal requirements outlined in section 6.15 of this manual.

11.1.1 Permanent Utility Shutdown Guidelines

(1) **10-Day Notice of Shutdown** – The General Contractor must provide Dallas ISD with notification of power or other utility shutdown no less than ten (10) calendar days in advance of shutdown.

(2) The General Contractor must select "**Permanent**" on the top right portion of the Shutdown Authorization Form (EXHIBIT I) prior to submitting for approval (See Attachment VII for reference).

(3) The General Contractor is responsible for providing power for the duration of the project.

(4) Once the project reaches substantial completion, the General Contractor and PMF representative must provide the Dallas ISD Sustainability Department with a copy of the General Contractor's utility bills for transfer of the utility service to Dallas ISD. Should Contractors have questions regarding this process, please reach out to the Dallas ISD Sustainability Department via email at: sg9453@dallasisd.org

NOTE: Before demolishing a portable and/or building, all meter numbers must be provided to the DISD sustainability department to close the account and have meters removed through the Owner provider. It is important ALL Utility Accounts are closed through sustainability to prevent the General Contractor from reimbursing the District. DISD is not responsible for providing General Contractors with utilities at Greenfield Project locations.

11.2 Greenfield Badging

Personnel who are issued a Greenfield Job Site Identification Badge are authorized to work on Greenfield Project **Sites until seven (7) days prior to substantial completion of the project or project site commencing operations** (no longer a Greenfield Project Site), whichever comes first. All other requirements for Non-Greenfield Project Sites (sites where district operations are on-going, or students/staff present) remain in effect.

a) General Contractors must issue/provide all workers with a Greenfield Identification Badge, along with a site-specific safety orientation prior to conducting any construction activity.

b) General Contractors must issue identification badges, at their own expense, for all workers on DISD Greenfield Project Sites.

c) Workers must wear the General Contractor issued identification badge at all times while on DISD Greenfield Project Sites.

d) Greenfield Project Site Identification Badge Requirements: Greenfield Identification Badges issued by the General Contractor must be issued by Dallas ISD's approved third-party badging vendor. Badges must contain the following information:

(1) The issuing/authorizing General Contractor's company logo in lieu of the DISD logo

(2) The issuing/authorizing General Contractor's company name

(3) The authorized Subcontractor or Vendor's company name
(4) The name of the specific project site authorized to work at
(5) A photograph and name of the authorized employee receiving the badge
(6) Badges must be labeled "Greenfield"

12. UNMANNED AIRCRAFT SYSTEM (DRONE) POLICY

The purpose of this Unmanned Aircraft System (UAS) Policy is to establish minimum standards for the safe use and operation of UAS and Small Unmanned Aircraft Systems (SUAS) on any Dallas ISD Bond Projects.

This policy requires that all UAS operations are performed in a manner that mitigates risks to safety, security, and privacy, and ensures compliance with the Federal Aviation Administration (FAA), 14 CFR Part 107 (for commercial purposes) and all applicable laws.

Contractors of any tier that will operate a UAS at a Dallas ISD Project must receive approval in advance in accordance with this Policy.

12.1 Operating Requirements

This Policy sets the minimum requirements for operating UAS. The requirements below must be implemented by the General Contractor, through their respective designated Project Manager. Minimum Requirements for UAS Operations and Operator:

a) Operations of UAS must not be conducted during occupied hours or extracurricular activities.
b) Operators of any UAS must hold a current Remote Pilot Certification.
c) Unmanned Aircraft must be FAA registered.
d) Certificate of Authorization must be in place and all requirements followed. The General Contractor must provide UAS / Drone liability coverage either through endorsement to its General Liability policy or a separate Aircraft Liability policy. The policy must name Dallas ISD as an Additional Insured and provide a waiver of subrogation in favor of Dallas ISD.

12.2 Pre-Operation Procedure

(1) General Contractor must submit a request to the Project Manager and DISD Safety Department **48 hours** prior to fly-through.
(2) Project Manager and DISD Safety Department may accept or reject this request.
(3) The Project Manager must verify with school admin that no activities will be taking place during fly-through.
(4) The Project Manager must notify Dallas ISD Police dispatch and school principal of UAS fly-through.

EXHIBITS

POLICY STATEMENT

It is the Dallas ISD's policy that, prior to work, Contractors are required to submit for review, an acceptable Site-Specific Safety Plan that includes safe and health work practices. The Owner's Representative will evaluate the plan to see that it meets the safety requirements for the Project's scope of work.

It is critical that contractors understand the importance of developing an effectively functioning Site-Specific Safety Plan that is pro-active and addresses the exposures to their employees for the particular work to be done. This should be addressed extensively in the Site-Specific Safety Plan.

The Site-Specific Safety Plan must provide guidelines to implement an accident prevention program on Dallas ISD projects, and fully describes the Contractor's commitments for meeting its obligations to provide safe and healthful working conditions for its employees.

This Document is intended to provide a working, uniform minimal level of program guidelines to assist or provide direction to the Contractors. This Document is not intended to replace the need for each Contractor of any tier to establish and maintain a proper Illness and Injury Prevention Program as required by the Department of Labor, Occupational Safety and Health Act (29 CFR 1926 and 29 CFR 1910) and the State of Texas.

EXHIBITS:

- EXHIBIT A – Campus Readiness Form
- EXHIBIT B – Job Hazard Analysis (JHA)
- EXHIBIT C – Demolition SPA Cover Letter
- EXHIBIT D – Confined Space SPA Cover Letter
- EXHIBIT E – Trenching and Excavation SPA Cover Letter
- EXHIBIT F – Pier Drilling SPA Cover Letter
- EXHIBIT G – Utility Shutdown SPA Cover Letter
- EXHIBIT H – Electrical Shutdown SPA Cover Letter
- EXHIBIT I – Shutdown Authorization Form
- EXHIBIT J – Elevated Work SPA Cover Letter
- EXHIBIT K – Crane Operation SPA Cover Letter
- EXHIBIT L – Steel Erection SPA Cover Letter
- EXHIBIT M – Aerial Crane Operation SPA Cover Letter
- EXHIBIT N – Hot Work Permit
- EXHIBIT O – Incident Investigation Report
- EXHIBIT P – Safety Inspection Checklist
- EXHIBIT Q – Contractor Acknowledgement Statement

EXHIBIT A – Campus Readiness Form

A completed copy of this form, along with **photographs of each area** must be provided to the Owner's Representative one (1) working day prior to the return of staff and students to ensure sustainability of proper separation of all work areas and conditions affected by all construction activities.

General Contractor: _____ Project & ORG Number:_____

Person in Charge:_____ Date and Time of Completion: _____

Column: **A** = Adequate	Column: **B** = Inadequate	Column: **C** = Not Applicable

Focused Areas	A	B	C
Appropriate Barricades to prevent non-construction personnel from entering work areas.			
Proper signage displayed near the temporary barricades.			
Access to school facility clean, orderly, and safe, e.g., sidewalks, building entrances, lobbies, corridors, aisles, stairways, etc.			
Critical systems functional, e.g., life safety systems, air conditioning systems, water systems, electrical systems, etc.			
Laydown and Staging areas neat and orderly.			
Campus EAP not impacted by construction activities, e.g., travel ways, access, emergency exits, and egress points, maintained clear of obstructions.			
Proper Traffic Control with work that interfaces with traffic or public			
Trash Dumpsters maintained			
Excavations, Trenches properly barricaded			
All floor holes and openings into which persons can accidentally walk or fall through are guarded by a physical barrier or cover, secured, and labeled.			
Heavy Equipment inside a fenced area and properly secured to prevent unauthorized access.			
Hydraulic Booms and/or Cranes not suspended over playgrounds or occupied areas.			
Construction work areas are kept segregated from school operations, staff, and students			
Nails, screws, and rebar not protruding from lumber or other materials in occupied areas.			
Means of egress for the school occupancy is maintained, free of obstructions, clean, and properly illuminated.			
Remarks:			

EXHIBIT B – Job Hazard Analysis (JHA)

Project Name:	**Contractor Name:**
Date:	**Competent Person Name:**
Scope of work to be Performed:	

EMERGENCY CONTACT LIST ASSOCIATED WITH THIS ACTIVITY		
Name	**Title**	**Phone Number**
1.	1.	1.
2.	2.	2.
3.	3.	3.

STEPS OF THE ACTIVITY	POTENTIAL HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS
1.		
2.		
3.		
4.		

STEPS OF THIS ACTIVITY	POTENTIAL HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		

Potential Fall Hazards	Potential Struck-By Hazards
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

Potential Electrical Hazards	Potential Caught In-between Hazards
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

Required Personal Protected Equipment

☐ Hard Hat	☐ Fall Protection	☐ Welding Hood
☐ Gloves	☐ Life Vest	☐ Welding Leathers
☐ Respirator	☐ Hearing Protection	☐ Welding Gloves
☐ Safety Boots	☐ Face Shield	☐ Safety Vest
☐ Rubber Boots	☐ Cutting Goggles	☐ High Vis Pants
☐ Safety Toed Boots	☐ Safety Glasses	☐ Blasting Hood
☐ Tyvek Suits	☐ Safety Goggles	☐ Other (if checked list PPE in the column spaces above)

List Other Protective Equipment (PPE)	
1.	
2.	
3.	
4.	
5.	

Required Equipment and Tools

☐ Telehandler	☐ Concrete Saw	☐ Welding Machine
☐ Crane	☐ Concrete Bucket	☐ Angle Grinder
☐ Scissor Lift	☐ Ladder	☐ HEPA Filtered Tools
☐ Boom Lift	☐ Generator	☐ LOTO System
☐ Scaffolding System	☐ Hand Tools	☐ GFCI
☐ Excavator	☐ Powder Actuated	☐ Cutting Torch
☐ Roofing Kettle	☐ 4-Gas Meter	☐ Other (list on right side)

Other Equipment & Tooling	
1.	
2.	
3.	
4.	
5.	
6.	
7.	

Required Traffic Control Equipment	
☐ Lane Closure	☐ Pilot Car
☐ Barrier Rail	☐ Signage
☐ Trench Plates	☐ Speed Limit
☐ Flagger Station	☐ 6' Fencing

Utilities Located / Marked	
☐ Gas	☐ Overhead
☐ Electric	☐ Sewer/Water
☐ Fiber	☐ Telecommunications
☐ Irrigation	☐ Other Utilities Located:_____

PERSONNEL PARTICIPATING IN THIS ACTIVITY		
Name (Printed)	**Signature**	**Company**
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

EXHIBIT C – Demolition SPA Cover Letter

The following Demolition requirements have been established for the General Contractor's Safety Manager. The General Contractor's Safety Manager must ensure and approve that its Subcontractor's SPA documentation meet all Federal, State, and local regulations and the requirements outlined in this manual prior to submitting for review.

The General Contractor's Safety Manager must submit this Cover Letter, along with the criteria listed below, to the Owner's Representative 5-7 days of any planned critical phases of work. **Demolition activities must not be performed during regular school hours or near occupied areas.**

To hold an on-site Demolition SPA pre-work meeting, at a minimum, the following parties must be present:

- ✓ Subcontractor Competent Person
- ✓ General Contractor Safety Representative
- ✓ Owner's Representative [Optional]

Campus Name and ORG Number: _____

Subcontractor Name and Competent Person: _____

General Contractor Name and Site-Superintendent: _____

General Contractor Safety Manager Signature of Approval: _____

Anticipated Start Date: _____

Demolition SPA must include but is not limited to the following:

- ☐ Scope of Work (describe methods, safe working procedures, and any critical systems affected by this operation. Critical systems include life safety systems, security systems, etc.)
- ☐ Make Safe (confirm if asbestos, lead, and/or other hazardous materials are present within the immediate work areas, provide LOTO procedure, and engineering survey)
- ☐ Asbestos Awareness Training Records (for all crewmembers performing this task)
- ☐ Competent Person Letter of Designation (include areas of competency and signatures)
- ☐ Competent Person Training Documentation (OSHA 10-hour and First Aid/CPR)
- ☐ Silica Exposure Prevention Plan
- ☐ Existing Utilities (describe safe working practices associated with any known utilities that may be affected by demolition activities)
- ☐ Site Map (identifying areas to be affected by demolition)
- ☐ Emergency Action Plan (including emergency contact information and medical facility)
- ☐ JHA (include hazard assessment, equipment, and PPE needed to safely perform this task)

Note: This Document is **not** intended to replace the need for each Contractor to establish and maintain a proper Illness and Injury Prevention Program as required by the Department of Labor, Occupational Safety and Health Act (29 CFR 1926 and 29 CFR 1910) and the State of Texas.

EXHIBIT D – Confined Space SPA Cover Letter

The following Confined Space Entry requirements have been established for the General Contractor's Safety Manager. The General Contractor's Safety Manager must ensure and approve that its Subcontractor's SPA documentation meet all Federal, State, and local regulations and the requirements outlined in this manual prior to submitting for review.

The General Contractor's Safety Manager must submit this Cover Letter, along with the criteria listed below, to the Owner's Representative 5-7 days of any planned critical phases of work.

To hold an on-site Confined Space SPA pre-work meeting, at a minimum, the following parties must be present:

- ✓ Subcontractor Competent Person
- ✓ General Contractor Safety Representative
- ✓ Owner's Representative [Optional]

Campus Name and ORG Number: _____

Subcontractor Name and Competent Person: _____

General Contractor Name and Site-Superintendent: _____

General Contractor Safety Manager Signature of Approval: _____

Anticipated Entry Date: _____

Confined Space SPA must include but is not limited to the following:

- ☐ Scope of Work (describe methods, operating procedures, and affected work areas)
- ☐ Confined Space Entry Procedure (describe atmospheric testing/monitoring methods, ventilation, communication, and make safe procedures to be taken prior to entry)
- ☐ Site Map (identifying entry points, emergency egress locations, and work areas affected by this operation)
- ☐ Confined Space Training Records (for all crewmembers performing this task)
- ☐ Competent Person Letter of Designation (include areas of competency)
- ☐ Competent Person Training Documentation (OSHA 10-hour and First Aid/CPR)
- ☐ Emergency Action Plan (describe emergency actions to be taken should a worker need rescue, first aid, medical treatment, or emergency contact information)
- ☐ JHA (include hazard assessment, equipment, and PPE needed to safely perform this task)

Note: This Document is **not** intended to replace the need for each Contractor to establish and maintain a proper Illness and Injury Prevention Program as required by the Department of Labor, Occupational Safety and Health Act (29 CFR 1926 and 29 CFR 1910) and the State of Texas.

EXHIBIT E – Trenching and Excavation SPA Cover Letter

The following Trenching and Excavation SPA pre-meeting requirements have been established for the General Contractor's Safety Manager. The General Contractor's Safety Manager must ensure and approve that its Subcontractor's SPA documentation meet all Federal, State, and local regulations and the requirements outlined in this manual prior to submitting for review.

The General Contractor's Safety Manager must submit this Cover Letter, along with the criteria listed below, to the Owner's Representative 5-7 days of any planned critical phases of work. **Trenching and Excavation activities must not be performed during regular school hours or near occupied school areas.**

To hold an on-site Excavation SPA pre-work meeting, at a minimum, the following parties must be present:

- ✓ Subcontractor Competent Person
- ✓ General Contractor Safety Representative
- ✓ Owner's Representative [Optional]

Campus Name and ORG Number: _____

Subcontractor Name and Competent Person: _____

General Contractor Name and Site-Superintendent: _____

General Contractor Safety Manager Signature of Approval: _____

Anticipated Start Date: _____

Trenching and Excavation SPA must include but is not limited to the following:

☐ Scope of Work (describe methods, known utilities in the area, and any affected right-of-way)

☐ Utility Strike Prevention (include GPR report, potholing method, and preventative measures)

☐ Excavation Training Records (for all crewmembers performing this task)

☐ Competent Person Letter of Designation (include areas of competency and signatures)

☐ Competent Person Training Documentation (OSHA 10-hour and First Aid/CPR)

☐ Site Map (identify areas affected by this operation and underground utility shut-off locations)

☐ Emergency Action Plan (including emergency contact information and medical facility)

☐ JHA (include hazard assessment, equipment, and PPE needed to safely perform this task)

Note: This Document is **not** intended to replace the need for each Contractor to establish and maintain a proper Illness and Injury Prevention Program as required by the Department of Labor, Occupational Safety and Health Act (29 CFR 1926 and 29 CFR 1910) and the State of Texas.

EXHIBIT F – Pier Drilling SPA Cover Letter

The following Pier Drilling SPA pre-meeting requirements have been established for the General Contractor's Safety Manager. The General Contractor's Safety Manager must ensure and approve that its Subcontractor's SPA documentation meet all Federal, State, and local regulations and the requirements outlined in this manual prior to submitting for review.

The General Contractor's Safety Manager must submit this Cover Letter, along with the criteria listed below, to the Owner's Representative 5-7 days of any planned critical phases of work. **Pier Drilling activities must not be performed during regular school hours or near occupied school areas.**

To hold an on-site Pier Drilling SPA pre-work meeting, at a minimum, the following parties must be present:

- ✓ Subcontractor Competent Person
- ✓ General Contractor Safety Representative
- ✓ Owner's Representative [Optional]

Campus Name and ORG Number: _____

Subcontractor Name and Competent Person: _____

General Contractor Name and Site-Superintendent: _____

General Contractor Safety Manager Signature of Approval: _____

Anticipated Start Date: _____

Pier Drilling SPA must include but is not limited to the following:

☐ Scope of Work (describe methods, known utilities in the area, and any affected right-of-way)

☐ Utility Strike Prevention (include GPR report, potholing method, and preventative measures)

☐ Competent Person Letter of Designation (include areas of competency and signatures)

☐ Competent Person Training Documentation (OSHA 10-hour and First Aid/CPR)

☐ Site Map (identify areas affected by this operation and underground utility shut-off locations)

☐ Emergency Action Plan (including emergency contact information and medical facility)

☐ JHA (include hazard assessment, equipment, and PPE needed to safely perform this task)

Note: This Document is **not** intended to replace the need for each Contractor to establish and maintain a proper Illness and Injury Prevention Program as required by the Department of Labor, Occupational Safety and Health Act (29 CFR 1926 and 29 CFR 1910) and the State of Texas.

EXHIBIT G – Utility Shutdown SPA Cover Letter

The following Utility Shutdown requirements have been established for the General Contractor's Safety Manager. The General Contractor's Safety Manager must ensure and approve that its Subcontractor's SPA documentation meet all Federal, State, and local regulations and the requirements outlined in this manual prior to submitting for review.

The General Contractor's Safety Manager must submit this Cover Letter, along with the criteria listed below, to the Owner's Representative 5-7 days of any planned critical phases of work. **Contractors of any tier must at no time perform any type of power or other utility shutdown activities during regular school hours**.

To hold an on-site Utility Shutdown SPA pre-work meeting, at a minimum, the following parties must be present:

- ✓ Subcontractor Competent Person
- ✓ General Contractor Safety Representative
- ✓ Owner's Representative [Optional]

Campus Name and ORG Number: _____

Subcontractor Name and Competent Person: _____

General Contractor Name and Site-Superintendent: _____

General Contractor Safety Manager Signature of Approval: _____

Anticipated Shutdown Date: _____

Utility Shutdown SPA must include but is not limited to the following:

- ☐ Shutdown Authorization Form (EXHIBIT I) must be submitted **10 days prior** to any planned shutdown and must contain pre-work notification signatures of approval)
- ☐ Scope of Work (describe methods, operating procedures, and any critical systems affected by this shutdown. Critical systems include life safety systems, security systems, kitchen, etc.)
- ☐ De-energizing System (describe system to be shutdown, methods for controlling hazardous energy, inadvertent release of stored energy, and make safe procedures)
- ☐ Contingency Plan (to prevent any disruptions to school operations, describe emergency actions to be taken for restoring system operations as quickly as possible)
- ☐ Restoring System (describe methods for safely restoring systems, removal of LOTO devices)
- ☐ Competent Person Letter of Designation (include areas of competency and signatures)
- ☐ Competent Person Training Documentation (OSHA 10-hour and First Aid/CPR)
- ☐ Site Map (identifying areas where shutdown is to be performed)
- ☐ Emergency Action Plan (including emergency contact information and medical facility)
- ☐ JHA (include hazard assessment, equipment, and PPE needed to safely perform this task)

Note: This Document is **not** intended to replace the need for each Contractor to establish and maintain a proper Illness and Injury Prevention Program as required by the Department of Labor, Occupational Safety and Health Act (29 CFR 1926 and 29 CFR 1910) and the State of Texas.

EXHIBIT H – Electrical Shutdown SPA Cover Letter

The following Electrical Shutdown requirements have been established for the General Contractor's Safety Manager. The General Contractor's Safety Manager must ensure and approve that its Subcontractor's SPA documentation meet all Federal, State, and local regulations and the requirements outlined in this manual prior to submitting for review.

The General Contractor's Safety Manager must submit this Cover Letter, along with the criteria listed below, to the Owner's Representative 5-7 days of any planned critical phases of work.

To hold an on-site Electrical Shutdown SPA pre-work meeting, at a minimum, the following parties must be present:

- ✓ Subcontractor Competent Person
- ✓ General Contractor Safety Representative
- ✓ Owner's Representative [Optional]

Campus Name and ORG Number: _____

Subcontractor Name and Competent Person: _____

General Contractor Name and Site-Superintendent: _____

General Contractor Safety Manager Signature of Approval: _____

Anticipated Shutdown Date: _____

Electrical Shutdown SPA must include but is not limited to the following:

- ☐ Shutdown Authorization Form (EXHIBIT I) must be submitted **10 days prior** to any planned shutdown and must contain pre-work notification signatures of approval)
- ☐ Scope of Work (describe methods, operating procedures, and any critical systems affected by this shutdown. Critical systems include life safety systems, security systems, kitchen, etc.)
- ☐ De-energizing System (describe system to be shutdown, methods for controlling hazardous energy, inadvertent release of stored energy, and make safe procedures – NFPA 120.2)
- ☐ Contingency Plan (to prevent any disruptions to school operations, describe emergency actions to be taken for restoring system operations as quickly as possible)
- ☐ Restoring System (describe methods for safely restoring systems, removal of LOTO devices)
- ☐ Electrically Qualified Person [NFPA 70 E] Training Records – NFPA 120.2(b)(2)
- ☐ Competent Person Letter of Designation (include areas of competency and signatures)
- ☐ Competent Person Training Documentation (OSHA 10-hour and First Aid/CPR)
- ☐ Site Map (identifying areas where shutdown is to be performed)
- ☐ Emergency Action Plan (including emergency contact information and medical facility)
- ☐ JHA (include hazard assessment equipment, and PPE needed to safely perform this task)

Note: This Document is **not** intended to replace the need for each Contractor to establish and maintain a proper Illness and Injury Prevention Program as required by the Department of Labor, Occupational Safety and Health Act (29 CFR 1926 and 29 CFR 1910) and the State of Texas.

EXHIBIT I – Shutdown Authorization Form

Dallas Independent School District
Bond Program
Scheduled Utility Shutdown Authorization Form: General Contractor(s)

SECTION A. GENERAL INFORMATION: ☐ ***Permanent** ☐ **Temporary**

School Name and Org. #: _____

Bond Program Manager (PM) Name: _____

General Contractor (GC) Person In-Charge: _____ _____

Sub-Contractor (SUB) Person In-Charge: (Name) _____ (Contact No.) _____

SECTION B. PRE-WORK NOTIFICATION:

Utility System(s) to Be Shut down: _____

Utility Meter number _____

Description of Work Performed: _____

Describe Procedure for Shutdown: _____

Safety Measures/ Precautions for Shutdown: _____

Date/ Time **Requested** for Shutdown:

Shutdown Date	Shutdown Time	Restart Date	Restart Time

It is requested that the noted** building system(s) be allowed for "shutdown" **by the General Contractor to allow for our tie-in of services for the Project as enumerated below. We note that** five (5) days advance notice **is required as a minimum. I hereby certify that the required work has been coordinated and scheduled to achieve completion within the requested time-period.

SUB Person-In-Charge: **(Sign)** _____ **(Date)** _____

GC Person-In-Charge: _____ (Sign) _____ (Date)

Bond Program Manager (PM) Approval: _____ (Sign) _____ (Date)

DISD Project Manager Approval: _____ (Sign) _____ (Date)

SECTION C. POST-WORK CERTIFICATION:

Actual Date/ Time for Shutdown:

Shutdown Date	Shutdown Time	Restart Date	Restart Time

GC Person-In-Charge Certification: _____ (Sign) _____ (Date)

Bond Program Manager (PM) Certification: _____ (Sign) _____ (Date)

DISD Project Manager Certification: _____ (Sign) _____ (Date)

(Sign)

DISD Sustainability Certification: _____ _____

SECTION D. PROCESS FOR SCHEDULED UTILITY SHUTDOWN AUTHORIZATION

A. The General Contractor is to complete the *Utility Shutdown Request Form*, at least **5 working days** prior to the scheduled utility shutdown, and submit it to the respective Bond Program Manager for approval.

B. The Bond Program Manager (PM) will review and approve submitted *Utility Shutdown Request Form* and forward to the respective Dallas ISD Project Manager for approval.

C. The Dallas ISD Project Manager will review and approve form and return to the PM.

D. PM forwards approved form to Director/Maintenance Solutions and notifies Deputy Chief Director, Emergency Operations and Bond Program Safety Manager.

Note: All scheduled shutdown requests will require a jobsite meeting with the Program Manager and the School staff 48 hours in advance to discuss the outage procedures and status of all District departments involved on the shutdown request.

Note: For electrical shutdowns (Scheduled/ involuntary), when required for building operations, the General contractor must supply a power generator to keep the telephones, data and alarms working at all times.

***Permanent shutdowns are facilities or specific meters that will not require power/ utility to be restored.**

EXHIBIT J – Elevated Work SPA Cover Letter

The following Elevated Work SPA pre-meeting requirements have been established for the General Contractor's Safety Manager. The General Contractor's Safety Manager must ensure and approve that its Subcontractor's SPA documentation meet all Federal, State, and local regulations and the requirements outlined in this manual prior to submitting for review.

The General Contractor's Safety Manager must submit this Cover Letter, along with the criteria listed below, to the Owner's Representative 5-7 days of any planned critical phases of work. **No roof work, regardless of the extent, is to be done over an occupied area/building.**

To hold an on-site Elevated Work SPA pre-work meeting, at a minimum, the following parties must be present:

- ✓ Subcontractor Competent Person
- ✓ General Contractor Safety Representative
- ✓ Owner's Representative [Optional]

Campus Name and ORG Number: _____

Subcontractor Name and Competent Person: _____

General Contractor Name and Site-Superintendent: _____

General Contractor Safety Manager Signature of Approval: _____

Anticipated Start Date: _____

Elevated Work SPA must include but is not limited to the following:

☐ Scope of Work (describe methods, operating procedures, and affected work areas)

☐ Fall Protection (describe systems to be used, methods, anchor point locations, etc.)

☐ Fall Protection Training Records (for all crewmembers performing this task)

☐ Competent Person Letter of Designation (include areas of competency and signatures)

☐ Competent Person Training Documentation (OSHA 10-hour and First Aid/CPR)

☐ Site Map (identifying areas where work is to be performed)

☐ Emergency Action Plan (including emergency contact information and medical facility)

☐ JHA (include hazard assessment, equipment, and PPE needed to safely perform this task)

Note: This Document is **not** intended to replace the need for each Contractor to establish and maintain a proper Illness and Injury Prevention Program as required by the Department of Labor, Occupational Safety and Health Act (29 CFR 1926 and 29 CFR 1910) and the State of Texas.

EXHIBIT K – Crane Operation SPA Cover Letter

The following Crane Operation requirements have been established for the General Contractor's Safety Manager. The General Contractor's Safety Manager must ensure and approve that its Subcontractor's SPA documentation meet all Federal, State, and local regulations and the requirements outlined in this manual prior to submitting for review.

The General Contractor's Safety Manager must submit this Cover Letter, along with the criteria listed below, to the Owner's Representative 5-7 days of any planned critical phases of work. **Booms or suspended loads must not be allowed to pass over playgrounds or other school property when there is a potential for students or staff to be present in these areas and/or within any fall radius.**

To hold an on-site Crane Operations SPA pre-work meeting, at a minimum, the following parties must be present:

- ✓ Subcontractor Competent Person
- ✓ General Contractor Safety Representative
- ✓ Owner's Representative [Optional]

Campus Name and ORG Number: _____

Subcontractor Name and Competent Person: _____

General Contractor Name and Site-Superintendent: _____

General Contractor Safety Manager Signature of Approval: _____

Anticipated Lift Date: _____

Crane Operations SPA must include but is not limited to the following:

☐ Scope of Work (describe methods, operating procedures, and affected work areas)

☐ Crane Location and Logistics Plan (identify underground and overhead crane hazards)

☐ Lift Plan (identify load capacities, means of communication, and rigging/lifting methods)

☐ Site Map (identifying sequence of operation and fall radius in relation to any occupied areas)

☐ Crane Certificate of Insurance and Annual Inspection Records

☐ Competent Person Letter of Designation (include areas of competency and signatures)

☐ Competent Person Training Documentation (OSHA 10-hour and First Aid/CPR)

☐ Crane Operator Certification and Medical Card

☐ Rigger and Signal Person Training Records

☐ Fall Protection (if applicable, describe systems to be used, methods, anchor point locations, etc.)

☐ Fall Protection Training Records (for all crewmembers performing this task)

☐ Emergency Action Plan (including emergency contact information and medical facility)

☐ JHA (include hazard assessment, equipment, and PPE needed to safely perform this task)

Note: This Document is **not** intended to replace the need for each Contractor to establish and maintain a proper Illness and Injury Prevention Program as required by the Department of Labor, Occupational Safety and Health Act (29 CFR 1926 and 29 CFR 1910) and the State of Texas.

EXHIBIT L – Steel Erection SPA Cover Letter

The following Steel Erection requirements have been established for the General Contractor's Safety Manager. The General Contractor's Safety Manager must ensure and approve that its Subcontractor's SPA documentation meet all Federal, State, and local regulations and the requirements outlined in this manual prior to submitting for review.

The General Contractor's Safety Manager must submit this Cover Letter, along with the criteria listed below, to the Owner's Representative 5-7 days of any planned critical phases of work. **Steel Erection must not be allowed when students and/or staff are present in occupied areas and/or within any fall radius.**

To hold an on-site Steel Erection SPA pre-work meeting, at a minimum, the following parties must be present:

- ✓ Subcontractor Competent Person
- ✓ General Contractor Safety Representative
- ✓ Owner's Representative [Optional]

Campus Name and ORG Number: _____

Subcontractor Name and Competent Person: _____

General Contractor Name and Site-Superintendent: _____

General Contractor Safety Manager Signature of Approval: _____

Anticipated Start Date: _____

Steel Erection SPA must include but is not limited to the following:

☐ Scope of Work (describe methods, operating procedures, and affected work areas)

☐ Steel Erection Plan (describe equipment placement, lifting methods, and connection procedures)

☐ Written Notification from the General Contractor confirming concrete footings, piers, and/or walls have been cured to a level that will provide adequate structural strength and stability.

☐ Site Map (identifying sequence of operation and fall radius in relation to any occupied areas)

☐ Fall Protection procedures (describe systems to be used, Controlled Access Zones, etc.)

☐ Fall Protection Training Records (for all crewmembers performing this task)

☐ Rigger and Signal Person Training Records

☐ Competent Person Letter of Designation (include areas of competency and signatures)

☐ Competent Person Training Documentation (OSHA 10-hour and First Aid/CPR)

☐ Emergency Action Plan (including emergency contact information and medical facility)

☐ JHA (include hazard assessment, equipment, and PPE needed to safely perform this task)

Note: This Document is **not** intended to replace the need for each Contractor to establish and maintain a proper Illness and Injury Prevention Program as required by the Department of Labor, Occupational Safety and Health Act (29 CFR 1926 and 29 CFR 1910) and the State of Texas.

EXHIBIT M – Aerial Crane Operation SPA Cover Letter

The following Aerial Crane Operation requirements have been established for the General Contractor's Safety Manager. The General Contractor's Safety Manager must ensure and approve that its Subcontractor's SPA documentation meet all Federal, State, and local regulations and the requirements outlined in this manual prior to submitting for review.

The General Contractor's Safety Manager must submit this Cover Letter, along with the criteria listed below, to the Owner's Representative 5-7 days of any planned critical phases of work. **Aircraft or suspended loads must not be allowed to pass over playgrounds or other school property when there is a potential for students, staff, or public to be present in these areas and/or within any potential drop zones.**

To hold an on-site Aerial Crane Operations SPA pre-work meeting, at a minimum, the following parties must be present:

- ✓ Subcontractor Competent Person
- ✓ General Contractor Safety Representative
- ✓ Owner's Representative [Optional]

Campus Name and ORG Number: _____

Subcontractor Name and Competent Person: _____

General Contractor Name and Site-Superintendent: _____

General Contractor Safety Manager Signature of Approval: _____

Anticipated Lift Date: _____

Aerial Crane Operations SPA must include but is not limited to the following:

☐ Lift Plan (scope of work, travel path, ground level and ariel hazards or obstructions)

☐ Site Set-Up (overhead map of staging areas, sequence of operation, primary and alternate emergency area locations, and potential drop zones in relation to occupied areas)

☐ Material to be lifted (method of attachment, rigging to be used, configuration, and load capacities)

☐ Roles and responsibilities (communication methods for ground crew, roof crew, and operator)

☐ Competent Person Letter of Designation form (include areas of competency and proof of training)

☐ Rigger and signal person training records

☐ JHA (include hazard assessment, equipment, and PPE needed to safely perform this task)

☐ Emergency Action Plan (including emergency contact information and medical facility)

☐ Standard Airworthiness Certificate

☐ Congested Area Plan Request to FAA

☐ FAA Registry of Aircraft

☐ FAA Airman Detail Report

☐ Notification of Dallas City Officials

☐ Certificate of Aircraft liability insurance (insurance limit must be $10 million, per contract amount)

☐ Evidence of additional insured and waiver of subrogation endorsement

EXHIBIT N – Hot Work Permit

All temporary work involving open flames, intense heat, or sparks will require a Hot Work Permit. The permit must be issued by the contractor and authorized by the appropriate supervisor before any hot work (welding, brazing, cutting, grinding, etc.) can begin. Two copies of the Hot Work Permit must be made. One should be filed with the contractor. The second copy should be posted at the site of the hot work until the job is completed.

Issue Date:	Permit Expires:	
Building:	Sub:	Area:
Authorizing Supervisor (GC):	Start Time:	End Time:
Operator:	Fire Watch:	

Checklist

Following items must be checked by the authorizing supervisor and operator/welder. If any item is checked "No", then hot work must not begin until item or area is corrected.

Yes	No	
☐	☐	Work area examined
☐	☐	Equipment inspected, in good repair
☐	☐	PPE inspected, in good repair
☐	☐	Sprinkler system operable
☐	☐	Combustible materials/items moved a radius of 35 feet away from work area.
☐	☐	Explosive atmosphere (s) eliminated
☐	☐	Floor and wall openings covered
☐	☐	Fire watch assigned and required during work and for 30 minutes afterwards* *Fire watch must be at least 30 minutes in duration
☐	☐	Fire watch has ample extinguishing equipment and is trained to properly use it
☐	☐	Work area is considered a confined space (if yes additional confined space will be required. Contact supervisor before proceeding)
☐	☐	Proper ventilation provided for the work area

Other precautions

1._____

2._____

Authorizing Supervisor Signature:_____ Date:_____

Final Checkup: To be completed after hot work is finished and fire watch is over

The work area and all surrounding areas subjected to heat and sparks were monitored during the hot work operations and during the required fire watch period and found to be safe.

Fire Watcher Signature: _____ Title:_____ Date:_____

EXHIBIT O – Incident Investigation Report

CONTRACTOR: _____ACCIDENT DATE: _____TIME: _____LOCATION _____

ACCIDENT LOCATION (SPECIFIC): _____

WHAT HAPPENED? (Describe operation, activity, condition and how accident or loss occurred.

Use separate sheet and diagram if necessary): _____

_____

Recommended correction action:

_____

Equipment involved #: _____Employee involved: _____

Employee Injury (Describe):

_____

Root Cause (Describe): _____

Medical referral? Yes____ No_____

Company Property Damage or Loss

(Describe): _____

DISD Property, Damage, or Injury to Others

(Describe): _____

Witnesses (Name, address, phone): _____

Police Report Number: _____ DISD Police Report Number: _____

Foreman/Supervisor_____ Date: _____

Keep Original in contractor's File and CC: Owner's Representatives

[Attach Photos]

EXHIBIT P – Safety Inspection Checklist

SAFETY INSPECTION CHECKLIST				
Contractor:	Contract No.			
Job-site Location:				
Person in Charge:				
Date: Time:				
Person(s) making inspection:	Column: A= Adequate B= Inadequate N/A = Not Applicable			
PROGRAM ADMINISTRATION:	A	B	N/A	REMARKS
1. Posting OSHA and other job-site warning posters.				
2. Do you have safety meetings?				
3. Job safety training, including first-aid training?				
4. Is first-aid equipment and supplies available?				
5. Are job-site injury records being kept?				
6. Are emergency telephone numbers, such as police department, fire department, doctor, hospital, and ambulance, posted?				
HOUSEKEEPING AND SANITATION:	A	B	N/A	REMARKS
1. General neatness of working areas.				
2. Regular disposal of waste and trash.				
3. Passageways and walkways clear?				
4. Adequate lighting.				
5. Protruding nails removed or bent over?				
6. Oil and grease removed.				
7. Waste containers provided and used.				
8. Sanitary facilities adequate and clean.				
9. Drinking water potable.				
10. Adequate supply of water.				

11. Disposable drinking cups.				
FIRE PREVENTION:	A	B	N/A	REMARKS
1. Fire instructions to personnel.				
2. Fire extinguishers identified, checked, accessible.				
3. Proper fire extinguishers provided.				
4. Hydrants clear, access to public thoroughfare open.				
5. Good housekeeping.				
6. "No Smoking" signage posted and enforced where needed.				
7. Fire brigades.				
ELECTRICAL INSTALLATIONS:	A	B	N/A	REMARKS
1. Adequate wiring, well insulated.				
2. Circuit breakers and GFCI (where required) provided.				
3. Fire hazards checked.				
4. Electrical danger signs posted.				
5. Are terminal boxes equipped with required covers? Are covers used?				
HAND TOOLS:	A	B	N/A	REMARKS
1. Proper tool being used for each job.				
2. Neat storage, safe carrying.				
3. Inspection and maintenance.				
4. Damaged tools repaired or replaced promptly. Are employee's tools inspected and repaired?				

POWER TOOLS:	A	B	N/A	REMARKS
1. Good housekeeping where tools are used.				
2. Tools and cords in good condition.				
3. Proper grounding.				
4. Proper instruction in use.				
5. All mechanical safeguards in use.				
6. Tools neatly stored when not in use.				

7. Right tool being used for the job at hand.				
8. Wiring properly installed.				
POWDER ACTUATED TOOLS:	A	B	N/A	REMARKS
1. Local laws and ordinances complied with.				
2. All operators trained.				
3. Tools and charges protected from unauthorized use.				
4. Competent instruction and supervision.				
5. Tools checked and in good working order.				
6. Tools not used on anything but recommended materials.				
7. Safety goggles or face shields provided and used.				
8. Flying hazard checked by backing up, removal of personnel, or use of captive stud tool.				
LADDERS:	A	B	N/A	REMARKS
1. Ladders inspected and in good condition?				
2. Secured to prevent slipping, sliding, or falling?				
3. Do side rails extend 36" above top of landing?				
4. Rungs or cleats not over 12" on center.				
5. Metal ladders not used around electrical hazards.				
6. Proper maintenance and storage.				
7. Are ladders not painted?				

SCAFFOLDING:	A	B	N/A	REMARKS
1. Is erection properly supervised?				
2. Will all structural members meet the safety factor?				
3. Are all connections secure?				
4. Is scaffold tied into structure where necessary?				
5. Are working areas free of debris, snow, ice, grease?				
6. Are base plates and mud sills provided?				
7. Are workers protected from falling objects?				

8. Is the scaffold plumb and square with cross- bracing?				
9. Are guardrails, intermediate rails, and toe boards in place?				
10. Are hoist ropes and cables in good condition?				
HOISTS, CRANES AND DERRICKS:	A	B	N/A	REMARKS
1. Inspect cables and sheaves.				
2. Check slings and chains, hooks, and eyes.				
3. Equipment firmly supported.				
4. Outriggers used, proper cribbing.				
5. Power lines deactivated, removed or at safe distance				
6. Proper loading for capacity of lifting radius.				
7. All equipment properly lubricated and maintained.				
8. Signalman where needed.				
9. Signals understood and observed.				
10. Are inspection and maintenance logs maintained?				
HEAVY EQUIPMENT:	A	B	N/A	REMARKS
1. Regular inspection and maintenance.				

2. Lubrication and repair of moving parts.				
3. Lights, brakes, warning signals operative.				
4. Wheels chocked when necessary.				
5. Haul roads well maintained and laid out properly.				
6. Protection when equipment is not in use.				
7. Shut-off devices on hose lines in case of failure?				
MOTOR VEHICLES:	A	B	N/A	REMARKS
1. Regular inspection and maintenance.				
2. Qualified operators.				
3. Brakes, lights, warning devices operative.				

4. Weight limits and load sizes controlled.				
5. Is all glass in good condition?				
6. Are back-up (reverse) alarms provided?				
7. Fire extinguishers provided in all vehicles?				
BARRICADES:	A	B	N/A	REMARKS
1. Floor openings planked over and secured, or barricaded.				
2. Roadways and sidewalks effectively protected.				
3. Adequate lighting provided.				
4. Traffic controlled.				
HANDLING AND STORAGE OF MATERIALS:	A	B	N/A	REMARKS
1. Are materials properly stored or stacked?				
2. Are passageways clear?				
3. Stacks on firm footings, not too high.				
4. Proper number of men for each operation.				
5. Are workers lifting loads correctly?				

6. Are materials protected from weather conditions?				
7. Protection against falling.				
8. Is dust protection observed?				
9. Extinguishers and other fire protection provided.				
10. Is traffic controlled in the storage area?				
EXCAVATION AND SHORING:	A	B	N/A	REMARKS
1. Are adjacent structures properly shored?				
2. Is shoring, benching, or sloping used for soil depth or excavation properly sloped?				
3. Are roads and sidewalks supported and protected?				
4. Is material stored at least 2 feet from excavations?				
5. Is excavation barricaded and lighting provided?				
6. Is equipment a safe distance from edge of excavation?				
7. Are ladders provided where needed?				

8. Are equipment ramps adequate?				
9. Is job supervisor on-site during trenching operations?				
DEMOLITION:	A	B	N/A	REMARKS
1. Are operations planned ahead?				
2. Is there shoring of adjacent structures?				
3. Are material chutes used?				
4. Is there sidewalk and other public protection?				
5. Adequate access ladders or stairs.				
FLAMMABLE GASSES AND LIQUIDS:	A	B	N/A	REMARKS
1. All containers U.L. approved meeting OSHA requirements with contents clearly identified.				
2. Proper storage practices observed.				
3. Fire hazards checked.				
4. Proper storage temperatures and protection.				
5. Proper types and number of extinguishers nearby.				
6. Carts for moving cylinders available.				
MASONRY:	A	B	N/A	REMARKS
1. Proper scaffolding.				
2. Saws properly equipped; dust protection provided.				
ROADWAY CONSTRUCTION:	A	B	N/A	REMARKS
1. Laws and ordinances observed.				
2. Flag-person properly dressed, instructed, and posted.				
3. Adequate warning signs and markers.				
4. Equipment not blocking right of way.				
5. Traffic control through construction site.				
6. Adequate marking and maintenance of detours.				
7. Dust control.				
8. Adequate lighting.				
PERSONAL PROTECTIVE EQUIPMENT:	A	B	N/A	REMARKS
1. Eye and Head protection.				
2. Face shields.				
3. Respirators and masks.				
List actions to be taken for all items found non-compliant				

EXHIBIT Q – Contractor Acknowledgement Statement

Campus Name and ORG Number: _____

Contractor Name:_____

Date: _____

By executing this document as an authorized representative of the referenced Company identified above, I acknowledge and confirm that I have read and understand the contents of the Dallas ISD Construction Safety Program Guidelines in its entirety.

I also recognize and acknowledge that the obligation to protect the safety and health of all persons affected by construction activities is not limited to the requirements of the Dallas ISD Construction Safety Program Guidelines only, but also includes all applicable OSHA, Federal, State, and local regulations, and guidelines necessary to provide a safe and healthful working environment for all contractors, campus staff, students, and general public.

The Contracting Company and its employees will comply with all applicable safety requirements while performing work on any Dallas ISD property. The Company will further communicate the requirements of the Dallas ISD Construction Safety Program Guidelines and other applicable OSHA, Federal, State, and local regulations, and guidelines to all tiered Subcontractors that will perform work on the Project and retain a physical signed copy of this Contractor Acknowledgement Statement from each such Subcontractor.

_____
(Name of Authorized Representative)

_____
(Signature of Authorized Representative)

_____
(Date Signed)

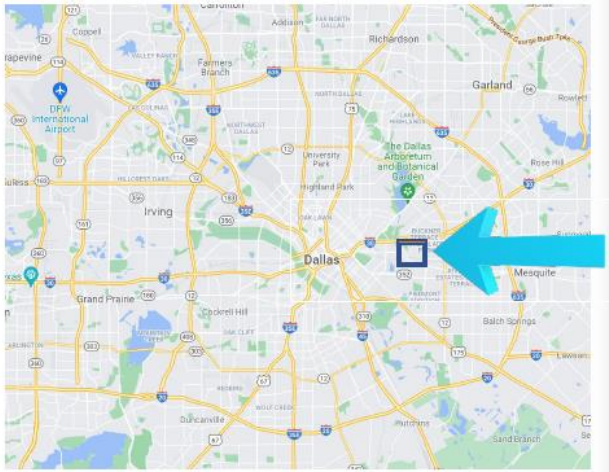
ATTACHMENTS

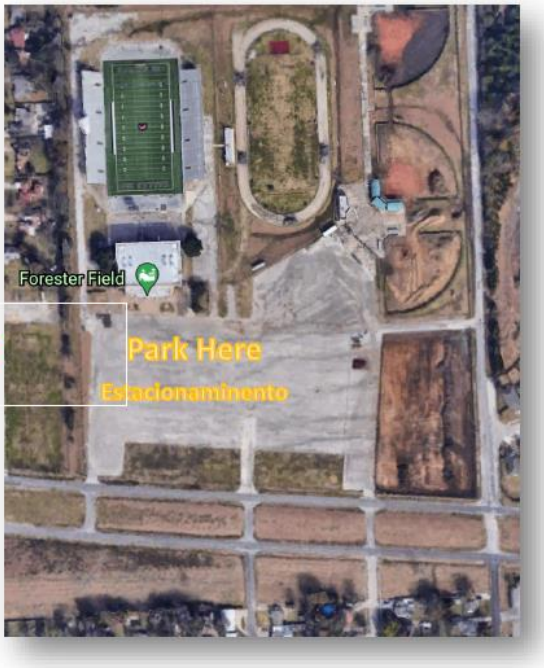
- Attachment I – Dallas ISD Orientation Location and Schedule
- Attachment II – Site-Specific Safety Plan Guidelines
- Attachment III – Crisis Communications Poster
- Attachment IV – Visitor's Release and Hold Harmless Agreement
- Attachment V – Shutdown Notification Guidelines
- Attachment VI – SWPPP Oversight Flowchart
- Attachment VII – Greenfield Shutdown Authorization Request Guidelines
- Attachment VIII – Intruder Detection
- Attachment IX – Campus Security Reminders
- Attachment X – Safety Meeting Sign-in Sheet
- Attachment XI – Geotechnical Soil Sampling Safety Guidelines
- Attachment XII – Inclement Weather Plan of Action

Dallas ISD Orientation Location and Schedule

DALLAS INDEPENDENT SCHOOL DISTRICT

Construction Services





Dallas ISD
Construction Safety Orientation
(Orientacion de Seguridad)

Location/Ubicacion
Forester Field
8233 Military Pkwy
Dallas, TX 75227

Schedule/Horario
7:30am-8:30am
Tuesday and Thursday
Martes y Jueves

You must have your Dallas ISD Badge to attend this orientation.

Usted debe tener su identificacion para poder asistir a esta Orientacion.

CRITERIA FOR DEVELOPING A SITE-SPECIFIC SAFETY PLAN

Prior to work, Contractors are required to submit for review, an acceptable Site-Specific Safety Plan that includes safe and health work practices. The Owner's Representative will evaluate the plan to see that it meets the safety requirements for the Project's scope of work.

A Site-Specific Safety Plan must include but is not limited to the following:

(1) **Scope of Work:** A description of the scope of work is to be included on the front page of the Site-Specific Safety Plan.

(2) **Job Safety Procedures:** Explain in detail and specifically how job safety is to be incorporated into each phase of the scope of work. Use of ladders, scaffolds, flagging, equipment, exposures, special conditions, fall protection, etc., must be included for the plan to be accepted. Generalities will not be accepted to Explain the safety and health conditions employees will be exposed to.

(3) **General Contractor's Site-Specific Safety Orientation:** Each employee who is new to the jobsite must receive a thorough safety and hazard communication orientation, which imparts basic information about the project safety and health program, federal/state regulations, and other safety rules and regulations needed to perform tasks safely. Future safety instructions may be necessary if hazardous work and/or unfamiliar tasks are performed.

(4) **Competent Person Designation(s):** Competent Person Designation Form(s) accompanied by a valid First Aid/CPR and OSHA 30-hour certification (within 5 years of the issuing date) must be provided for all on-site persons designated as competent.

(5) **Supervising for Safety:** Explain how supervisors are going to constantly review the safe practices and procedures. Jobsite inspections are required daily. An inspection checklist should be documented at least weekly.

(6) **Disciplinary Policy:** Contractor must explain disciplinary action for any employee who jeopardizes his health or safety, or the health or safety of others.

(7) **Subcontractor Compliance:** Explain how Subcontractor compliance with your safety program and the Construction Minimum Safety Program Guidelines Manual will be verified and documented. When Subcontractor's programs are deficient, the General Contractor must be responsible for providing them with the necessary training and protection. This must be documented.

(8) **Incident Investigation Procedure:** Explain how the General Contractor and involved Subcontractors will investigate all incidents involving a near miss, injury, and/or property damage. Investigation Procedures must include a Root Cause Analysis and Corrective Action Plan to prevent reoccurrence.

(9) **Emergency Action Plan:** Describe Actions to be taken should an emergency occur. Emergency Action Plans must cover injuries, fires, evacuations, and similar situations. Plans must include designated emergency contact names and telephone numbers, e.g., on-site supervision, police department, fire department, doctor, hospital, and ambulance.

(10) **Personal Protective Equipment:** Describe Personal Protective Equipment (PPE) to be worn, training requirements, and parameters for its use.

(11) **Occupational Health Programs:** Site-specific Occupational Health and Illness Prevention Programs are required to protect employees working on the project, i.e., Asbestos Awareness, Air Monitoring, Silica, Sampling, Special Protective Clothing or Equipment, and Particular Hazards.

(12) **Job Hazard Analysis (JHA):** Explain the formal job hazard analysis process

(13) **Task Training:** Contractors are required to task train employees in the exposures they will be confronted with and the job they are expected to perform. Other situations, however, may arise during the course of the project that will require additional training. Explain how task training will be accomplished, how often it will be conducted, and who will be conducting the training.

(14) **Reporting Unsafe Acts or Conditions:** Explain the program in place that promotes positive feedback to supervision and employees who report unsafe acts and/or conditions.

(15) **Toolbox Talk Safety Meetings:** These must be held and documented at least weekly. Explain who will be responsible for conducting these meetings, when they will be held, and where they will be held.

(16) **Fire Prevention and Protection Plan:** Explain the job-site fire prevention and protection program in detail.

(17) **Hazard Communication Program:** Provide copy of the Site-specific Haz-Com program.

(18) **Lock-out/Tag-out (LOTO) Program**: Provide a copy of the Site-specific LOTO Program

(19) **Confined Space Entry:** Provide a copy of the Site-specific Confined Space Program

(20) **Trenching/Excavation and Utility Strike Prevention**: Provide a copy of the Site-specific Trenching/Excavation Procedures and a Utility Strike Prevention Plan.

(21) **Fall Protection and Prevention Program:** Provide a copy of the Site-specific Fall Protection and Prevention Program

(22) **Traffic Control Plan:** Provide a copy of the Site-specific Traffic Control Plan

(23) **Substance Abuse Policy:** Provide a copy of the Substance Abuse Policy

(24) **Special Instructions and Information:** Provide any special instruction or additional safety information as it relates to the unique conditions and/or environment associated with the project.

Note: The requirements outlined in this Document are intended to provide a working, uniform minimal level of program guidelines to assist or provide direction to Contractors. This Document is **not** intended to replace the need for each Contractor of any tier to establish and maintain a proper Illness and Injury Prevention Program as required by the Department of Labor, Occupational Safety and Health Act (29 CFR 1926 and 29 CFR 1910) and the State of Texas.

CONSTRUCTION SITE Crisis Communications GUIDELINES

SUGGESTED STEPS FOR CRISIS SITUATIONS:

1. Evaluate the situation and extent of damage or injuries.
2. If students are present, immediately contact the principal or school office.
3. Call 9-1-1 if necessary. Be prepared to give the dispatcher details of the accident and injuries, the exact address and where emergency crews should enter the site.
4. Assign someone to meet emergency crews at the gate.
5. Call Dallas ISD Communications at (972) 925-3917. Be prepared to provide as much information as possible.
6. Call Dallas ISD Police at (214) 932-5627.
7. Call Construction Services at (972) 925-7200.
8. Call the Safety Manager at (214) 435-2204.
8. Other than as noted below, *do not speak* to reporters or photographers. Refer them to Dallas ISD Communications.

How to handle reporters who come to the construction site:

There is no such thing as "off the record." Be polite, but firm. Tell reporters and photographers they must wait off-site, outside the main gate, until an authorized Dallas ISD spokesperson arrives. Do not push, shove, block, or attempt to physically restrain a reporter or photographer. When dealing with reporters, photographers or TV crews, always assume that they are recording.

EMERGENCY TELEPHONE NUMBERS:

Dallas ISD Police
(214) 932-5627

Robyn Harris
Dallas ISD Communications/ District Spokesperson
(972) 925-3917

Alvaro Meza
Bond Program Safety Manager
(214) 435-2204

DALLAS INDEPENDENT SCHOOL DISTRICT

Visitor's Release and Hold Harmless Agreement

General Contractor: _____

Project Name: _____ Date: _____

In consideration of being permitted, for my own purposes and interests, to enter upon the premises or construction site of Dallas Independent School District Construction Project, I hereby release, hold harmless, and indemnify the Dallas Independent School District, Consultants, Inspectors, Contractors and Subcontractors from and against, and assume the risk for and on behalf of myself, my heirs, my supervisor and my estate, all damages, losses, injuries and any and all other claims of any type whatsoever for personal injury (including death) and other loss or damage of any nature whatsoever including damage to my personal property, and reasonable attorney's fees and court costs sustained or caused while on such premises or site.

In the event any clause, term, or provision of this agreement must be declared or adjudicated void or invalid, it must in no manner affect the other clauses, terms, and provisions hereof, which must remain in full force and effect, as if the clause, term, or provision so declared or adjudicated invalid was not originally a part hereof.

Visitor's Name: _____

Visitor's Signature: _____

Address: _____

Date: _____

Shutdown Notification Guidelines

The General Contractor must provide Dallas ISD with notification of power or other utility shutdown no less than ten (10) calendar days in advance of the shutdown. Notification includes Dallas ISD Central Maintenance Office, A/E, Program Manager, and the Principal at each affected school.

- Shutdown Authorization Form (EXHIBIT I) must be submitted to the Dallas ISD Bond Program Manager and Dallas ISD Project Manager for signatures of approval **10 days prior** to any planned shutdown.
- Shutdowns to be scheduled during weekends or extended breaks.
- Overtime Code may be needed for Dallas ISD Personnel involved after hours.
- Permanent shutdowns must be field verified by Contractor. If utility service remains active, immediately report to DISD Sustainability via Bond PM.

Water Shut-off Guidelines

Notification To:

- ✓ Dallas ISD Quadrant Supervisor
- ✓ Dallas ISD Department Supervisor
- ✓ Affected Dallas ISD Departments & Confirmation of readiness (Including but not limited to HVAC, Kitchen, Fire Suppression, etc.)
- ✓ Dallas ISD Sustainability Manager and/or Technician

Content of Notification:

- ✓ Signed Authorization form-DISD PM.
- ✓ Type of Shutdown: Emergency, Minor, Complete, Relocation.
- ✓ Meter number (if applicable).
- ✓ Area affected, Duration, and Contingency Plan
- ✓ SPA-Cover Letter Authorized by GC Safety Representative
- ✓ When relocating a utility, DISD Sustainability department must be notified.

Dallas ISD Plumbing Department:

- Department Manager: Bart Braswell
- SE Quad Supervisor: Jesse Rincon
- SW Quad Supervisor: James Baker
- NE Quad Supervisor: Justin Morris
- NW Quad Supervisor: David Martin
- Sustainability Department Manager: Bryant Shaw
- Sustainability Department Technician: Stephanie Garcia

Re-pressurizing:

- ✓ Include City Inspection
- ✓ Contractor to provide post inspection along with photos to DISD Plumbing Manager

Gas Shut-off Guidelines

Notification To:

- ✓ Quadrant Supervisor
- ✓ Department Manager
- ✓ Affected Departments & Confirmation of readiness (Including but not limited to HVAC, Kitchen, etc.)
- ✓ Dallas ISD Sustainability Manager and/or Technician

NOTE: When adding HVAC units, Project AE approval of increased load is expected.

Content of Notification:

- ✓ Signed Authorization form-DISD PM.
- ✓ Type of Shutdown: Emergency, Minor, Complete, Relocation.
- ✓ Meter number (if applicable).
- ✓ Area affected, Duration, and Contingency Plan
- ✓ SPA-Cover Letter Authorized by GC Safety Representative
- ✓ When relocating a utility, DISD Sustainability department must be notified.

Re-pressurizing:

- ✓ Include City Inspection
- ✓ Contractor to provide post inspection along with photos to DISD Plumbing Manager

Sanitary Sewer Guidelines

Notification To:

- ✓ Quadrant Supervisor
- ✓ Department Manager
- ✓ Dallas ISD Sustainability Manager and/or Technician

Content of Notification:

- ✓ Signed Authorization form-DISD PM
- ✓ Type of Shutdown: Emergency, Minor, Complete
- ✓ Meter number (if applicable)
- ✓ Area affected, Duration, and Contingency Plan
- ✓ SPA-Cover Letter Authorized by GC Safety Representative
- ✓ PMF PM to provide a Post Audit to DISD Plumbing Manager
- ✓ Include Pictures of tie-in
- ✓ Include City Inspection for all work.

Tie-In Guidelines:

- ✓ PMF PM to provide post inspection of service to DISD Plumbing Manager.

Electrical Shutdown Guidelines

Notification To: [Prior to Shut down and after restoration of service]

- ✓ ONCOR (if applicable)
- ✓ DISD Electrical Quadrant Supervisor
- ✓ DISD Electrical Department Supervisor
- ✓ MEP Director
- ✓ Dallas ISD Sustainability Manager and/or Technician.
- ✓ Affected Departments & Confirmation of readiness (HVAC, Kitchen, IT, Building Security, Fire Alarm, etc.)

Dallas ISD Electrical Department:

- Department Director: Bart Webster
- Department Manager: George Lakes
- NW Supervisor: Ainsworth, Steven
- NE Supervisor: Kevin T Liles
- SE Supervisor: Douglas Hall
- SW Supervisor: Jim Ward

Dallas ISD Sustainability Department:

- Sustainability Department Manager: Bryant Shaw
- Sustainability Department Technician: Stephanie Garcia

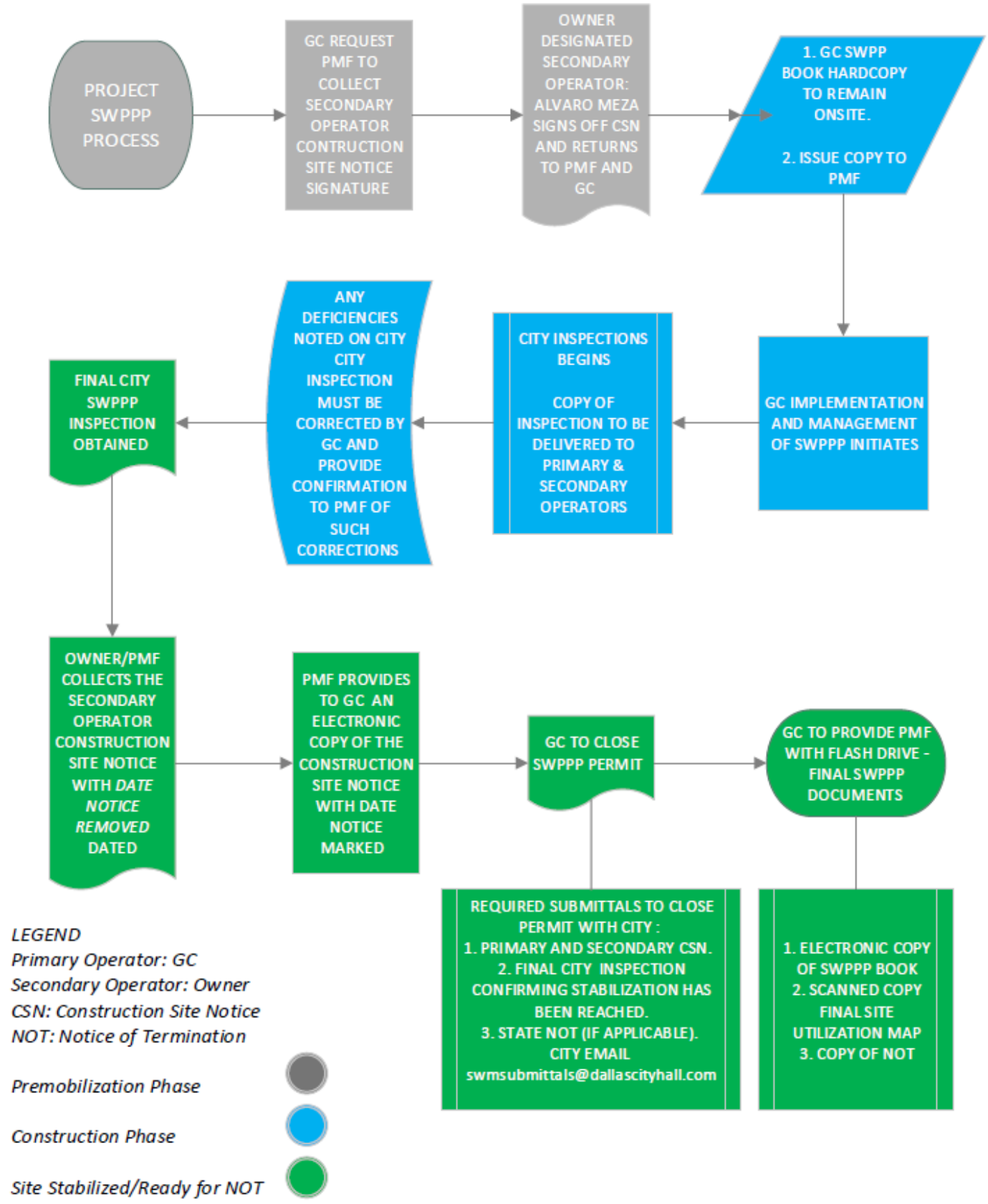
Content of notification:

- ✓ Signed Authorization form-DISD PM
- ✓ Type of Shutdown: Emergency, Minor, Complete
- ✓ Meter number (if applicable)
- ✓ When relocating a utility, DISD Sustainability department must be notified
- ✓ Area affected, Duration, and Contingency Plan
- ✓ SPA-Cover Letter Authorized by GC Safety Representative
- ✓ Complete-Shutdowns-

Re-energizing:

- ✓ Quadrant Supervisor
- ✓ Department Supervisor
- ✓ Affected Departments & Confirmation of readiness (HVAC, Kitchen, IT, Building Security, Fire Alarm, etc.)
- ✓ Electrical Contractor to gradually increase power

SWPPP Oversight Flowchart



Greenfield Shutdown Authorization Request Guidelines

See below set of guidelines for greenfield projects requesting permanent utility shutdown:

1. **Utility Shutdown request should select PERMANENT on the top right portion of our authorization form. (See below sample)**

2. **General Contractor (GC) responsible to provide power for the duration of the project.**

3. **Once the project reaches substantial completion, the GC/PMF to provide the Dallas ISD Sustainability Department with a copy of the GC utility bills to transfer the utility service to Dallas ISD.**

If you have any questions, please reach out to Dallas ISD Sustainability Department: sg9453@dallasisd.org

Note:
- Before demolishing a portable and/or building all meters numbers should be provided to DISD sustainability department to closed account and have the meters removed through the Owner provider.
- Please be reminded there is a "Minimum of 10-day(s) advance notice" for utilities.
It is very important that ALL Utility Accounts are closed through sustainability to prevent the GC reimbursing the district.
- Lastly, DISD is not responsible to provide GC utilities on Greenfield Locations.

Dallas Independent School District
Bond Program
Scheduled Utility Shutdown Authorization Form: General Contractor(s)

SECTION A. GENERAL INFORMATION: ☐ *Permanent ☐ Temporary

School Name and Org. #:
Bond Program Manager (PM) Name:
General Contractor (GC) Person In-Charge:
Sub-Contractor (SUB) Person In-Charge: (Name) (Contact No.)

SECTION B. PRE-WORK NOTIFICATION:

Utility System(s) to Be Shut down:
Utility Meter number:
Description of Work Performed:
Describe Procedure for Shutdown:
Safety Measures/ Precautions for Shutdown:
Date/ Time Requested for Shutdown: Shutdown Date / Shutdown Time / Restart Date / Restart Time

It is requested that the noted building systems be allowed for "shutdown" by the General Contractor to allow for our tie-in of services for the Project as enumerated below. We note that five (5) days advance notice is required as a minimum. I hereby certify that the required work has been coordinated and scheduled to achieve completion within the requested time-period.

SUB Person-In-Charge: (Sign) (Date)
GC Person-In-Charge: (Sign) (Date)
Bond Program Manager (PM) Approval: (Sign) (Date)
DISD Project Manager Approval: (Sign) (Date)

SECTION C. POST-WORK CERTIFICATION:

Actual Date/ Time for Shutdown: Shutdown Date / Shutdown Time / Restart Date / Restart Time

GC Person-In-Charge Certification: (Sign) (Date)
Bond Program Manager (PM) Certification: (Sign) (Date)
DISD Project Manager Certification: (Sign) (Date)
DISD Sustainability Certification: (Sign)

SECTION D. PROCESS FOR SCHEDULED UTILITY SHUTDOWN AUTHORIZATION

A. The General Contractor is to complete the Utility Shutdown Request Form, at least 2 working days prior to the scheduled utility shutdown, and submit it to the respective Bond Program Manager for approval.
B. The Bond Program Manager (PM) will review and approve submitted Utility Shutdown Request Form and forward to the respective Dallas ISD Project Manager for approval.
C. The Dallas ISD Project Manager will review and approve form and return to the PM.
D. PM forwards approved form to Director/Maintenance Solutions and notifies Deputy Chief Director, Emergency Operations and Bond Program Safety Manager.

Note: All scheduled shutdown requests will require a phone meeting with the Program Manager and the School staff 48 hours in advance to discuss the outage procedures and status of all Division departments involved on the shutdown request.

Note: For electrical shutdowns (Scheduled/ involuntary), when required for building operations, the General contractor must supply a power generator to keep the telephones, data and alarm working at all times.

*Permanent shutdowns are facilities or specific meters that will not require power/ utility to be restored.

AGENDA FOR CAMPUS SECURITY MEETING

Sign-in Sheet

- ✓ All personnel in attendance must sign-in

Welcome

- ✓ Purpose of the Meeting – To Review the Requirements Regarding Intruder Detection and Campus Security.

Intruder Detection

- ✓ All visitors must enter through the campus' secured entry point
- ✓ Immediately report any suspicious activity to the Project Management Team
- ✓ Always be alert – See Something, Say Something, Do Something
- ✓ Stop any individuals in your building who do not display a District Badge or Visitor Badge and escort them to the main office.

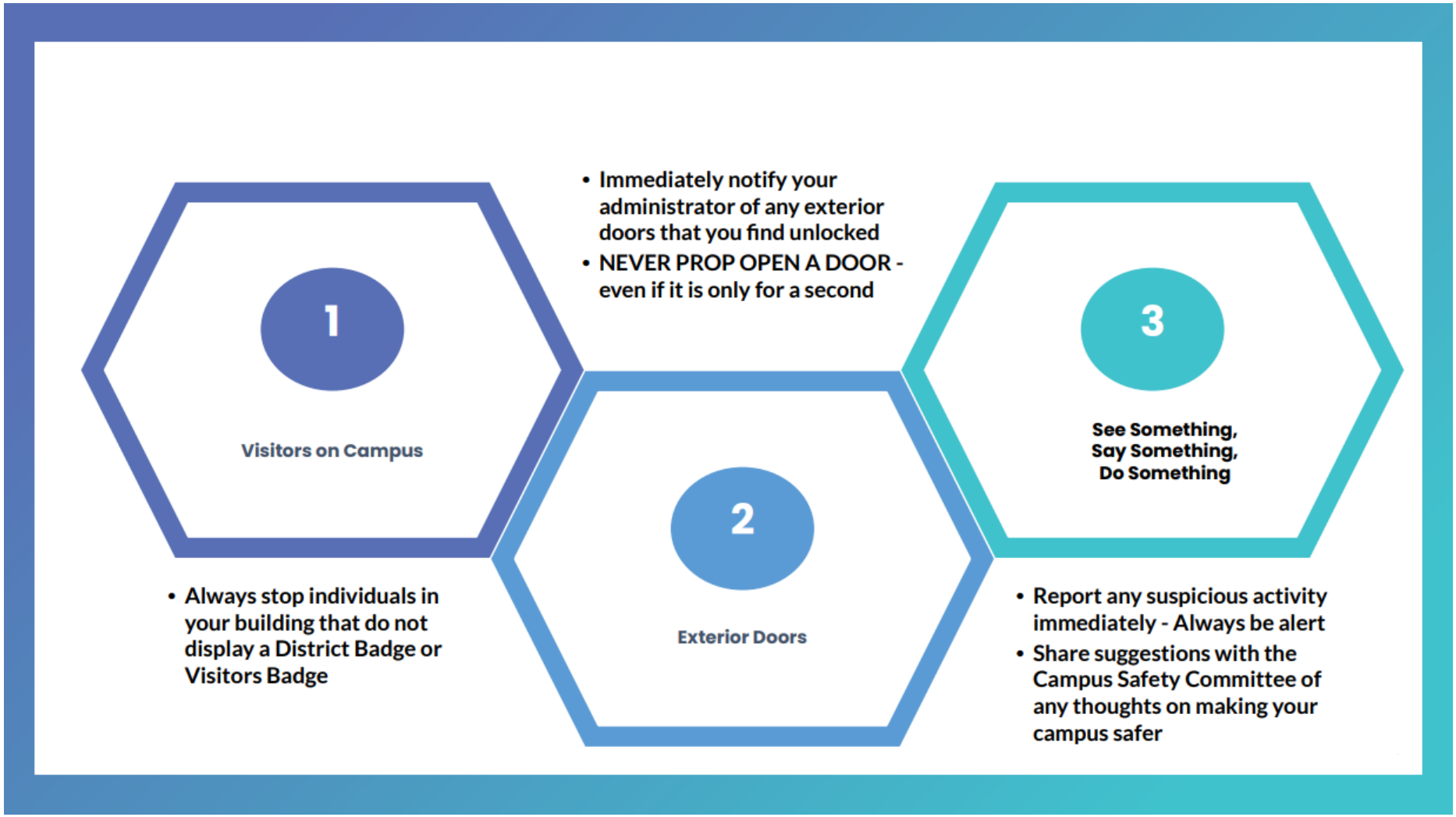
Propped Doors and Secured Areas

- ✓ **NEVER** prop open a door for any reason
- ✓ All exterior doors must remain locked at all times
- ✓ All interior doors leading into construction areas must remain locked at all times
- ✓ Portable doors are considered exterior doors and must be locked at all times
- ✓ Immediately notify the Project Management Team of any exterior door that you may find unlocked or propped open

Questions and Answers:

Note for General Contractors: All locked doors leading into construction areas and/or restricted pathways must be communicated with the campus Principal and Fire Marshal to ensure restrictions and/or physical alterations of any kind do not conflict with Campus Emergency Action Plans, Emergency Egress and NFPA 101 Life Safety Codes.

Campus Security Reminders



Safety Meeting Sign-in Sheet

DATE: _____ PROJECT: _____

CONTRACTOR:_____

Foreman's Signature:_____

Safety Representative:_____

TOPICS DISCUSSED:_____

NAME – PRINTED	SIGNATURE	COMPANY
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		

Geotechnical Soil Sampling Safety Guidelines

General Information:_____

School Name and Org #:_____

Bond Program Manager: _____

Company Name: _____ Supervisor: _____Cell Phone_____

Scope: _____Boring Map Location Attached: [circle] YES or NO

Mobilization Date: _____ Demobilization Date: _____Work Hours: _____

Minimum Drilling Safety Guidelines:

1. ALL crew members must be properly badged.
2. Schedule site access through your Dallas ISD Project Manager
3. [If Applicable] Pre-approved signed forms for custodial overtime may apply. Please confirm with your Dallas ISD PM.
4. During arrival, check in at the front office with badge displayed in the upper body and face cover.
5. Drill Rig must be barricaded and NOT be operated in occupied school areas.
6. Before any excavation is started, should contact 811 DIG-TESS for confirmation, Ground penetrating radar (GPR), review of existing plans, and any other reasonable efforts shall be made to determine if any underground utilities (i.e.: power lines, water lines, fuel lines, etc.) are present within the boundaries of the proposed work area. As the excavation work approaches the location of any known utilities, the lines shall be uncovered, using extreme caution not to disturb the lines, and adequate measures shall be taken to protect the lines from damage while the work progresses.
7. Any disturbed areas must be returned to existing and safe condition prior to departure.
8. Damage to property-Injuries Beyond First Aid must be immediately reported to Alvaro Meza 214-435-2204 and your Dallas ISD Project Manager.

NOTE: This Document is intended to provide a working, uniform minimal level of program guidelines to assist or provide direction to the Contractors. This Document is not intended to replace the need for each Contractor to establish and maintain a proper Illness and Injury Prevention Program as required by the Department of Labor, Occupational Safety and Health Act (29 CFR 1926 and 29 CFR 1910) and the State of Texas.

Inclement Weather Plan of Action

General Guidelines
PMFs are required to notify and coordinate with the GCs to take proactive steps during inclement weather events. •Construction Services may schedule a coordination call prior to any severe weather event with PMF (in a group call or individually- These calls or meetings may be on a regular or impromptu basis as needed) to share information about projects with medium/high probability of damage to property or interruption to school operations. The intent is to provide Construction Services a complete situational awareness of a school's readiness for return of students, and to eliminate or mitigate risk to DISD's facilities.

PRIOR to Inclement Weather Event:
For projects under construction PMF to provide a report to DISD Construction Services any conditions that may impact campus occupancy or function.
Coordination with DISD Maintenance (Managers and Supervisors) and Custodial Services (campus, and supervisors), along with Principals is REQUIRED. Be prepared to report this coordination.

POST Inclement Weather Event:
•PMFs to conduct a field verification and begin the mitigation phase.
•Work with contractors and appropriate maintenance personnel to create a recovery plan
•Provide Construction Services a real time update - by campus- on said issue(s)•Reporting shall continue as needed till mitigation is completed.

Return of Students and Staff
•PMF Leadership or designee to coordinate with campus Principal and Facility Supervisor. iffeasible, PMF Project Manager will be on site for that morning to confirm good working schooloperations.

Sample Reporting
•013-FD Roosevelt – No issues to report
•013-FD Roosevelt- 2. Campus has an issue – Provide detailed description and mitigation.

The intent of this document is to establish a minimum level of proactive steps/reporting, but not be completely inflexible.
After Action Reviews or a Root Cause Analysis may be required. Information should be captured to support these events

[End of Document]

DISD 2020 Bond – General Contractor

Step One: Set up your project account with Field Control Analytics formerly FC Construction Services

- Visit **www.fcbackground.com/clientsignup/**
  (Internet Explorer 5.0 or higher required)
- Enter your Project Pass Code: **DI20SC21**

EXISTING CUSTOMERS: You will be required to provide login credentials to complete signup. If you do not know your login credentials contact Customer Support @ customer.support@fieldca.com

You will be required to provide the following information. You will be unable to complete signup without all.

- Billing address and contact information
- Contact information for all authorized users
- Name and contact information for the company that hired you (Prime Contractor)
- Credit card information for payment

ALLOW TWO FULL BUSINESS DAYS FOR ACCOUNT SETUP COMPLETION AND NOTICE TO CLIENT/EMPLOYER

Step Two: Initiate Project Drug Testing, Background Check, and Badging

DISD 2020 Bond - $74.50 *(see Pricing Agreement for details)*
Replacement Badge Fee – $25.00 * Enrollment Fee - $50.00

1. Upon setup completion, contractor receives **Web Instructions** to download/print **Consent Document**.
2. Consent Document. ($25.00 handling fee for employees without a properly authorized Consent Document. No appointment necessary and maps are available online.)
3. Most results are available within one business day, but may take up to three. Authorized users will receive an e-mail notification when report results are available.
4. DISD badges will be printed and available for pickup at the facility selected during project setup.

Other Important Information

- FCA notifies your General Contractor of all unpaid invoices.
- If a worker fails a drug test, he/she will not be authorized to work for the duration of the project.

Background checks and badging requires one of the following identification sources of a person:

- Current U.S. Driver's License
- U.S. Birth Certificate (along with photo id)
- Current US Passport
- U.S. Citizenship Naturalization
- Foreign Passport
- U.S. issued photo ID Card
- Temporary identification card
- Resident Visa
- Employment Visa

Acceptable forms of ID do not include the non-US issued Matricula Card.

DISD 2020 Bond Badge Qualifications:

- Negative drug test result
- No felony convictions, no open or pending felony cases for crimes against a minor (no time limit)
- No felony convictions, no open or pending felony cases for crimes against a person (25 years)
- No felony convictions, no open or pending felony cases (7 years)
- No misdemeanor crimes (see misdemeanor offenses below). Misdemeanor records are limited to the previous 7-years.
- No registered sex offenders
- No outstanding warrants for crimes that would disqualify an individual from receiving a badge

Misdemeanor Offenses Include the following:

Possession of a Prohibited Weapon
Unlawful Carrying Weapon
Purchase/Furnish Alcohol to Minor
Assault Causes Bodily Injury
Terroristic Threat
Enticing a Child
Harboring Runaway Child
Violation of a Protective Order
Criminal Mischief
Burglary
Shoplifting
Theft
Larceny
Fraud
Forgery
Passing Forgery Writing
Fleeing from Police Officer
Leaving Scene of Accident
Failure to Stop and Give Information
Fail to Identify Giving False/Fictitious Info
Resisting Arrest
Evading Arrest/Detention
Escape from Custody
Interference with Public Duties
Disorderly Conduct
Interference with Emergency Call
Harassment
Prostitution

FCA Client Support Team
Phone: (972) 404-4479
Monday - Friday 6:00am – 6:00pm CST
customer.support@fieldca.com

DISD 2020 Bond – Professional Services

Step One: Set up your project account with Field Control Analytics formerly FC Construction Services

- Visit **www.fcbackground.com/clientsignup/**
  (Internet Explorer 5.0 or higher required)
- Enter your Project Pass Code: **DI20PS21**

EXISTING CUSTOMERS: You will be required to provide login credentials to complete signup. If you do not know your login credentials contact Customer Support @ customer.support@fieldca.com

You will be required to provide the following information. You will be unable to complete signup without all.

- Billing address and contact information
- Contact information for all authorized users
- Name and contact information for the company that hired you (Prime Contractor)
- Credit card information for payment

ALLOW TWO FULL BUSINESS DAYS FOR ACCOUNT SETUP COMPLETION AND NOTICE TO CLIENT/EMPLOYER

Step Two: Initiate Project Drug Testing, Background Check, and Badging

DISD 2020 Bond - $74.50 *(see Pricing Agreement for details)*
Replacement Badge Fee – $25.00 * Enrollment Fee - $50.00

1. Upon setup completion, contractor receives **Web Instructions** to download/print **Consent Document**.
2. Consent Document. ($25.00 handling fee for employees without a properly authorized Consent Document. No appointment necessary and maps are available online.)
3. Most results are available within one business day, but may take up to three. Authorized users will receive an e-mail notification when report results are available.
4. DISD badges will be printed and available for pickup at the facility selected during project setup.

Other Important Information

- FCA notifies your General Contractor of all unpaid invoices.
- If a worker fails a drug test, he/she will not be authorized to work for the duration of the project.

Background checks and badging requires one of the following identification sources of a person:

- Current U.S. Driver's License
- U.S. Birth Certificate (along with photo id)
- Current US Passport
- U.S. Citizenship Naturalization
- Foreign Passport
- U.S. issued photo ID Card
- Temporary identification card
- Resident Visa
- Employment Visa

Acceptable forms of ID do not include the non-US issued Matricula Card.

DISD 2020 Bond Badge Qualifications:

- Negative drug test result
- No felony convictions, no open or pending felony cases for crimes against a minor (no time limit)
- No felony convictions, no open or pending felony cases for crimes against a person (25 years)
- No felony convictions, no open or pending felony cases (7 years)
- No misdemeanor crimes (see misdemeanor offenses below). Misdemeanor records are limited to the previous 7-years.
- No registered sex offenders
- No outstanding warrants for crimes that would disqualify an individual from receiving a badge

Misdemeanor Offenses Include the following:

Possession of a Prohibited Weapon
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Enticing a Child
Harboring Runaway Child
Violation of a Protective Order
Criminal Mischief
Burglary
Shoplifting
Theft
Larceny
Fraud
Forgery
Passing Forgery Writing
Fleeing from Police Officer
Leaving Scene of Accident
Failure to Stop and Give Information
Fail to Identify Giving False/Fictitious Info
Resisting Arrest
Evading Arrest/Detention
Escape from Custody
Interference with Public Duties
Disorderly Conduct
Interference with Emergency Call
Harassment
Prostitution

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Monday - Friday 6:00am – 6:00pm CST
customer.support@fieldca.com

DISD 2020 Bond - Subcontractor

Step One: Set up your project account with Field Control Analytics formerly FC Construction Services

- Visit **www.fcbackground.com/clientsignup/**
  (Internet Explorer 5.0 or higher required)
- Enter your Project Pass Code: **DI20SC21**

EXISTING CUSTOMERS: You will be required to provide login credentials to complete signup. If you do not know your login credentials contact Customer Support @ customer.support@fieldca.com

You will be required to provide the following information. You will be unable to complete signup without all.

- Billing address and contact information
- Contact information for all authorized users
- Name and contact information for the company that hired you (Prime Contractor)
- Credit card information for payment

ALLOW TWO FULL BUSINESS DAYS FOR ACCOUNT SETUP COMPLETION AND NOTICE TO CLIENT/EMPLOYER

Step Two: Initiate Project Drug Testing, Background Check, and Badging

DISD 2020 Bond - $74.50 *(see Pricing Agreement for details)*
Replacement Badge Fee – $25.00 * Enrollment Fee - $50.00

1. Upon setup completion, contractor receives **Web Instructions** to download/print **Consent Document**.
2. Consent Document. ($25.00 handling fee for employees without a properly authorized Consent Document. No appointment necessary and maps are available online.)
3. Most results are available within one business day, but may take up to three. Authorized users will receive an e-mail notification when report results are available.
4. DISD badges will be printed and available for pickup at the facility selected during project setup.

Other Important Information

- FCA notifies your General Contractor of all unpaid invoices.
- If a worker fails a drug test, he/she will not be authorized to work for the duration of the project.

Background checks and badging requires one of the following identification sources of a person:

- Current U.S. Driver's License
- U.S. Birth Certificate (along with photo id)
- Current US Passport
- U.S. Citizenship Naturalization
- Foreign Passport
- U.S. issued photo ID Card
- Temporary identification card
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Unlawful Carrying Weapon
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Harboring Runaway Child
Violation of a Protective Order
Criminal Mischief
Burglary
Shoplifting
Theft
Larceny
Fraud
Forgery
Passing Forgery Writing
Fleeing from Police Officer
Leaving Scene of Accident
Failure to Stop and Give Information
Fail to Identify Giving False/Fictitious Info
Resisting Arrest
Evading Arrest/Detention
Escape from Custody
Interference with Public Duties
Disorderly Conduct
Interference with Emergency Call
Harassment
Prostitution

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Phone: (972) 404-4479
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customer.support@fieldca.com

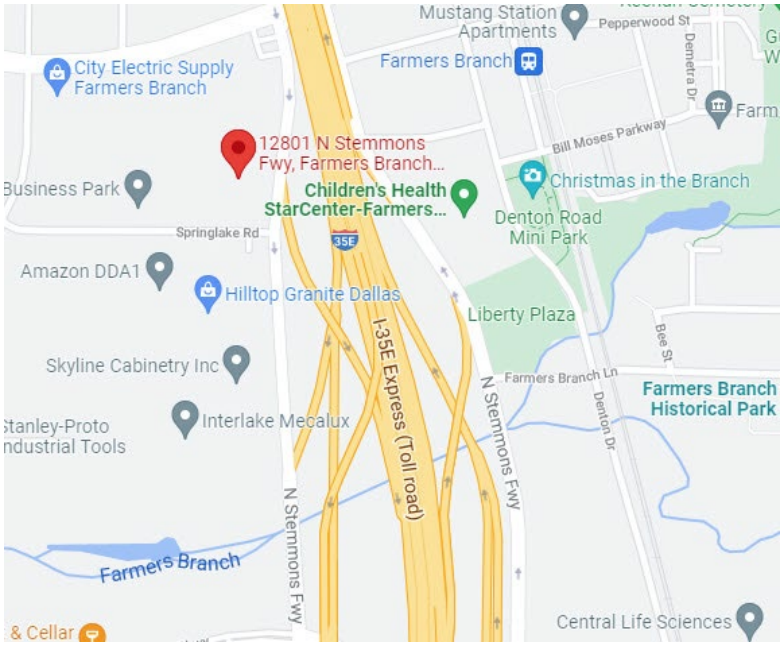
FCA EXPRESS - DALLAS SCREENING & BADGING FACILITY

ADDRESS

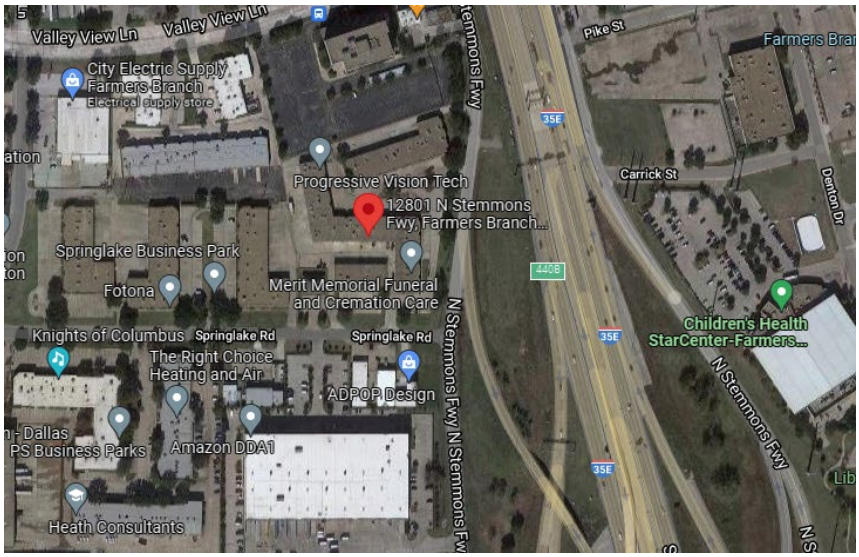
12801 N. Stemmons Frwy.
Ste. 807
Farmers Branch, TX 75234
Phone: 833.227.0637;
option 2
Hours: 7:30am - 4:30pm
Monday - Friday

OPENING FEBRUARY 14, 2022

Scan the QR code for instant directions!



Scan the QR code to contact us!



All FCA Express locations can process screens that require a background, drug test and badge.

www.fieldcontrolanalytics.com | 800-388-88827

SECTION 01 10 00 – SUMMARY OF WORK

PART 1 - GENERAL

1.1 Related Documents

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 Summary

A. Section includes:
1. Project information
2. Work covered by Contract Documents
3. Phased construction
4. Access to site
5. Coordination with occupants
6. Work restrictions

B. Related Sections:
1. Division 00 Section 00 31 00 Available Project Information
2. Division 00 Section 00 31 18 School Operations Parameters Statement
3. Division 01 Section 01 50 00 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities
4. Division 01 Section 01 52 14 “Temporary Facilities for Students” for specifications and procedures regarding the use of temporary swing space that the Contractor may furnish and install to accommodate the Work

1.3 Project Information

A. Refer to Section 00 31 00

1.4 Scope of Work. The Work consists of:

274 – MARY MCLEOD BETHUNE ELEMENTARY SCHOOL – Project Consists of the following:

1. **Provide Security System Upgrade, including card access readers, cameras, and door contacts etc.**
2. **Provide Secure Front Vestibule, Renovate and Expand Administration.**
3. **Replace Existing Marquee Sign.**
4. **Replace Existing Roof: A, B & C**
5. **Replace Existing Waterproofing / Sealant Joints**
6. **Mechanical / HVAC Improvements including New Split System and Rooftop Units, Replace Condenser Water Piping, Controls, Condenser Water Pumps, and Air-Cooled Chiller.**

1.5 Multiple Project Site Representation for Bid Packages**.** If multiple project sites are identified in the Work, the contractor shall employ and designate one qualified full-time Superintendent who shall oversee the performance on each individual project site within the bid package, for the duration of the project. Any deviation from this will need to be approved by DISD and the Program Manager.

1.6 Schedule of Values for Bid Packages. If multiple project sites are identified in the Work, the contractor shall provide one Schedule of Values for each project site attached to each application for payment. In addition, each school site shall have a separate schedule of values in the CSI format followed in the bid documents, identifying the labor and material components separately. Projects that have both Renovation and Addition scope shall have a sub-total for each of these two categories, within the Schedule of Values.

1.7 Concurrent Construction for Bid Packages. Work (additions and renovations) at each school site will be performed concurrently with the other school sites unless otherwise indicated by DISD.

1.8 Phasing. Since the school buildings will be in use during construction, the Work shall be conducted in such a manner as to not interrupt or disturb school activities. **THE PHASING PLANS ARE GUIDELINES AND ARE USED TO IDENTIFY A POSSIBLE APPROACH TO THE WORK. THE CONTRACTOR MAY SUBMIT A PHASING PLAN. ANY DEVIATION FROM THE SUGGESTED PLAN CONTAINED IN THE CONTRACT DOCUMENTS MUST BE APPROVED BY THE A/E, PROGRAM MANAGER, AND PRINCIPAL PRIOR TO IMPLEMENTATION.**

A. Temporary classroom space (Swing Space) if needed, **shall be provided by the Contractor**. The Contractor will be responsible for all associated planning, permitting, scheduling, installation, removal, site restoration, coordination and costs associated with providing temporary space for classrooms. Temporary classroom space will be in accordance with Section 01 52 14 - TEMPORARY FACILITIES FOR STUDENTS.

B. The Contractor may submit, as part of the proposal, optional phasing plans that can potentially save the District time and money.

C. Some work may need to be performed after normal school operating hours, nights and weekends. A DISD representative must be present at the school during times that the Contractor is working at the school site. The Owner will incur overtime costs for DISD staff presence at the school site outside normal hours of school operation, including weekends and holidays. Such overtime costs incurred will be the financial responsibility of the General Contractor and will be credited to the Owner in a manner to be determined by the DISD and the Program Manager.

D. Refer to the School Operations Parameter Statement Section for details of the regular working hours, holidays and procedures for custodial overtime, etc.

E. Work cannot start in a particular Phase until students/staff have been relocated to the designated Swing Space (either in the existing building or in Temporary Buildings outside) or until there is an arrangement in place for alternate shift work involved.

1. Close coordination with the A/E, Program Manager, and the School Staff, will be required of the Contractor.

F. Certain areas included in the Contractor's scope of work may contain furniture, boxes, etc. Protection of these contents is the responsibility of the Contractor.

G. Refer to Construction Documents for additional Phasing information.

1.9 HVAC and Water Treatment Requirements. Contractor will coordinate with DISD for water treatment and HVAC maintenance. Please refer to the plumbing and mechanical specifications for the contractor's responsibilities related to these requirements.

1.10 Phase Acceptance. Upon certification by the Contractor and recommendation of the A/E, DISD will accept the Work of each individual phase as it is completed. Architectural acceptance shall be called "phase acceptance". The HVAC, electrical, plumbing and roofing systems will be accepted by DISD when the entire project has been completed; at that point, upon completion of all relevant contractual requirements, DISD will issue substantial completion. The contractor will operate and maintain the HVAC, electrical and plumbing systems that are a part of his scope of work until substantial completion. The contractor's

warranty for any new HVAC, electrical, plumbing and roofing systems shall commence at substantial completion for each school project. The contractor will install new filters and record date of replacement on each filter upon substantial completion.

1.11 Use of Technology for Project Management. DISD will furnish information related to accessing web-enabled project management applications for this contract. DISD and the Program Manager will implement project management software, that will be easily accessible through the Internet. Contractor will cooperate with the Program Manager for the implementation and use of this tool.

Contractor will be required to create and post several types of documents into the web-enabled project management software via the Internet. Request for Information (RFIs) will be posted by the Contractor and responded to by the A/E(s) in the software via the Internet, thereby facilitating communication among all parties and expediting resolution of issues. A/E responses to RFIs will not be considered official and are still subject to revision until the Program Manager has approved the response in the software . Any meeting minutes and field reports required to be created by the Contractor or A/E(s) will be posted to the software. DISD and the Program Manager reserve the right to require additional documents to be entered into the software at their discretion.

1.12 Permitting. Contractors are responsible for the costs of acquiring the building permit at standard City of Dallas rates.

1.13 Storm Water Pollution Prevention Plan. Once the Notice to Proceed has been issued, the Contractor is obligated to comply with the applicable municipalities and applicable SWPPP codes and protocol. The Contractor assumes full responsibility for any complaints, citations, maintenance and complete management of the SWPPP plan including any and all documentation. For new schools with demolition scope by a separate contractor, Contractor shall coordinate with the separate contractor for a seamless transfer / transition of an existing SWPPP. Contractor will then submit all documentation to the District at closeout.

1.14 Construction Specification Index. All construction documentation will follow the Construction Specification Index format followed by the construction bid documents.

1.15 The contractor shall tag locations of all equipment within the scope of work by securing a plastic tag on the appropriate ceiling grid locations. This will assist easy identification of the equipment to DISD maintenance staff. The contractor will install stickers on all equipment provided indicating the warranty dates/periods and the contact information.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00

SECTION 01 21 00 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements governing allowances.

1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to the Contractor. Refer to the AIA 201 General conditions for additional requirements concerning allowances,

2. All lump-sum and Owner Controlled Allowances are within the Contract Sum, and shall be covered by the bonds, insurance, general conditions, overhead, profit and all other costs so that the totals represented by the Allowances are available without additional charge or cost to the Owner.

B. Types of allowances include the following:

1. Lump-sum allowances.
2. Owner Controlled Contingency allowances.

C. Related Sections:
1. Division 00, File 00 41 11 - Proposal Form - Base Bid.
2. Division 01, File 01 22 00 - Unit Prices (for procedures for using unit prices)
3. Divisions 02 through 49 (or as applicable) Sections for items of Work covered by allowances.

1.3 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, Contractor shall advise Architect and Program Manager of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

B. At Architect's or Program Manager’s request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Once the proposal is approved by the Owner, purchase products and systems selected by Architect from the designated supplier.

1.4 SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Allowance Expenditure Request Authorization (AERA).

B. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

C. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

D. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 COORDINATION

A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.6 ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include freight, insurance, and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials under allowance shall be included as part of the Contract Sum and not part of the allowance.

1.7 ADJUSTMENT OF ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, prepare a proposal based on the difference between purchase amount and the allowance.

1. Include installation costs in purchase amount only where indicated as part of the allowance.
2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
3. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

B. Schedule of Allowances is included in section 00 41 11

END OF SECTION 01 21 00

SECTION 01 22 00 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

B. Related Sections:

1. Division 00 Section 00 41 12 Proposal Form – Alternates and Unit Pricing.
2. Division 01 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
3. Division 01 Section "Quality Requirements" for general testing and inspecting requirements (File: 01 40 00)

1.3 DEFINITIONS

A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are either increased or decreased.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, and profit.

B. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. If the quantities of the items listed in the Schedule of Unit Prices are increased, the Unit Prices set forth by the Contractor in Section 00 41 12 shall apply to such increased quantities. Unit Prices for adjusting the Contract Sum for less work or material installation will be 95% of these amounts.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

3.1 SCHEDULE OF UNIT PRICES

A. Refer to section 00 41 12 for Schedule of Unit Prices.

END OF SECTION 01 22 00

SECTION 01 23 00 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by Proposers and stated on the Proposal Form for certain work defined in the Proposal Requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.

2. The cost or credit for each alternate is the total addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum. Pricing for alternates may not be submitted or listed in the form of an allowance amount on the proposal form.

1.4 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

2. Cost listed for each Alternate includes cost of related coordination, modification or adjustment.

B. Notification: Immediately following award of the Contract, Contractor shall prepare and distribute to each entity or person to be involved in the performance of the Alternate Work, a notification of the status of each Alternate scheduled herein. Indicate which alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates if any.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Contractor shall be responsible for any changes in the Work affected by acceptance of Alternates. Claims for additional costs or time extensions resulting from changes to the Work as a result of the Owner’s election of any or all Alternates will not be allowed.

E. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Refer to section 00 41 12 for Schedule of Alternates

END OF SECTION 01 23 00

SECTION 01 25 00 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Sections:

1. Division 01 Section "Allowances" for products selected under an allowance.
2. Division 01 Section "Alternates" for products selected under an alternate.
3. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
4. Divisions 02 through 49 Sections for specific requirements and limitations for substitutions.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor and Owner.

1.4 SUBMITTALS

A. Substitution Requests: Submit five (5) copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include related Specification Section number and title, Drawing numbers and titles and complete documentation for substitution. Include the following information with each request:
1. Certification by the Contractor to the effect that, in the Contractor’s opinion, after thorough evaluation, the proposed substitution will result in work that in every significant respect is equal to or better than the work required by the Contract Documents, and that it will perform adequately in the application indicated.
a. Include in a certification the Contractor’s waiver of right to additional payment or time, which may subsequently be necessary because of the failure of the substitution to perform adequately.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.

b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project, from IBC.
j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Cost information, including a proposal of change, if any.

3. Approval: If necessary, Architect will request additional information or documentation for evaluation within a reasonable amount time from receipt of a request for substitution. Architect will recommend to the Program Manager acceptance or rejection of proposed substitution within a reasonable amount of time from receipt of all required documentation. Program Manager will recommend to the District acceptance or rejection of proposed substitution within a reasonable amount of time from receipt of all required documentation. Upon recommendation from the Program Manager, the District will provide acceptance or rejection of proposed substitution within a reasonable amount of time from receipt of all required documentation.
   a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work with Program Manager and Owner written approval.
   b. Rejection will include a statement giving reason for rejection.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

A. Coordination: Modify or adjust affected work as necessary to integrate work of the approved substitutions.

B. The Owner may not consider the request if the Contractor cannot provide the product or method because of failure to pursue work promptly or coordinate activities properly.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

Approval process for both types of substitutions shall be as described above.

A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than fifteen (15) days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Architect will consider requests for substitution if received within twenty (20) days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect, only when there is an advantage to the Owner. The Owner may override rejections made by the Architect and request that the Program Managers make a determination as to whether the substitution shall be considered by the Architect.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
b. Requested substitution does not require extensive revisions to the Contract Documents.
c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
d. Substitution request is fully documented and properly submitted.
e. Requested substitution will not adversely affect Contractor's construction schedule.
f. Requested substitution has received necessary approvals of authorities having jurisdiction.
g. Requested substitution is compatible with other portions of the Work.
h. Requested substitution has been coordinated with other portions of the Work.
i. Requested substitution provides specified warranty.

j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

C. System Substitution: No changes should be anticipated in major building system types or approved manufactures in pricing of schedule; the Owner has standardized materials in place in existing buildings, and will not change for the convenience of the contractor.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 25 00

SECTION 01 29 00 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Provisions established within the General, Supplementary and Other Conditions of the Contract, Division 1 – General Requirements, and Drawings are collectively applicable to this Section.

1.02 SECTION INCLUDES

A. Procedures for preparation and submittal of Application for Payment.

1.03 RELATED SECTIONS/DOCUMENTS

A. General Conditions: Progress Payment, and Final Payment.

B. Section 01340 – Shop Drawings, Product Data and Samples

C. Section 01370 – Schedule of Values

1.04 FORMAT

A. AIA G702 – Application and Certificate for Payment

B. For continuation sheet, use AIA G703 in format at Section 01 29 73 for schedule of values.

1.05 PREPARTATION OF APPLICATIONS

A. Type required information or use media printout.

B. Execute certification by authorized officer.

C. Use data on accepted Schedule of Values. Provide dollar value in each column for each line item for portion of Work performed and for products.

D. List each authorized Change Order as an extension on continuation sheet, listing Change Order number and dollar amount as for original item of Work.

E. Prepare Application for Final Payment as specified by Program Manager.

F. Prepare one application with a schedule of values for each school with a breakdown in the CSI format followed by the bid documents.

G. Projects that have both Renovation and Addition scope shall have a sub-total for each of these two categories, within the Schedule of Values.

1.06 SUBMITTAL PROCEDURES

A. Schedule meeting (20) days prior to submitting first pay request, to review schedule with Architect, and Project Manager.

B. Submit one (1) original copy of each Application for Payment at times stipulated in Agreement.

C. Submit under transmittal letter.

D. Payment Period: Submit at intervals stipulated in the Agreement.

1.07 SUBSTANTIATING DATA

A. When Architect requires substantiating information, submit data justifying line-item amounts in questions. On Owner controlled allowance items, submit actual invoices from supplier of product or service.

B. Provide one (1) copy of data with cover letter for each copy of submittal. Show Application number and date, and line item by number and description.

1.08 FORMAT AND SUBMITTAL REQUIREMENTS

A. Set-up format and submittal requirements include but are not limited to the following:
   a. Contractor must use AIA 702 and AIA 703 forms for Application for Payment.
   b. All values should be taken to the hundredth (penny).
   c. All items must be broken down by school, by addition/renovation (where applicable). This break down must match the breakdown as specified in the GC Contract or established with the Program Manager.
   d. All items must be organized by the CSI division.
   e. All items must be broken down by material and labor.
   f. All applicable CSI divisions must be sub-totaled.
   g. Each addition/renovation (where applicable) and school must be sub-totaled.
   h. The Owner's Contingency Allowance (O.C.A.) should occupy one line item at the bottom of each addition/renovation and match the amount specified in the GC contract. This line item should be separated from any other CSI division.
   i. All other contract allowances (pre-bid or post-bid) should be specified per the GC contract and included in CSI division 1.
   j. Contractor must include a summary by school, by addition/renovation (where applicable), at the end of AIA 703.
   k. General Conditions, P&P Bonds, Insurance, Fee, Building Permit, and Mobilization must be broken out and included in CSI division 1.

B. Post-set-up format and submittal requirements include but are not limited to the following:
   a. Contractor may not change the "scheduled values" after approval of the Schedule of Values (SOV) by the A/E, PM, and DISD (at first Application for Payment).
   b. Include DISD P.O. number on AIA 702.
   c. Include DISD P.O. number in application number. For example, "222123-3" would be the third Application for Payment for P.O. 222123.
   d. Certified by A/E.
   e. Previous invoice totals match previous invoice.
   f. Attach fully executed signature page when billing for any DISD-approved CAEAs.
   g. Attach fully executed signature page when billing for any DISD-approved AERAs.
   h. Attach fully executed signature page when billing for any DISD-approved CAELs.
   i. Attach fully executed signature page when billing for any DISD-approved Change Orders.
   j. Attach an M/WBE Pay Activity Report, signed or acknowledged by e-mail or waiver by all minority subcontractors. (Acknowledgment must include amount paid during current period.)
   k. Attach all Custodian Overtime Approval forms for the billing period, with a summary of OT hours to date for the project.
   l. Attach a complete project schedule for each project, updated for the billing period, with substantial completion dates per GC contract.
   m. Attach a Title Transfer Form insurance/bonding documents for storage facility for any material stored off-site, per GC contract.
   n. Attach "GC Application for Payment Review & Sign-Off" with GC signature signifying review of all Application for Payment elements.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01 29 00

SECTION 01 29 73 - SCHEDULE OF VALUES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Provisions established within the General, Supplementary and Other Conditions of the Contract, Division 1 – General Requirements, and the Drawings are collectively applicable to this Section.

1.02 REQUIREMENTS INCLUDED

A. Procedures for preparation and submittal of Schedule of Values.

1.03 RELATED SECTIONS/DOCUMENTS

A. General Conditions.

B. Section 01 29 00 – Payment Procedures.

1.04 FORMAT

A. Print schedule on AIA Documents G703 – Continuation Sheet for Application and Certificate for Payment.

B. Follow Table of Contents of Project Manual for listing components parts. Identify each line item by number and title of major Specifications Section.

1.05 CONTENT

A. Using CSI format, each school shall have a separate schedule of values for Renovation Work and for Addition Work, as applicable.

B. In CSI format, list installed value of each major item of Work and each subcontracted item of Work as a separate line item to serve as a basis for computing values for Progress Payments. Do NOT Round off values to nearest dollar. All values should be taken to the hundredth (penny).

C. In CSI format, for each major subcontract, list material and labor of that subcontract as separate line items.

D. List Owner Controlled Contingency Allowance and other allowances with the specified monetary amount for each allowance in separate divisions.

E. Contractor to use separate lines for bonds, insurance, temporary facilities and controls, superintendence, and mobilization. Each item shall include pro rata portion of overhead and profit.

F. The sum of the values listed shall equal total Contract Sum.

1.06 SUBMITTAL

A. Submit electronic copy of Schedule of Values within ten (10) days of award of contract and prior to Pre-Construction Meeting.

B. Transmit under Architect accepted form transmittal letter. Identify Project by title and number.

C. Secure the A/E and Program Manager's (PM) review of the Schedule of Values prior to submitting the first Pay Application.

D. Limit amount of items on the Schedule of Values not to exceed $25,000, unless approved by the Architect and the Program Manager.

E. Break all major equipment costs into equipment and materials/labor at a minimum.

1.07 SUBSTANTIATING DATA

A. When the A/E or the PM requires substantiating information, submit data justifying line item amounts in question.

B. Provide one (1) copy of data with cover letter for each copy of Pay Application. Show Pay Application number and date and line item by number and description.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01 29 73

SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
   1. General project coordination procedures.
   2. Administrative and supervisory personnel.
   3. Requests for Information (RFIs).
   4. Project meetings.

B. Related Sections:
   1. Division 01 Section "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
   2. Division 01 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. RFI: Request from Owner, Architect, or Contractor seeking information from each other during construction.

1.4 COORDINATION

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.

   1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
   3. Make adequate provisions to accommodate items scheduled for later installation.

B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

   1. Preparation of Contractor's construction schedule.
   2. Preparation of the schedule of values.
   3. Installation and removal of temporary facilities and controls.
   4. Delivery and processing of submittals.
   5. Progress meetings.
   6. Pre-Installation conferences.
   7. Project closeout activities.

8. Startup and adjustment of systems.
9. Shutdown requests
10. Abatement coordination
11. Owner inspections
12. Training

1.5 KEY PERSONNEL

A. Key Personnel Names: Within ten (10) days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and email addresses. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1. Post copies of list in project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.6 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified using the District-specified electronic project management software.

1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. If solution(s) impacts the Contract Time, Construction Documents or the Contract Sum, Contractor shall state impact in the RFI. Select importance category from pull down menu.
12. Include e-mail notification to the Architect, Program Manager and District Project Manager for all RFI’s.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: Software-generated form generated using District-specified electronic project management software with substantially the same content as indicated above.

D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow fourteen (14) working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.

1. The following RFIs will be returned without action:

   a. Requests for approval of submittals.
   b. Requests for approval of substitutions.
   c. Requests for coordination information already indicated in the Contract Documents.
   d. Requests for adjustments in the Contract Time or the Contract Sum.
   e. Requests for interpretation of Architect's actions on submittals.
   f. Incomplete RFIs or inaccurately prepared RFIs.

2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum will be administered per the general conditions of contract.

   a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect and Program Manager in writing within seven (7) days of receipt of the RFI response.

E. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect and Program Manager within seven (7) days if Contractor disagrees with response.

F. RFI Log: Prepare, maintain, and submit on a weekly basis a log of RFI's organized by the RFI number. The log should be generated using the District-specified electronic project management software and should contain the following basic information:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were dropped and not submitted.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.
8. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

1.7 PROJECT MEETINGS

A. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference at the earliest possible date after the execution of the Agreement and before starting construction, at a time convenient to Owner, PM and Architect.

1. Purpose of the conference will be to review responsibilities and personnel assignments.
2. Attendees: Authorized representatives of Owner, PM, Architect, and their consultants; Contractor, Contractor's Project Manager and its superintendents; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect progress, including the following:
   a. Introductions
   b. Submission of Post Proposal Information if any outstanding
   c. Tentative Construction schedule.
   d. Safety
      1) Emergency Contact List

2) First aid.
3) Site Security.
4) Badging requirements

e. Meetings: dates, locations, attendees, types, agendas
f. Communication: District-specified electronic project management software set up and administration procedures, correspondence flow
1) Lines of communications, decision ladder and escalation procedures.
g. Schedule:
1) Phasing
2) Critical work sequencing and long-lead items
h. Designation of key personnel and their duties
i. Procedures for processing field decisions and Change Orders
j. Procedures for RFIs
k. Consultant / Lab Notification Requirements
1) HazMat
2) Roofing
3) Test & Balance
4) Materials Testing
5) Inspecting
l. Procedures for processing Applications for Payment
1) Schedule of Values
2) Review
3) M/WBE
m. Distribution of the Contract Documents.
n. Submittal procedures.
o. Preparation of record documents. Use of the premises and existing building Work restrictions.
p. Working hours.
q. After hours work requirements and overtime payment procedures.
r. Owner's occupancy requirements.
s. Responsibility for temporary facilities and controls.
1) Site access
2) Signage
3) Dumpsters
4) Fencing
5) SWPPP
6) Parking availability
7) Office, work and storage areas
8) Equipment deliveries and priorities
t. Procedures for shutdowns.
u. Progress cleaning.

4. Minutes: Architect will record and distribute meeting minutes and sign-in sheet using the District-specified electronic project management software.

B. Progress Meetings: The architect will schedule and administer progress meetings at weekly intervals.
1. Contractor shall make physical arrangements at site for the progress meetings.
2. Location of meetings: Contractor’s field office, unless agreed upon mutually by the Architect, Contractor and PM.
a. Determine at the Pre-construction Meeting if space in the existing facility or facilities is available for meetings.
b. For multiple school Bid Packages, weekly progress meetings will be held at each school site on a rotating basis. Site specific meetings may be held at the discretion of the PM.
3. Architect will prepare agenda, distribute notice of the meeting, preside at meetings, record minutes and distribute copies within three (3) days after meeting to participants, and to entities affected by decisions at meetings.
4. Coordinate dates of meetings with preparation of payment requests.

5. Attendees: In addition to representatives of Owner, Program Manager, Professional Consultants, as appropriate to the agenda, and Architect, each contractor, job superintendent, subcontractor, supplier, and other entities as appropriate to the agenda shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
6. Agenda:
    a. Review and correct or approve minutes of previous progress meeting.
    b. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
        1) Safety (lost time, accidents, violations, etc.)
        2) Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
            a) Review schedule for next period.
        3) New Business (Field observations, problems, decision, identification of problems which impeded planned progress, non-confirming work, etc.)
        4) RFI's and RFI log review
        5) Submittals and submittal log review
        6) RFP's, CAEAs and related log reviews
        7) Review of draft Application for Payment, as necessary.
    c. Review present and future needs of each entity present, including the following:
        1) Interface requirements.
        2) Sequence of operations.
        3) Access.
        4) Site utilization.
        5) Temporary facilities and controls.
        6) Progress cleaning.
        7) Quality and work standards.
        8) Status of correction of deficient items.
        9) Field observations.
        10) Pending claims and disputes.
7. Minutes: Using the District-specified electronic project management software, the entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
    a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction. These include pre-dig, pre-lift, pre-drill, pre-power shutdown, or pre-roof meetings at the work site prior to commencing the specific construction activity.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Owner, PM, and Architect of scheduled meeting dates, five business (5) days in advance
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

    a. Contract Documents.
    b. Related RFIs.
    c. Approved submittals.
    d. Review of mock-ups.

e. Possible conflicts and/or delays
f. Compatibility problems.
g. Time schedules.
h. Safety issues and AHA's
i. Weather limitations.
j. Manufacturer's written recommendations.
k. Warranty requirements.
l. Compatibility of materials.
m. Acceptability of substrates.
n. Space and access limitations.
o. Testing and inspecting requirements.
p. Installation procedures.
q. Coordination with other work.
r. Required performance results.
s. Protection of adjacent work.
t. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions, using the District specified electronic management software
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Pre-installation Conference: When required in individual Specification Sections, convene a Pre-installation conference at work site prior to commencing work of the section.
1. Require attendance of entities directly affecting or affected by Work of the Section.
2. Notify Owner, PM and Architect at least five (5) business days in advance of meeting date.
3. Prepare agenda, preside at conference, record minutes (using the District specified electronic management software), and distribute copies within two (2) business days after conference to participants.
4. Review conditions of reinstallation, preparation and installation procedures, and coordination with related work.

E. Project Closeout Conference: Schedule and conduct a Project closeout conference, at a time convenient to Owner, Program Manager and Architect, but no later than fourteen (14) days prior to the scheduled date of Substantial Completion.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.
2. Attendees: Authorized representatives of Owner, Program Manager, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:

a. Preparation of record documents.
b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
c. Submittal of written warranties.
d. Requirements for preparing operations and maintenance data.
e. Requirements for demonstration and training.
f. Preparation of Contractor's punch list.
g. Procedures for processing Applications for Payment at Substantial Completion and for final payment.

h. Submittal procedures.
i. Responsibility for removing temporary facilities and controls.

4. Minutes: Entity conducting meeting will record and distribute meeting minutes using the District-specified electronic project management software.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
   1. Daily construction reports.
   2. Material and equipment delivery status reports.
   .

B. Related Sections:
   1. Division 01 Section “Construction Progress Schedule”.
   2. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
   3. Division 01 Section "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

   1. PDF electronic file uploaded to District’s Project Management software.

B. Daily Construction Reports: Submit at weekly intervals.

C. Material and Equipment Delivery Status Reports: Submit at weekly construction progress meetings.

PART 2 - PRODUCTS

2.1 REPORTS

A. Daily Construction Reports: Prepare a daily construction report using the District-specified Project Management software recording the following information concerning events at Project site:

   1. List of subcontractors at Project site.
   2. Approximate count of personnel at Project site.
   3. Equipment at Project site.
   4. Material deliveries.
   5. High and low temperatures and general weather conditions, including presence of rain or snow.

6. Accidents.
7. Meetings and significant decisions.
8. Unusual events (refer to special reports).
9. Stoppages, delays, shortages, and losses.
10. Meter readings and similar recordings.
11. Emergency procedures.
12. Orders and requests of authorities having jurisdiction.
13. Change Orders received and implemented.
14. Construction Change Directives received and implemented.
15. Services connected and disconnected.
16. Equipment or system tests and startups.
17. Partial completions and occupancies.
18. Substantial Completions authorized.

B. Material and Equipment Delivery Status Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.

PART 3 - EXECUTION – Not Used

END OF SECTION 01 32 00

SECTION 01 32 16 – CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 Description

A. Section includes administrative and procedural requirements for developing, submitting and updating a detailed Critical Path Method (CPM) project schedule and related reports. The project schedule is developed by the Contractor and herein referred to initially as the Preliminary CPM Schedule. Subsequent to the Owner, Architect and Contractor acceptance of the Preliminary CPM Schedule, the Contractor completes the development of a more complete and thorough schedule called the Detailed CPM Schedule. Once the Detailed CPM Schedule is accepted by the Program Manager (PM), Architect, and the Contractor, it shall be "baselined" and referred to as the Project Schedule or Detailed CPM Schedule. Monthly progress updates will be compared to the baseline schedule.

B. If the Contractor should desire or intend to complete the Work earlier than any required milestone, completion date, or end period of performance, then the Owner/PM shall not be liable to the Contractor for any costs or other damages should the Contractor be unable to complete the work before such milestone, completion date or end of Period of performance.

1.02 Quality Control and Quality Assurance

A. The Contractor shall develop and maintain a Project Schedule for each project site (School) (referred to as the Preliminary CPM Schedule and ultimately the Project Schedule) in accordance with the requirements of this Section. The requirement for a Project Schedule is included to:

1. Ensure adequate planning before and during the execution and progress of the Work in accordance with the allowable number of working days and milestones.
2. Assure coordination and execution of the work among various trades of the Contractor, subcontractors, suppliers, third party utility companies or other related entities that may be involved in the Project.
3. Assist the Contractor and the Owner in evaluating:
    a. Contract performance relative to the required contract schedule milestones
    b. Monthly progress
    c. Proposed Contract Modifications
    d. Documenting anticipated, requested and or approved time extensions
    e. The documentation of unplanned events, time extensions and other impacts arising from such events

B. The project schedule shall show the sequence and interdependence of activities required for complete performance of the work. The Contractor shall be responsible for assuring all work sequences are logical and show a coordinated plan of the work. The project schedule shall employ computerized CPM planning, scheduling and progress reporting of the work as described in this specification. The Contractor shall create and maintain the schedule using project scheduling software approved by the Owner and PM that utilizes the fundamentals of CPM for scheduling. The observance of the requirements herein is an essential part of the work under the Contract.

C. Within seven (7) calendar days after issuance of Notice to Proceed, the Contractor shall designate in writing a schedule representative in the Contractor's organization who shall be responsible for coordinating with the PM during development and maintenance of the Project Schedule. The Contractor's representative shall have the expertise to operate the CPM software and be capable of rapidly evaluating alternate scenarios to optimize management capabilities. The Contractor has the option to utilize qualified outside scheduling consultation for the assistance of developing and maintaining the Project Schedule, however, the use of an outside consultant does not relieve the Contractor of responsibilities for compliance of this specification. The Contractor's schedule representative shall have complete authority to act for the Contractor in fulfilling the schedule requirements of the Contract, and if such authority is interrupted during the Contract, approval shall be obtained in writing by the PM.

D. All activities shall have at least one predecessor and one successor unless approved by the PM. The exceptions are no predecessor is needed for the Notice To Proceed (NTP) milestone and no successor is needed for the Project Completion milestone.

E. **Contractor shall not use any constraints of any type without prior approval of the Owner.**

F. Each activity's "Activity ID" and "Activity Description" or "Task Name" shall remain unchanged throughout the duration of the project subsequent the baseline acceptance by the Owner.

G. An activity's "Activity Description" may only be revised to clarify an activity's original scope. If the scope of an activity increases or decreases, a replacement activity shall be created.

H. PM acceptance shall be obtained prior to making any changes or revisions to an activity's "Activity Description".

1.03 Submittals

A. All CPM Schedules shall be presented on two (2) copies (preferable 8 ½ x 11) and one electronic copy (accessible format, not pdf). Preliminary CPM Baseline Schedule: Within fourteen (14) calendar days after issuance of Notice to Proceed, but prior to the start of any construction activities, the Contractor shall submit the Preliminary CPM Baseline Schedule deliverable package. The preliminary baseline

schedule shall cover the planned activities for each project site (school) in sufficient level of detail.

B. Detailed CPM Schedule: Within thirty (30) calendar days after Notice to Proceed (NTP), the Contractor shall submit the Detailed CPM Baseline Schedule deliverable package, with a detailed schedule for each project site (school). The substantial completion date in the detailed CPM schedule shall coincide with the substantial completion date in the approved preliminary baseline schedule.

C. Schedule Update: The Contractor shall submit with the payment application a CPM Schedule Update on at least a monthly basis throughout the duration of the Work. The "baselined" Project Schedule, once updated for actual activities, shall be used as the first CPM Schedule Update. All schedule updates shall have a current data date (not older than 5 days). Include a narrative report specifying all changes and modifications made to the CPM schedule.

D. Recovery or Revision to the Detailed CPM Schedule: The Contractor shall provide a Recovery CPM Schedule within seven (7) calendar days of any CPM Schedule Update Meeting if any milestone, completion date or end of Period Performance falls seven (7) calendar days or greater behind (negative float).

E. Schedule Review: All schedules that are to be submitted for review shall be stamped as being reviewed/approved by the General Contractor and key subcontractors.

PART 2 PRELIMINARY CPM SCHEDULE

2.01 Preliminary CPM Schedule

A. The Preliminary CPM Schedule shall be the basis for the sequence of work during the first ninety (90) calendar days of the Contract while the Project Schedule is being developed, submitted, reviewed and accepted. The Preliminary CPM Schedule shall be updated on a monthly basis. If the acceptance of the Project CPM Schedule extends beyond one month, the Preliminary CPM Schedule shall be updated according to the requirements stated in paragraph 3.03.

B. The Preliminary CPM Schedule shall include:

1. The Procurement activities for each project site (school) to be accomplished (either in whole or in part) during the first ninety (90) calendar days of the Contract. The procurement activities shall include mobilization, shop drawing submittal, sample submittal, Architect/Engineer review and approval period, material fabrication and delivery of key and long-lead items. If portable swing space buildings are required for a project, the preliminary CPM schedule shall include milestones for relocation and installation of such swing space buildings.

2. The construction activities for each project site (school) to be accomplished (either in whole or in part) during the first ninety (90) days of the Contract. These activities shall be in units of

whole working days and shall be limited to a maximum of ten (10) work days, unless otherwise approved by the PM, except for non-construction activities including mobilization, procurement and concrete curing activities.

3. The approach to scheduling the remaining work or phases of work beyond the first ninety (90) calendar days of the contract. The work for each phase or milestone must be represented by at least one summary activity for each major item of work such that they cumulatively indicate the entire schedule, with milestones as defined in Paragraph 3.01, B.7. The approximate duration for each summary activity shall include the Contractor's best estimate for the work it represents.

4. Submit a written narrative describing the Contractor's approach to mobilization, procurement, and construction during the first ninety (90) calendar days of the Project. The narrative shall elaborate on the basis for durations, major equipment to be used, and shall identify all major assumptions used to develop and support the schedule. The narrative shall also include the Contractor's description of the critical path work activity as represented in the Preliminary CPM Schedule.

C. The Preliminary CPM Schedule shall be used for review of time extension request(s) until the Project CPM Schedule is accepted. When changes and alterations are initiated, unplanned events or excusable delays are experienced, or the Contractor desires to revise the sequence of work, the Contractor shall submit a written time impact analysis.

D. The final determination of all time extensions requested under the Preliminary CPM Schedule shall be determined and finalized subsequent to the review and acceptance of the Project CPM Schedule.

E. Deliverable: **No later than fourteen (14) calendar days after award of Contract, but prior to the start of any construction activities, the Contractor shall submit the Preliminary CPM Schedule deliverable package**. The deliverable package shall include at a minimum, the following information:

1. Two (2) copies (preferable 8 ½ x 11). The critical path shall be readily discernible in red ink.

2. Two (2) copies of the written narrative as described in paragraph 2.01B.5.

3. One (1) electronic copy (accessible format not pdf).

2.02 Schedule Review and Acceptance

A. The PM, Architect/Engineer and the Contractor shall meet within seven (7) calendar days of receipt of the Preliminary CPM Schedule for joint review. The Contractor shall revise any areas, which, in the opinion of the PM and/or Architect/Engineer, conflict with either the intent of this

specification or the timely completion and acceptable coordination of the Project. In the event the Contractor fails to define any element of work activity or logic currently designed and the PM review does not detect this omission or error, such omission or error, when discovered by the Contractor or the PM, shall be corrected by the Contractor and incorporated into the next schedule submission.

Within seven (5) business days after the joint review between the A/E, Contractor and the PM, the Contractor shall revise the Preliminary CPM Schedule in accordance with agreements reached during the joint review and submit the revised schedule per the deliverable requirements.

Acceptance of the Preliminary CPM Schedule by the A/E, Owner or PM does not relieve the Contractor of any of its responsibility for the accuracy or feasibility of the project schedule. However, to the extent that the accepted Project Schedule is reasonable, it becomes a part of this Contract.

B. Submission and final PM and Contractor acceptance of the Preliminary CPM Schedule will be a condition precedent to the application or payment of any progress payments under the Contract, unless otherwise agreed upon by the Owner. The PM shall notify the Contractor of the Owner acceptance of the Preliminary CPM Schedule in writing.

PART 3 PROJECT CPM SCHEDULE

3.01 Project Schedule

A. The Project Schedule shall begin at the project NTP and incorporate the accepted Preliminary CPM Schedule including all required revisions and applicable progress updating as warranted. The Project Schedule shall indicate a logical sequence of work for each project site (school) and major restrictions from the availability and use of manpower, material and equipment. Utilize the schedule in planning, scheduling, coordinating and performing the work under this Contract (including all activities of subcontractors, equipment vendors and suppliers). The Project Schedule shall indicate the sequence and interdependence of activities required for complete performance of the Work.

Proposed durations assigned to each activity shall be the Contractor's best estimate of time required to complete the activity considering the scope and resources planned for the activity. In developing the Project Schedule, the Contractor shall be responsible for ensuring that subcontractor work scope and sequencing at all tiers, as well as its own work, is included. If a contract for a subcontractor has not yet been awarded for a certain portion of the work, the Contractor is responsible for the development of the schedule for the work as described under this section. After the subcontractor award of contract, the Contractor shall modify the current accepted schedule to reflect any changes or revisions for the subcontractor sequence of work. Under no circumstance or event, shall a schedule modification or revision under

this paragraph extend a milestone. The Project Schedule shall comply with the various limits imposed by the scope of work and by any contractually specified intermediate milestone dates and completion dates. The degree of detail shall be to the satisfaction of the PM the A/E or the Owner.

B. Provide sufficient detail and clarity of form and technique so that all work can be properly controlled and progress monitored by the PM and A/E. The Project Schedule shall consist of, but not be limited to, the following criteria:

1. Full detail of all major procurement activities including the activities and information contained within the Preliminary CPM Schedule. Break up all procurement activities for major components and long lead items to include submittal dates, fabrication duration, and expected delivery dates.
2. Full detail of all major construction activities including the activities and information contained within the Preliminary CPM Schedule. Add column for responsible party for all construction activities.
3. Multiple Calendars shall be used for establishing Holidays and periods of non-work based on the School Operations Parameter Statement in the Project Information Section of Division 0, concrete curing activities, other weather or ambient temperature sensitive construction activities, and or other work requiring overtime or double shift work.
4. Seasonal weather conditions shall be considered and included in the planning and scheduling of all work influenced by high or low ambient temperatures, precipitation and/or saturated soil to ensure recognition, planning and anticipation of intermittent inclement weather throughout the project duration. In addition, activities of similar nature shall be assigned to independent calendars based on this weather data. The software calendars shall be updated monthly to reflect actual days worked.
5. Activity duration in whole working days with a maximum duration of ten (10) working days each, unless otherwise approved by the PM, except for non-construction activities including mobilization, procurement and concrete curing activities.
6. At a minimum, the following guidelines, intermediate and final milestones shall be included in the project schedules for each individual project site (school), except for activities that are specifically identified to be common for all the project sites for a multi-project bundle:

    a. Notice to Proceed

b. Required Periodic Inspections (examples: rebar, utilities, electrical and mechanical rough-in, overhead and architectural
c. Time allotted for coordination with and execution of abatement activities
d. Specific Phase start and finish dates – renovations and additions
e. Preliminary CPM Schedule submission and acceptance
f. Project Schedule submission and acceptance
g. Building dry-in
h. Permanent power
i. Conditioned air available
j. Completed testing and acceptance of Life Safety Systems and other critical building components
k. Completion of ADA upgrades in restrooms
l. Commissioning, when project requires
m. Ten percent (10%) minimum float for the project
n. Substantial Completion
o. Final Completion
p. Owner Turn-Over / Start-Up / Project Closeout Activity / Warranty Period / Owner Testing/Training
q. Earliest Date that Owner can occupy the affected portion of the building (by phase, by complete project, etc.). This shall include all necessary approvals, permits (Fire Marshall Acceptance, Certificate of Occupancy, etc.).

C. The Contractor shall prepare a written narrative explaining the Contractor's approach to construction for the entire Project and include the narrative information as submitted with the Preliminary CPM Schedule deliverable package. The narrative shall elaborate on the basis for durations, major equipment to be used, and shall identify all major assumptions used to develop and support the schedule. The narrative shall also include the Contractor's description of the critical path work activity as represented in the Project Schedule.

D. Deliverable: Within thirty (30) calendar days after the Notice to Proceed, the Detailed CPM Schedule deliverable submitted by the Contractor shall include at a minimum, the following information:

1. Two (2) copies (preferably 8 ½ x 11) of the project schedule. The critical path shall be readily discernible in red ink.
2. Two (2) copies of the written narrative as described in paragraph 3.01, B.5
3. One (1) electronic copy (accessible format not pdf)
3. A list of all rain days occurring over the past month. Each rain day shall be incorporated into the Project Schedule Calendar as record information subsequent to PM review and acceptance.

3.02 Schedule Review and Acceptance

A. Within fourteen (14) calendar days of receipt of the Contractor's proposed Project Schedule, the PM shall evaluate the schedule for compliance with this item and other Contract requirements, and notify the Contractor in writing of its findings.

B. If the PM does not request a revision or justification, The A/E, PM and the Contractor shall meet within seven (7) calendar days on a date selected by the PM and finalize acceptance of the schedule. If a revision or justification is requested by the PM and/or A/E, the Contractor shall re-submit the proposed Project Schedule within seven (7) calendar days and address all issues to the satisfaction of the PM. Any and all disagreements or interpretations of the meaning or intent of this specification shall be solely dictated by the Owner.

C. The PM, A/E and the Contractor shall meet within seven (7) calendar days of receipt of the Contractor's response for joint review, correction or adjustment of the Contractor's proposed Project Schedule. Any area, in the opinion of the PM and/or A/E, conflicts with timely completion of the project, shall be subject to revision by the Contractor. In the event the Contractor fails to define any element of work, activity or logic and the Owner review does not detect this omission or error, when discovered it shall be corrected by the Contractor and amended to the Project Schedule as soon as possible.

D. Within seven (7) calendar days after the joint review meeting, the Contractor shall incorporate revisions as directed by the PM and re-submit the proposed Project Schedule per the deliverable requirement as stated in paragraph 3.01, E. All further review by the PM shall be within seven (7) calendar days of receipt. The PM shall notify the Contractor in writing of final acceptance of the Contractor's Project Schedule.

E. The process of approving Contractor's schedules and updates to Contractor's schedule shall not constitute a warranty by the Owner that any non-Contractor milestones or activities will occur as set out on Contractor's schedule.

3.03 Schedule Updates

A. After the Project Schedule is accepted by the PM and the Contractor, it shall be "baselined" and used as a comparison for future progress updates. The accepted Project Schedule shall be updated on a monthly basis, or as directed by the Owner, throughout the duration of the work until final completion is met. The Contractor shall meet with the PM each month at a Project Progress Meeting to review the work progress update and PM comments regarding the Project Schedule update. The Contractor shall submit a schedule update no later than three (3) working days before the Project Progress Meeting for the PM to review and comment.

B. The percentage of all work shall be calculated by estimating the actual remaining duration of each progressed activity. The data date of each

schedule update shall be determined by the PM each month. Contractor prepared estimates of the percent completion of each scheduled activity and the necessary supporting data shall be submitted on or before the data date referenced above and shall include the following information:

1. One (1) original of the previous month's Schedule Update indicating actual activity start and/or finish dates to date, and revised (current) remaining durations.
2. A narrative report shall be included that indicates in writing those activities the Contractor plans to work on during the following update month and current or anticipated conditions that have delayed or may delay the work in order to discuss remedial action. The Contractor shall also explain, for work that reflects less than satisfactory progress, whether any uncompleted and/or upcoming work will (or will not) be affected in a like manner and the Contractors method of correction. Any additional written information necessary to support the updated schedule including explanations of revisions to activities: logic, durations, resources, etc.

C. In case of disagreements at the project progress meeting concerning actual progress to date, the Owner's determination shall govern. Upon completion of the schedule update meeting, the Contractor shall revise the Schedule Update to reflect progress as of the date of the schedule update meeting and any approved revisions to the Schedule Update and carry out a computer produced calculation to determine the status of the Project Schedule.

D. Each Schedule Update shall be forwarded to the PM within five (5) calendar days after the schedule update meeting and shall include two (2) copies of the narrative report with the following information:

1. Activities that have been added in the month of this Project Schedule Update.
2. Activities that have been deleted in the month of this Project Schedule Update.
3. Activities that have "Actual Starts" prior to the month of this Project Schedule Update and remain unfinished.
4. Activities that have "Actual Starts and Actual Finishes" in the month of this Project Schedule Update.
5. A description of any approved revisions to the activity descriptions, schedule logic, or initial activity durations.
6. One (1) print of the updated CPM Schedule Update indicating the progress made up to the date of the schedule update and indication of any revisions to the CPM Schedule Update.
7. Two (2) prints of the written narrative as described in paragraph 3.03, B.3.

8. A list of all rain days occurring over the past month. Each rain day shall be incorporated into the Project Schedule Calendar.

E. If the Contractor's monthly progress schedule update reflects, or PM determines, that the Contractor is at least ten percent (10%) or at least negative seven (-7) calendar days behind the “baselined” schedule, the Contractor shall provide a revised or recovery schedule. The Contractor’s revised or recovery schedule must incorporate a proposed plan for bringing the work back on schedule and completing the work by the contract completion date at no additional expense to the PM or Owner. The revised or recovery schedule shall be in accordance to paragraph 2.08.

3.04 Revisions to the Project Schedule

A. Revisions to the Schedule Update to reflect actual progress made up to the date of a schedule update shall not be considered as revisions to the Project Schedule. If as a result of the monthly schedule update, it appears the Project Schedule no longer represents the actual execution and progress of the work, PM will request, and the Contractor shall submit, a Revision to the schedule.

B. The Contractor may also request revisions to the Project Schedule in the event the Contractor’s planning for the work is revised. If the Contractor desires to make changes in the Project Schedule to reflect revisions in his method of operating and scheduling of the work, the Contractor shall notify PM in writing, stating the reason for the proposed revision. If revision to the schedule is contemplated, the Contractor or PM shall so advise the other in writing at least seven (7) calendar days prior to the next schedule update meeting, describing the revision and setting forth the reasons thereof.

Contractors must submit a three (3) week look-ahead schedule that will include all lifts, shutdowns, etc.

3.05 Project Float Time

A. Float time is not for the exclusive use or benefit of either the Contractor or the Owner. Contractor’s work shall proceed according to early start dates, and the Owner shall have the right to reserve and apportion float time according to the needs of the Project. The Contractor acknowledges and agrees that actual delays, affecting paths of activities containing float time, will not have any affect upon contract completion times, providing that the actual delay does not exceed the float time associated with those activities.

3.06 Impact Analysis for: Change Orders, Delays, and Contractor Requests

A. When changes are initiated, delays are experienced, or the Contractor desires to revise the Project Schedule, the Contractor shall submit to the PM written time impact analysis illustrating the influence of each change, delay or Contractor request, on any milestone. Each time impact analysis shall include a fragmentary network (network analysis) demonstrating how the Contractor proposed to incorporate the change,

delay or Contractor request into the schedule. The time impact analysis shall demonstrate the time impact to each and every affected activity in the Project Schedule utilizing the most recent schedule update as the basis for the analysis. The date of the most recent schedule update shall be a date prior to the date the change is given to the Contractor, the date the delay occurred or the date the Contractor submits a request for a change. The event times used in the time impact analysis shall include the most recent schedule update or as adjusted by mutual agreement. The time impact analysis shall include a backup copy on CD which shall contain the detail of the change, including but not limited to, added, changed or deleted data for activities and logic restraints. If the Detailed CPM Schedule is revised subsequent to submittal of a time impact analysis but prior to its approval, the Contractor shall promptly indicate in writing to the PM the need for any modification to its time impact analysis.

B. Activity delays shall not automatically mean that an extension of any milestones is warranted or due to the Contractor. A change or delay may not affect existing critical activities or cause non-critical activities to become critical. A change or delay may result in only absorbing a part of the available total float that may exist within an activity chain of the network, thereby not causing any effect on any milestone.

C. A comprehensive narrative of each time impact analysis shall be submitted within seven (7) calendar days after the commencement of a delay or the notice for a change is given to the Contractor.

D. Recommendation to the Owner for the acceptance or rejection of each time impact analysis by the PM and A/E shall be made within seven (7) calendar days after receipt unless subsequent meetings or negotiations are necessary. After a decision has been made by the Owner, a copy of the time impact analysis signed by the PM, A/E, Owner and the Contractor shall be returned to the Contractor and incorporated into the Project Schedule at the next monthly schedule update. The time impact analysis shall be incorporated into and attached to any relevant supplemental agreement (s).

END OF SECTION 01 32 16

SECTION 01 32 33 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Preconstruction photographs.
2. Periodic construction photographs.
3. Final completion construction photographs.
4. Preconstruction video recordings.
5. Periodic construction video recordings.

B. Related Sections:
1. Division 01 Section "Submittal Procedures" for submitting photographic documentation.
2. Division 01 Section "Closeout Procedures" for submitting photographic documentation as project record documents at Project closeout.
3. Division 01 Section "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 INFORMATIONAL SUBMITTALS

A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph or video recording. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.

B. Digital Photographs: Submit image files in the quantities and at the intervals described in paragraph 3.1 of this section.

1. Digital Camera: Minimum sensor resolution of at least 8 mega pixels.
2. Format: Unaltered original files, with same aspect ratio as the sensor, uncropped, date and time stamped, in folder named by date of photograph, accompanied by key plan file.
3. Identification: Provide the following information with each image description in file metadata tag:

a. Name of Project.
b. Name and contact information for photographer.
c. Name of Architect.
d. Name of Contractor.
e. Date photograph was taken.
f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
g. Unique sequential identifier keyed to accompanying key plan.

C. Construction Photographs: The project requires comprehensive documentation of construction progress and post inspection milestones. Submit prints of each photographic view in the quantities and at the intervals described in paragraph 3.1 of this Section.

1. Format: 8-by-10-inch (203-by-254-mm) on photographic paper to allow a 1-inch-(25-mm-) wide margin and enclosed back to back in clear plastic sleeves that are punched for standard three-ring binder.
2. Identification: On back of each print, provide an applied label or rubber-stamped impression with the following information:

    a. Name of Project.
    b. Name and contact information for photographer.
    c. Name of Architect.
    d. Name of Contractor.
    e. Date photograph was taken if not date stamped by camera.
    f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
    g. Unique sequential identifier keyed to accompanying key plan.

3. “Progression” photo sets are to be performed at pre-determined intervals throughout the duration of construction, as applicable to the scope and as follows:

    a. Site survey (Pre-construction): A onetime shot that provides coverage of site and immediate and immediate surroundings.
    b. Exterior progression shots: Taken from key perspectives along site perimeter and 360 degrees around building envelope, to be performed at monthly intervals.
    c. Interior progression shots: Broadly track the improvements from logical perspectives, to be performed at monthly intervals and coordinated with pace of erection.
    d. Pre-slab/Pre-Chase/Interior record shots: Underground or concealed utilities will be documented post inspection/pre-insulation and prior to pouring slabs, backfilling or closing chases/walls/ceilings.

D. Video Recordings: Submit video recordings in accordance with paragraph 3.2 of this Section.

1. Submit video recordings in digital video disc format.
2. Identification: With each submittal, provide the following information:

    a. Name of Project.
    b. Name and address of photographer.
    c. Name of Architect.
    d. Name of Contractor.
    e. Date video recording was recorded.
    f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
    g. Weather conditions at time of recording.

E. Aerial Photography
1. On new construction and addition projects, submit monthly aerial photographs of the project. The photos should be taken from 4 different angles and 4 sets of color 8”x10” prints should be submitted.
    a. Digital Photographs: provide color images in JPG format with minimum sensor of 12 megapixels, and at an image resolution of not less than 3200 by 2400 pixels. Use flash in low light levels or backlit conditions.

b. Digital Video Recordings: Provide high resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full high-definition mode. Provide supplemental lighting in low light levels or backlit conditions.

1.4 QUALITY ASSURANCE

A. Photographer Qualifications: An individual who has the basic skills necessary to record digital photographs and video recordings.

B. Drone Operator Qualifications: FAA Part 107 Licensed drone operator, certified as an unmanned aircraft operator with UAS rating for the operation of a commercial drone (unmanned aerial vehicle) pilot, having a minimum of 7 years' experience as a drone operator with current Certifications.

1.5 COORDINATION

A. Auxiliary Services: Provide auxiliary services necessary, including temporary lighting required to produce clear, well-lit photographs.

1.6 USAGE RIGHTS

A. Contractor will transfer copyright usage rights to Owner for unlimited reproduction of photographic documentation.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

A. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor size of 8 mega pixels. Images shall not have their resolution reduced.

B. Digital Video Recordings: Provide high-resolution, digital video disc.

PART 3 - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS

A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.

1. Maintain key plan with each set of construction photographs that identifies each photographic location.

2. Taking photographs or video recordings with students and schools staff included on the photograph is strictly prohibited.

B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
   1. Date and Time: Include date and time in file name for each image.
   2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Architect.

C. Preconstruction / Pre-Demo / Pre-Site Clearing Photographs: Before starting demolition or construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, or as directed by Architect.
   1. Take photographs as required to show existing conditions adjacent to property before starting the Work.
   2. Take photographs as required of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
   3. Reference Section 017300 Execution for details of documenting and reporting existing conditions.

D. Periodic Construction Photographs: Take a photographs monthly and submit with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken. For renovation projects: The location and type of items to be photographed will be determined by the Architect and/or PM based on the specific project conditions not to exceed the number of progress photographs required above.

E. Final Completion Construction Photographs: Take color photographs after date of Substantial Completion for submission as project record documents. Architect will inform photographer of desired vantage points.

3.2 CONSTRUCTION VIDEO RECORDINGS

A. Preconstruction Video Recording: Before starting demolition or construction, record video of Project site and surrounding properties from different vantage points, as directed by Architect.
   1. Show existing conditions adjacent to Project site before starting the Work.
   2. Show existing buildings either on or adjoining Project site to accurately record physical conditions at the start of demolition or construction].
   3. Show protection efforts by Contractor.
   4. Narrate all noted conditions on the video.
   5. On renovation projects with crawlspace work, record video of these areas before, during and after work is completed.

B. Periodic Construction Video Recordings: Record video monthly and submit with each Application for Payment. Select vantage points to show status of construction and progress since last video recordings were recorded. Minimum recording time shall be 15 minutes and shall include narration of actual conditions and progress made since last recording.

C. Owner’s Training: Record video during the manufacturer’s training session at substantial completion. Minimum recording time shall be 30 minutes per session. Deliver the recordings with the PDF Electronic File of the O&M Manual at Substantial Completion. Video shall be clear with easily understandable audio.

D. Submit videos in DVD format.

END OF SECTION 01 32 33

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Sections:
1. Division 01 Section "Payment Procedures" for submitting Applications for Payment.
2. Division 01 Section "Schedule of Values" for submitting the schedule of values.
3. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
4. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
5. Division 01 Section "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
6. Division 01 Section "Demonstration and Training" for submitting video recordings of equipment demonstration and training of Owner's personnel.

C. Refer to other Division 1 Sections and other Contract Documents for Specifications on administrative submittals. Such submittals include, but are not limited to the following:
1. Permits.
2. Payment Applications.
3. Inspection and Test Reports.
4. Schedule of Values
5. Progress Reports.
6. Listing of Subcontractors

D. Shop Drawings are technical drawings and data that have been specially prepared for this Project, including but not limited to the following items:
1. Fabrication and installation drawings.
2. Setting diagrams.
3. Shopwork manufacturing instructions.
4. Templates.
5. Patterns.
6. Coordination drawings (for use on-site).
7. Schedules.
8. Design mix formulas.
9. Contractor's engineering calculations.

Standard information prepared with specific reference to a Project is not considered to be shop drawings.

E. Product Data includes standard printed information on manufactured products that has not been specially prepared for this Project, including but not limited to the following items:

1. Manufacturer’s product specifications and installation instructions.
2. Standard color charts.
3. Catalog cuts.
4. Rough-in diagram and templates.
5. Standard wiring diagrams.
6. Printed performance curves.
7. Operational range diagrams.
8. Mill reports.
9. Standard product operating and maintenance manuals.
   Modify standard product data, drawings and diagrams to delete information not applicable to the project, and / or supplement standard information to provide specific data that is applicable to the work.

F. Samples are physical examples of Work, including but not limited to the following items:
1. Partial sections of manufactured or fabricated work.
2. Small cuts or container of materials.
3. Complete units of repetitively used materials.
4. Swatches showing color, texture and pattern.
5. Color range sets.
6. Units of work to be used for independent inspection and testing.

G. Miscellaneous Submittals are work-related, non-administrative submittals that do not fit in the three previous categories, including but not limited to the following:
1. Specially prepared and standard printed warranties.
2. Maintenance agreements.
3. Workmanship bonds.
4. Survey data and reports.
5. Project photographs.
6. Testing and certification reports.
7. Record Drawings.
8. Field measurement data.
9. Operating and maintenance manuals.
10. Keys and other security protection devices.
11. Maintenance tools and spare parts.
12. Overrun stock.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as action submittals.

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as informational submittals.

C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or modifications to submittals noted by the Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with start-up construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Monthly submittal log. Submit at the weekly progress meeting, an updated submittal log indicating status of all project submittals.
4. Final Submittal: Submit concurrently with the first complete submittal of Project schedule.

    a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

5. Format: Arrange the following information in a tabular format:

    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal category: Action, informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Architect's final release or approval.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

B. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect’s receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 14 calendar days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 10 calendars days for review of each resubmittal.
4. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 14 calendar days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.

C. Identification and Information: Place a permanent label or title block on each paper copy submittal item for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Include the following information for processing and recording action taken:

    a. Project name.
    b. Date.
    c. Name of Architect.
    d. Name of Contractor.
    e. Name of subcontractor.
    f. Name of supplier.
    g. Name of manufacturer.
    h. Submittal number or other unique identifier, including revision identifier.
        1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).
    i. Number and title of appropriate Specification Section.
    j. Drawing number and detail references, as appropriate.
    k. Location(s) where product is to be installed, as appropriate.
    l. Other necessary identification.

D. Identification and Information: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
    a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).
3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
4. Include the following information on an inserted cover sheet:

    a. Project name.
    b. Date.
    c. Name and address of Architect.
    d. Name of Contractor.
    e. Name of firm or entity that prepared submittal.
    f. Name of subcontractor.
    g. Name of supplier.
    h. Name of manufacturer.

i. Number and title of appropriate Specification Section.
j. Drawing number and detail references, as appropriate.
k. Location(s) where product is to be installed, as appropriate.
l. Related physical samples submitted directly.
m. Other necessary identification.

5. Include the following information as keywords in the electronic file metadata:

a. Project name.
b. Number and title of appropriate Specification Section.
c. Manufacturer name.
d. Product name.

E. Options: Identify options requiring selection by the Architect.

F. Deviations: Identify deviations from the Contract Documents on submittals and the transmittal sheet. Failure to note deviation may void action taken on submittal.

G. Transmittal: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review received from sources other than Contractor.

1. Transmittal Form: Provide locations on form for the following information:

a. Project name.
b. Date.
c. Destination (To:).
d. Source (From:).
e. Names of subcontractor, manufacturer, and supplier.
f. Category and type of submittal.
g. Submittal purpose and description.
h. Specification Section number and title.
i. Indication of full or partial submittal.
j. Drawing number and detail references, as appropriate.
k. Transmittal number, numbered consecutively.
l. Submittal and transmittal distribution record.
m. Remarks.
n. Signature of transmitter.

2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect’s action stamp.

I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

J. Use for Construction: Use only final submittals that are marked with approval notation from Architect's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Post electronic submittals as PDF electronic files directly to the appropriate location. Defined at the pre-construction meeting.

    a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

2. Submit electronic submittals as PDF electronic files.

    a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
3. Action Submittals: Submit three paper copies of each submittal, unless otherwise indicated. Architect will return two copies.
4. Informational Submittals: Submit two paper copies of each submittal, unless otherwise indicated. Architect will not return copies.
5. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."
6. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
7. Test and Inspection Reports Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable. Cross out all inapplicable data and information.
3. Include the following information, as applicable:
    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.
4. For equipment, include the following in addition to the above, as applicable:
    a. Wiring diagrams showing factory-installed wiring.
    b. Printed performance curves.
    c. Operational range diagrams.

d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.
6. Submit Product Data in the following format:
   a. PDF electronic file.
   b. Three paper copies of Product Data, unless otherwise indicated. Architect will return two copies.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based upon Architect's digital data drawing files is otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
   a. Identification of products.
   b. Schedules.
   c. Compliance with specified standards.
   d. Notation of coordination and accessibility (maintenance and service) requirements.
   e. Notation of dimensions established by field measurement.
   f. Relationship and attachment to adjoining construction clearly indicated.
   g. Seal and signature of professional engineer if specified.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches.

3. Submit Shop Drawings in the following format:
   a. PDF electronic file.
   b. Three opaque copies of each submittal. Architect will retain two copies; remainder will be returned.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:
   a. Generic description of Sample.
   b. Product name and name of manufacturer.
   c. Sample source.
   d. Number and title of applicable Specification Section.
3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
   a. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
   a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and

physically identical with material or product proposed for use, and that show full range of color and texture variations expected.

a. Number of Samples: Submit three sets of Samples. Architect will retain one Sample sets; remainder will be returned.
   1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
   2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents.
2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.
5. Submit product schedule in the following format:

   a. PDF electronic file.
   b. Three paper copies of product schedule or list, unless otherwise indicated. Architect will return two copies.

F. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

G. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."

H. Schedule of Values: Comply with requirements specified in Division 01 Section "Schedule of Values."

I. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.
4. Submit subcontract list in the following format:

   a. PDF electronic file.

J. Coordination Drawings: Comply with requirements specified in Division 01 Section "Project Management and Coordination."

K. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

L. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on American Welding Society (AWS) forms. Include names of firms and personnel certified.

M. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

N. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

O. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

P. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

Q. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

R. Product Test Reports: Submit written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

S. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

T. Schedule of Tests and Inspections: Comply with requirements specified in Division 01 Section "Quality Requirements."

U. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

V. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

W. Field Test Reports: Submit reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

X. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

Y. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect, no later than 30 days after notice to proceed.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Project Closeout and Maintenance/Material Submittals: Refer to requirements in Division 01 Section "Closeout Procedures."

C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT/ENGINEER’S ACTION

A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
   1. Action Stamp: The Architect/Engineer will stamp each submittal to be returned with a uniform, self explanatory stamp, appropriately marked and executed to indicate whether the submittal returned is for unrestricted use, final-but-restricted use (as marked), must be revised and resubmitted (use not permitted) or without action (as explained on the transmittal form).

C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

E. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

F. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 01 33 00

DALLAS INDEPENDENT SCHOOL DISTRICT

MEMORANDUM

To: All General Contractors working on Elementary Schools (and other facilities occupied by children under the age of 6) built before 1978 for Dallas ISD Construction Services Department
From: DISD Executive Director
Construction Services
Date: June 14, 2010

RE: EPA Lead-Based Paint Renovation, Repair, and Painting Program

In April of 2008, the EPA introduced its new Lead-Based Paint Renovation, Repair, and Painting Program Rule, hereafter referred to as the RRP. This new rule requires renovation firms to be EPA-certified. Furthermore, the rule requires workers to be trained to use lead-safe work practices when they disturb painted surfaces in buildings built prior to 1978 and which are occupied by children under age 6. These requirements became fully effective on April 22, 2010.

In addition, pre-renovation education requirements are in effect. These require contractors and others who perform renovations for compensation and that may disturb lead-base paint in child occupied facilities built before 1978 to distribute a lead pamphlet to the users of the facility. The RRP defines renovation broadly to include any activity that disturbs painted surfaces greater than 6 square feet per room on the interior and greater than 20 square feet on the exterior of a facility.

It is the understanding and expectation of Dallas ISD that renovation contractors should be fully aware of and in compliance with this new EPA rule.

IF YOUR FIRM IS CURRENTLY PERFORMING RENOVATION WORK ON A CAPITAL IMPROVEMENT PROGRAM PROJECT, AND YOUR FIRM IS NOT IN FULL COMPLIANCE WITH THE NEW RULE, YOU MUST CEASE ACTIVITIES IMMEDIATELY ON ANY WORK THAT MAY DISTURB MORE THAN 6 SF (20 SF ON EXTERIOR) OF PAINTED SURFACES, OR WINDOW REPLACEMENT IN BUILDINGS BUILT PRIOR TO 1978 AND WHICH ARE OCCUPIED BY CHILDREN UNDER AGE 6.

If you must cease work on any portion of the project as a result of this rule, please contact your Project Manager immediately to discuss the appropriate course of action.

If you are in full compliance with the rule, as should be the case, please submit the following at your earliest convenience:

- EPA firm certification (In the absence of prime's firm certification, the certification from the appropriate sub-contractor and the prime's application for certification will suffice for now)
- Identify who is the certified staff on site
- Evidence of worker training by the certified staff
- Summary of lead-safe work practices to be implemented

In addition, please prepare to attend a meeting with the School Principal, Dallas ISD PM and PM to inform her/him about the rule, share the RRP pamphlet and Notices. Your PM will notify you of date and time of the meeting.

If the scope of work planned or in progress does not require compliance with the training and lead-safe work practices of the RRP, then you may continue on with the construction activities and there is no need for any further action on your part. At the same time, the Owner understands that contractors are responsible for compliance with the rule. Therefore, the Owner's expectation is that you will bring to the PM's attention immediately, any scope of work that may trigger compliance with this rule.

Cc: Dallas ISD PM
Program Director, PM Firm
Construction Manager, PM Firm
Project Manager, PM Firm
PM Firm Document Control

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. Owner will employ and pay for the service of an Independent Testing Laboratory to perform specified testing and laboratory services.
   1. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
   2. Contractor shall cooperate with the Laboratory to facilitate the execution of its required services.
   3. Contractor shall pay for additional samples and tests required for Contractor's convenience or when initial tests indicate work does not comply with Contract Documents.
   4. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
   5. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
   6. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, Commissioning Authority, Construction Manager, or authorities having jurisdiction are not limited by provisions of this Section.

C. Related Sections:

   1. Division 01 Section "Allowances" for testing and inspecting allowances.
   2. Division 01 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
   3. Division 01 Section "Execution" for cutting and patching.
   4. Divisions 02 through 49 Sections for specific test and inspection requirements.
   5. Division 01 Section "Testing, Adjusting, and Balancing for HVAC" **(FOR INFORMATION ONLY – TAB SERVICES PROVIDED BY OWNER)**

1.3 DEFINITIONS

A. Quality Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect or Construction Manager.

C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

1. Laboratory Mockups: Full-size physical assemblies constructed at testing facility to verify performance characteristics.
2. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.
3. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.

D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

F. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.

G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

H. Testing Agency: An entity engaged by the Owner to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade or trades.

J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with

the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

C. Conflicts between the specifications and the construction documents. The most stringent requirement will govern.

D. Conflicts on specification requirements. The most stringent requirement will govern.

1.5 ACTION SUBMITTALS

A. Shop Drawings: For [integrated exterior] [laboratory] mockups, provide plans, sections, and elevations, indicating materials and size of mockup construction.
   1. Indicate manufacturer and model number of individual components
   2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.6 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data: For Contractor's quality-control personnel.

C. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

D. Schedule of Tests and Inspections: Prepare in tabular form and include the following, as applicable:

   1. Specification Section number and title.
   2. Entity responsible for performing tests and inspections.
   3. Description of test and inspection.
   4. Identification of applicable standards.
   5. Identification of test and inspection methods.
   6. Number of tests and inspections required.
   7. Time schedule or time span for tests and inspections.
   8. Requirements for obtaining samples.
   9. Unique characteristics of each quality-control service.

1.7 CONTRACTOR’S QUALITY CONTROL PLAN

A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice of Award, and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.

B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
   1. Project quality-control manager [may also serve as Project superintendent] [shall not have other Project responsibilities].

C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
   1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
   2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."
   3. Owner-performed tests and inspections indicated in the Contract Documents [, including tests and inspections indicated to be performed by the Commissioning Authority].

E. E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.

F. F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.8 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following as applicable:

   1. Date of issue.
   2. Project title and number.
   3. Name, address, and telephone number of testing agency.
   4. Dates and locations of samples and tests or inspections.
   5. Names of individuals making tests and inspections.
   6. Description of the Work and test and inspection method.
   7. Identification of product and Specification Section.
   8. Complete test or inspection data.
   9. Test and inspection results and an interpretation of test results.
   10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
   11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
   12. Name and signature of laboratory inspector.
   13. Recommendations on retesting and reinspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.9 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
   1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329, 'Standards of Recommended Practices for Inspection and Testing Agencies for Concrete and Steel as Used in Construction'; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.

   1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
   2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
   1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect [or Construction Manager].
   2. Notify Architect [and Construction Manager] seven days in advance of dates and times when mockups will be constructed.
   3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
   4. Demonstrate the proposed range of aesthetic effects and workmanship.
   5. Obtain Architect's [and Construction Manager's] approval of mockups before starting work, fabrication, or construction.
      a. Allow seven days for initial review and each re-review of each mockup.
   6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
   7. Demolish and remove mockups when directed unless otherwise indicated.

K. Integrated Exterior Mockups: Construct integrated exterior mockup [according to approved Shop Drawings] [as indicated on Drawings]. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials.

L. Room Mockups: Construct room mockups incorporating required materials and assemblies, finished according to requirements. Provide required lighting and additional lighting where required to enable Architect to evaluate quality of the Work. Provide room mockups of the following rooms:
   1. List or rooms requiring mockups.

1.10 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor**,** and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. GC/Contractor will have a quality control program in place to review the installation and serviceability of all field devices and valves.
3. For tests and inspections performed by the Owner’s Testing Laboratories:
    a. Cooperate with Laboratory personnel; provide access to Work and to manufacturer’s operations.
    b. Secure and deliver to the Laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.
    c. Furnish to the Laboratory proposed concrete design mixes, and other material mixes which require evaluation by the Testing Laboratory, a minimum of fourteen (14) days prior to use on the Project.
    d. Furnish incidental labor and facilities
        1) To provide access to Work to be tested.
        2) To obtain and handle samples at the Project site or at the source product to be tested.
        3) To facilitate inspections and tests.
        4) For safe storage and curing of test samples.
        5) Notify Laboratory, PM and Architect sufficiently in advance of operations to allow for Laboratory assignment of personnel and scheduling of tests.
            a) When test or inspections cannot be performed after such notice, reimburse Laboratory for personnel and travel expenses incurred due to Contractor’s negligence.
        6) Make arrangements with Laboratory and pay for additional samples, tests, or inspections as required for the Contractor’s convenience.
        7) Make arrangements with Laboratory and pay for additional samples and tests required when initial test indicate non-compliance with Contract Documents, including load test.

4. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
    a. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
    b. Retain first subparagraph below if some Specification Sections require an independent testing agency to perform certain tests and inspections.
    c. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
    d. Retain first subparagraph below to assure validity of agencies' reports.

e. Notify testing agencies at least twenty-four (24) hours in advance of time when Work that requires testing or inspecting will be performed.
f. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.

5. Testing and inspecting requested by Contractor and not required by the Contract Documents is Contractor's responsibility.

6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."

D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

F. Testing Agency Responsibilities: Cooperate with Architect, Commissioning Authority, Construction Manager, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect, Commissioning Authority, Construction Manager, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses. .

1. Distribution: Distribute schedule to Owner, PM, Architect, Commissioning Authority, Construction Manager, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's, Commissioning Authority’s, Construction Manager’s reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 40 00

SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK REQUIREMENTS

A. General: This Section specifies procedural and administrative requirements for compliance with governing regulations and codes and standards imposed upon the Work. These requirements include the obtaining of permits, licenses, inspections, releases, and similar statements, as well as payments, associated with regulations, codes, and standards.

B. “Regulations” is defined to include laws, statutes, ordinances, and lawful orders issued by governing authorities, as well as those rules, conventions and agreements within the construction industry which effectively control the performance of the Work regardless of whether they are lawfully imposed by governing authority or not.

C. Governing Regulations: Refer to General and Supplementary Conditions for requirements related to compliance with governing regulations.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference. Individual Specification Sections indicate which codes and standards the Contractor must keep available at the project site for reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Conflicting Requirements: Where compliance with two or more standards is specified, and where these standards establish different or conflicting requirements for minimum quantities or quality levels, the most stringent requirement will be enforced, unless the Contract Documents specifically indicate a less stringent requirement. Refer requirements that are different, but apparently equal, and uncertainties as to which quality level is more stringent to the Architect/Engineer for a decision before proceeding.

D. Minimum Quantities or Quality Levels: In every instance the quantity or quality level shown or specified is intended to be the minimum for the work to be provided or performed. Unless otherwise indicated, the actual work may either comply exactly, within specified tolerances, with the minimum quantity or quality specified, or may exceed that minimum within reasonable limits. In complying with these requirements, the indicated numeric values are either minimum or maximum values, as noted, or as appropriate for context of the requirements. Refer instances of uncertainty to the Architect/Engineer for decision before proceeding.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the trade association, standards-producing organization, authorities having jurisdiction or other entity applicable to the context of the text provision.

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the.

C. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations

1.06 SUBMITTALS

A. Permits, Licenses and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and records established in conjunction with compliance with standards and regulations bearing upon performance of the Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

SECTION 01 45 23 - HVAC TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Owner will employ and pay for the service of an Independent Testing Agency for Testing, Adjusting and Balancing (TAB) of HVAC systems.

1. The Testing, Adjusting and Balancing of air conditioning systems will be performed by an impartial Independent Technical Firm whose operations are primarily engaged in the field of professional TAB. TAB work shall be done under direct supervision of a professional engineer, licensed in the State of Texas, a Test and Balance Engineer (TBE, AABC) or TAB Certified Professional (TAB CP, NEBB), or other experienced/certified TAB professional deemed appropriate by the Owner. All personnel performing TAB work shall be fulltime, regular employees of the TAB firm.

2. The Contractor shall cooperate with the Owner provided TAB firm; provide necessary data on design and proper application of system components; furnish labor and materials required to eliminate any deficiencies or mal-performance.

1.2 RELATED WORK

A. Drawings and General Provisions of the Contract, including General, Supplementary and Other Conditions and Division – 1 Specifications Sections, apply to work of this Section.

B. Refer to Division 23 and Division 26 for testing in conjunction with Mechanical and Electrical work.

1.3 QUALIFICATION OF HVAC TESTING, ADJUSTING AND BALANCING FIRM

A. Minimum Qualification of HVAC Testing, Adjusting and Balancing Firm:

1. General:

a. Each professional firm desiring to submit proposals for testing and balancing HVAC systems for Project shall submit necessary brochures describing history of firm and qualifications of personnel to Architect.

b. Each professional firm shall have a minimum of five years of experience.

c. Each submittal shall contain a listing of similar projects.

d. Each professional firm submitting such information on its qualifications and personnel shall keep information current by submitting supplemental data a minimum of once every six (6) months or when professional or technical personnel who shall perform the work may change.

e. Each professional firm warrants by submittal of its personnel qualifications that such personnel shall be used in the performance of the work. In the event of personnel change, professional firm submitting proposal shall submit complete qualifications and experience of new personnel. Owner, upon acceptance of proposal, expects work to be performed by the personnel whose experience is so described.

2. Qualifications of Firm:
    a. Firm shall be one which is licensed to perform professional services of this specified type and as a minimum have one professional engineer (PE), TBE or TAB CP (or equivalent) with current registration/certification to perform such professional services.

    b. Firm shall be capable of performing services at location of facility described within time specified, preparing and submitting the detailed report of actual field work as may be required.

    c. Firm shall be a member in good standing of Associated Air Balance Council (AABC), National Environmental Balancing Bureau (NEBB), or other experienced/certified TAB governing body deemed appropriate by the Owner, and listed in its current relevant directory.

1.4 TAB FIRM DUTIES AND RESPONSIBILITIES

A. HVAC Testing and Balancing:

1. TAB firm shall act as liaison between Owner, Architect, and Contractor and inspect installation of mechanical piping systems, sheet metal work, temperature controls, and other component parts of Heating, Air- Conditioning and Ventilating systems. Inspection of work shall cover that part relating to proper arrangement and adequate provisions for Testing and Balancing.

2. TAB firm, within sixty (60) days of its employment, shall review Drawings and Specifications to identify potential Testing/Balancing problems and to determine if there are adequate provisions for Testing and Balancing systems. Report any problem to Architect or Architect's representative and Program/Project Manager.

3. Upon completion of installation, start-up, and Controls Contractor point to point verification review on mechanical equipment, check, adjust and balance system components to obtain design conditions in each conditioned space in building. Prepare and submit to Owner, or Owner's delegated representative, complete reports on the Test/Balance and operation of systems.

4. Permanent employed technicians or engineers of firm must do measurements and recorded readings of air, water and electricity that appear in reports.

5. Make a total of three (3) inspections within ninety (90) days after occupancy of building to ensure that satisfactory conditions are being maintained throughout and to satisfy any unusual conditions.

6. Make an inspection in building during opposite season in which initial adjustments were made, and at that time make any necessary modifications to initial adjustment required to produce optimum operation of system components to produce proper conditions in each conditioned space. At time of opposite season checkout, Owner's representative shall be timely notified before any readings or adjustments.

1.5 CONTRACTOR'S RESPONSIBILITIES

A. HVAC Testing, Adjusting and Balancing

1. Contractor shall add TAB activities to the Project schedule to allow TAB completion prior to the scheduled Substantial Completion date. TAB completion requires fully

functioning HVAC, Lighting and Domestic Hot Water Systems, including all necessary controls. The Owner may occupy the completed areas of the site and existing building prior to Substantial Completion. Cooperate with the Owner during TAB operations to minimize conflicts with Owner's operations

2. Have all systems complete in operational readiness prior to notifying TAB firm that Project is ready for their services. Include scheduled testing dates and times requested allowing a minimum of 7 days prior notification and so certify in writing to Owner that such a condition exists.

3. Make any changes in sheaves, belts and dampers or the addition of dampers required for correct balance as required by TAB firm, at no additional cost to the Owner or TAB Firm.

3. Provide and coordinate services of qualified, responsible subcontractors, suppliers and personnel as required to correct, repair or replace any and all deficient items or conditions found during the Testing, Adjusting and Balancing period.

4. In order that systems may be properly Tested, Adjusted and Balanced as required by these specifications and industry standards, operate said systems for length of time necessary to properly verify that the equipment is free from defects and meets the operational requirements outlined in this Specification and the construction documents. Indicate the completion and readiness for TAB and pay costs of operations during TAB period. Contractor's failure to complete the TAB work by the scheduled date of Substantial Completion will not be a reason to extend the Substantial Completion date, the Final Completion date, or for the Contractor to receive additional monies.

5. The costs for the TAB Firm to re-evaluate functionality of systems due to open issues shall be bore by the Contractor.

6. The TAB Firm will be available for two attempts of Testing, Adjusting and Balancing the Systems with minimal follow-up where necessary (due to deficiencies, systems not ready, incomplete work, etc.) in an effort to accomplish the TAB requirements. When additional work or project site visits are required because Systems are not ready or because they do not successfully meet industry standard installation and functionality requirements, the Contractor will be charged for the TAB Firm's additional reasonable re-testing costs. Charges include a flat fee of $300 plus an hourly fee at the TAB Firm's standard rates per employee that mobilized to the project site for each visit. Additional fees will be paid to the TAB Firm by the Owner and shall be reimbursed to the Owner by the Contractor.

7. Complete operational readiness, prior to commencement to TAB services shall include the following:
    a. Construction status of building permits closing of doors, windows and ceilings installed to obtain projected operational conditions.
    b. All Volume damper handles shall be clearly identified with red/orange/yellow vinyl tape to identify locations.
    c. A clean/new set of Final Filters shall be installed prior to the commencement of TAB services.

8. Air Distribution Systems:

a. Verify installation for conformity to design. Supply, return and exhaust ducts terminated and pressure tested for leakage as required by Specifications.

b. Volume and fire dampers properly located and functional. All dampers shall be left in the fully open position. Dampers serving requirements of minimum and maximum outside air, return and relief, shall provide tight closure and smooth operation.

c. Supply, return, exhaust and transfer grills, registers, diffusers and terminal units installed, connected and fully functional.

d. Air handling systems, units and associated apparatus, such as filter sections and access doors, shall be blanked or sealed to eliminate excessive bypass or air leakage.

e. Fans (supply, return, and exhaust) operating and verified for freedom from vibration, proper fan rotation and belt tension; heater elements shall be proper size and rating; all VFDs shall be fully functional and programmed; record motor amperage and voltage and verify name plate ratings are not exceeded.

9. Water Circulating Systems:
   a. Check and verify pump alignment and rotation.

   b. Position and valves pertinent to system design and require operation to permit full flow of water through system components. Operate hydronic systems under full flow conditions until circulating water is clean. Strainers shall be removed and cleaned as required during this cycle of operation.

   c. Record each pump motor amperage and voltage. Readings shall not exceed nameplate rating.

   d. Verify electrical heater elements to be of proper size and rating or VFD programming complete.

   e. Water circulating systems shall be full of water and free of air, expansion tanks set for proper water level and air vents installed at high points of systems and operating freely. Verify that the Make-up water pressure is set properly. All manual flow control valves shall be left in the fully open position.

   f. Check and set operating temperature of heat exchangers to design requirements.

   g. Submit digital copies of the recorded findings on the above mentioned items to the TAB firm.

10. Automatic Controls:
    a. Verify that control components are installed in accordance with Project requirements and functional, including electrical interlocks, damper sequences, freeze-stats and smoke detectors.

b. Controlling instruments shall be functional and set for designed operating conditions. Factory pre-calibration of thermostats will not be acceptable.

11. TAB firm will not instruct/direct Contractor in any of the work, but will make such reports as are necessary direct to Owner.

12. For design document required plans and miscellaneous adjustment devices for purpose of adjustment to obtain design conditions; install these devices in a manner that will leave them readily accessible, provide access as required by TAB firm.

13. Provide Plans, Plan Revisions, Architectural Specifications, and Change Orders to TAB firm at least 21 days prior to commencement of TAB work.

14. Provide approved Submittal data on equipment installed and related changes required to accomplish test procedures outlined in this Section of the Specification to the TAB firm at least 21 days prior to commencement of TAB work.

15. Transmit one (1) copy of the following 'Record for Owner' to TAB firm for review and comments at least 21 days before commencement of TAB work:
    a. 'As installed' drawings.
    b. Approved Fixture Brochure.
    c. Approved Wiring Diagrams.
    d. Approved Control Diagrams.
    e. Approved, Implemented and Verified Sequences of Operations
    f. Shop Drawings.
    g. Approved Submittals.

1.6 HVAC TESTING, ADJUSTING AND BALANCING

A. Testing and Balancing Air Systems:

1. Test and adjust air systems to conditions set forth in Plans and Specifications. Air systems include:
    a. Supply Air Systems.
    b. Return Air Systems.
    c. Exhaust Air Systems.

2. In fan systems, air quantities indicated on Plans may be varied as required to secure a maximum temperature variation of two (2) degrees within each controlled space, but total air quantity indicated for each zone must be obtained.

3. Test and Adjust blowers and fan to deliver CFM required by systems with concurrent recording of RPM, supply voltage and full load amperes. Report any changes of belts and sheaves required.

4. Make Pitot tube traverses of main supply, return and exhaust ducts and adjust fans and dampers to achieve specified air volumes. Patch and cover the Pitot tube holes after air balancing is complete. For Equipment exposed to the sun, metal grommets shall be used.

5. Test and Adjust fresh air intake and return air dampers and louvers to conditions scheduled or required.

6. Test and record static pressure on entering and leaving side of each supply fan, exhaust fan filter, coil and balancing dampers and other components of the system.

7. Test and adjust supply air diffusers, grilles, and return air registers to Specification requirements and as shown on Drawings. Adjust supply diffuser pattern blades for proper air distribution in each room or space.

8. A test and balance report shall be completed and submitted to the Owner that includes air flow, temperature and pressure test results for all HVAC equipment/systems included in the project. The systems shall include unit testing that verifies control system correct operation.

B. Testing and Adjusting of Water System:
   1. Flow of water through water coils shall be adjusted by adjusting valves until rated pressure drop across each coil is obtained and water flow verified by Venturi readings. On those with three-way valves, rated pressure drop shall first be adjusted though coils in each of several systems and the temperature differential between inlet and outlet shall be determined to be in accordance with its rating. Bypass valves shall then be adjusted on each coil until an equal pressure drop between supply and return connections is obtained with three-way valves set to bypass all coils in each of the several systems.

   2. Geothermal Heat Pumps TAB shall be performed with a single unit per well field operating. This single unit balancing shall include both the air side, particularly the outside air, and the water side.

C. Testing and Adjusting of Automatic Controls:
   1. Test automatic controls, controlled devices, interlocks, safety devices associated with HVAC system for proper operation and sequence during heating, cooling, intermediate and smoke removal modes of operation. Adjust automatic controls to deliver required quantities of air at temperatures specified or scheduled on Plans and to maintain proper conditions in each room of the building.

   2. Report deficiencies or malfunctions to Owner in the form of a formal, written Deficiency Report.

D. Equipment Settings:
   1. Before final acceptance of reports is made, TAB firm shall furnish Owner the following data:

      a. Summary of main supply, return and exhaust duct Pitot tube traverses and fan settings indicating minimum value required to achieve specified air volumes.

b. A tabulated record of temperature in all spaces on each separately controlled zone, together with outside temperature at time of measurement.

c. A list of measured air quantities at each outlet corresponding to temperature tabulation specified above.

d. Air quantities at each return and exhaust air-handling devices.

e. Supply pressure readings entering and leaving each supply fan, exhaust fan, filter, balancing dampers and other components of ventilation equipment and systems. These readings shall be quantified using fan curves in terms of CFM handled.

f. Motor current readings per phase at each equipment motor. Voltage at time of reading shall be listed.

g. Water pressure reading at gauge connections. Pressure readings at coils and pumps shall be quantified using coil and pump curves in terms of GPM flow through metering stations at each coil if applicable.

h. Water temperature readings entering and leaving each coil and heat exchanger under maximum load conditions in each case.

i. Unless specified otherwise in Specification 23 05 93, set HVAC system airflow and water flow rates within the following tolerances:

A. Supply, Return, Exhaust Fans and Equipment with Fans:

1. +/- 10 % of Design conditions.

B. Air Devices

1. +/-10 % of Design conditions.

C. Hydronic Flow Rates

1. +/- 10 % of Design conditions.

2. The final report shall certify test methods and instrumentation used, final velocity reading obtained, air quantities at each outlet supply, return, exhaust, temperature, pressure drops, RPM of equipment, amperage of motors, air balancing problems encountered, recommendations and uncompleted punch list items.

3. A summary of actual operating conditions shall be included on each system outlining normal and/or ventilation cycles of operation. The intent of final report will provide a reference of actual operating conditions for Owner's operating personnel

.

4. Certificate of Substantial Completion will not be signed by the Owner unless an acceptable TAB deficiency report has been provided and accepted by the Owner. An acceptable deficiency report shall indicate that the TAB work is completed except for deficiencies that can be resolved within 14 days.

5. Ensure that all systems are balanced at the proper time in the opposite season.

PART 2 – PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 45 23

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Sections:
1. Division 01 Section "Summary" for work restrictions and limitations on utility interruptions.
2. Division 32 Section "Concrete Paving" for construction and maintenance of cement concrete pavement for temporary roads and paved areas.

1.3 DESCRIPTION OF REQUIREMENTS.

A. Connections for temporary and permanent utilities and payment for temporary utilities services required for the Work, whether the Work is new construction or renovation of an existing facility, are the responsibility of the Contractor. Cost or use charges for temporary services or facilities will not be accepted as a basis of claims for a Change Order. Temporary utilities services required for use at the project site include but are not limited to the following:
1. Water service and sewer.
2. Temporary electric power and light.
3. Telephone service and internet.
4. Provide adequate utility capacity at each stage of construction.
5. Prior to availability of temporary utilities at the site, provide trucked-in-services for start-up of construction operations.

B. Temporary construction and support facilities required for the Project include but are not limited to the following:
1. Temporary heat.
2. Field offices and storage sheds.
3. Sanitary facilities, including drinking water.
4. Dewatering facilities and drains.
5. Temporary enclosures.
6. First aid station.
7. Project identification, bulletin boards and signs.
8. Waste disposal services.
9. Rodent and pest control.
10. Construction aids and miscellaneous general services and facilities.
11. Alternate temporary services and facilities, equivalent to those specified, may be used, subject to acceptance by the Architect/Engineer and Program Manager.
12. Temporary Interior Barriers
13. Temporary Exterior Barriers

C. Security and protection facilities and services required for Project include but are not limited to the following:
   1. Temporary protected interior walkway between occupied building areas.
   2. Dust barricade between occupied building areas and work areas.
   3. Temporary fire protection.
   4. Barricades, warning signs, lights.
   5. Sidewalk bridge or enclosure fence for the site.
   6. Environmental protection.
   7. Alternate security and protection methods or facilities, equivalent to those specified, may be used, subject to acceptance by the Architect/Engineer.
   8. The Contractor shall provide a temporary barrier whenever a certain area of the school is sealed off for remodeling work for phasing purposes. The barrier shall be made of 3/4" plywood or drywall, and it shall extend from floor to ceiling, wall to wall. The temporary barrier shall have a door which can be locked. This barrier will remain until work in the specified area is completely finished. The barrier may subsequently be moved to a different location, provided that it still meets the requirements. Proper signage should be displayed near the temporary barrier, according to safety regulations. Any temporary barriers will need to be coordinated with the emergency egress plan of the building. Signage is to be paid for by an Owners allowance of $7,500.00. Bond Marketing has oversight of graphic approval and vendor.
   9. Temporary Construction Screening with Dallas ISD graphics is to be paid for by an Owners allowance of $8,000.00. Bond Marketing has oversight of graphic approval and vendor. No signs serving as advertisement shall be allowed. (Refer to 3.3 in 01.50.00)
   10. Barrier requirements for minor renovation work will be discussed and agreed upon at weekly progress meetings.

1.4 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to Owner, Program Manager, Architect, testing agencies, and authorities having jurisdiction.

1.5 INFORMATIONAL SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas (including dumpster, construction trailer, temporary fencing, silt fence, storage units and portable toilets), and parking areas for construction personnel.

B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of relevant Construction General Permit or authorities having jurisdiction, whichever is more stringent.

C. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage, including delivery, handling, and storage provisions for materials subject to water absorption or water damage, discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water damaged Work.
   1. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.

D. Dust-Control and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust-control and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
   1. Locations of dust-control partitions at each phase of the work.
   2. HVAC system isolation schematic drawing.
   3. Other dust-control measures.
   4. Waste management plan.

1.6 QUALITY ASSURANCE

A. Regulations: Comply with requirements of local laws and regulations governing construction and local industry standards, in the installation and maintenance of temporary services and facilities, including but not limited to the following:
   1. Building Codes, including local requirements for permits, testing and inspections.
   2. Health and safety regulations.
   3. Utility company regulations and recommendations governing temporary utility services.
   4. Police and Fire Department rules and recommendations.
   5. Environmental protection regulations governing use of water and energy, and the control of dust, noise and other nuisances.
   6. In addition, comply with “Environmental Impact” commitments the Owner or previous Owners of the site may have made to secure approval to proceed with construction of the Project.

B. Standards: Comply with the requirements of NFPA Code 241, "Safeguarding Construction, Alterations, and Demolition Operations", the ANSI A10.6 "Safety Requirements for Construction and Demolition", and the NECA National Joint Guideline NJG-6 "Temporary Job Utilities and Services".

C. Inspections: Inspect and test each service before placing temporary utilities in use. Arrange for require inspections and tests by governing authorities, and obtain required certifications, and permits for use.

D. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

1.7 PROJECT CONDITIONS

A. General: Provide each temporary service and facility ready for use at each location when the service or facility is first needed to avoid delay in performance of the Work. Maintain, expand as required and modify temporary services or facilities as needed throughout the progress of the Work. Do not remove until services or facilities are no longer needed or are replaced by the authorized use of completed permanent facilities.

B. Conditions of Use: Operate temporary services and facilities in a safe and efficient manner. Do not overload temporary services of facilities, and do not permit them to interfere with the progress of the Work. Do not allow unsanitary conditions, public nuisances, or hazardous conditions to develop or persist on the site.

C. Temporary Utilities: Do not permit the freezing of pipes, flooding, or the contamination of water sources.

D. Security and Protection: Maintain site security and protection facilities in a safe, lawful and publicly acceptable manner. Take necessary measures to prevent erosion of the site.

E. The roof removal and new roof installation shall proceed on a phased basis to minimize risk to the School's ongoing operations and its property. The GC shall be responsible for protection of interior spaces from damage during roofing work.

F. Distribute material, debris, and equipment over the roof deck to avoid damage to the structural deck. Not more than two weeks supply of material shall be stored on a roof at any given time. Place materials and equipment to be stored on the roof as nearly direct over structural members as can be determined. Secure equipment, material, and debris on the roof to prevent movement by wind or other elements. Contractor assumes full responsibility for loading on the structural deck or roofing materials during roof replacement operations.

G. Consult with the A/E and the Construction Services PM regarding permission for the use of selected areas with the building. Coordination will also be held with the Principal and / or site staff.

H. Temporary Use of Permanent Facilities: Engage installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

I. Areas utilized for temporary facilities, staging area, construction access and controls, shall be reestablished to its original condition at the time of substantial completion or demobilization, whichever comes first.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide new materials and equipment for temporary services and facilities; used materials and equipment that are undamaged and in serviceable condition may be used, if acceptable to the Architect/Engineer. Provide only materials and equipment that are recognized as being suitable for the intended use, by compliance with appropriate standards.

B. Portable Chain-Link Fencing: Minimum 2-inch 0.148-inch- thick, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide galvanized steel bases for supporting posts.

C. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10 mils minimum thickness, with flame-spread rating of 15 or less per ASTM E 84.

D. Dust Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60.

2.2 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, PM, Architect, and construction personnel office activities and to accommodate project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
   1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases. Assign one desk for the Program Manager and/or Architect, with printer and scanner access.
   2. Conference room of sufficient size to accommodate meetings of 8 individuals (minimum). Provide electrical power service and 120-V ac duplex receptacles, with not less than 1 receptacle on each wall. Furnish room with conference table, chairs, and 4-foot-square tack and marker boards.
   3. Coffee maker and supplies.
   4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
   5. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.

C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
   1. These shall be weather tight, structurally sound, compliant with applicable codes and shall be secure.
   2. Store combustible materials apart from building.

D. Temporary Construction and Support Facilities: Provide facilities that can be maintained properly throughout their use at the Project site.

E. Self-Contained Toilet Units:
   1. Sanitary facilities include temporary toilets, with facilities and drinking water fixtures. Comply with governing regulations including safety and health codes for type, number, location, operation, and maintenance of fixtures and facilities; provide not less than specified requirements. Install in locations that will best serve the Project's needs.
   2. Provide single-occupant self-contained toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar non-absorbent material. Provide at least one for every thirty (30) employees.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
   1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
   2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
   3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return air grille in system and remove at end of construction.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
   1. Locate facilities to limit site disturbance as specified in Division 01 Section "Summary of Work."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.
   1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
   1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

F. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
   1. Prior to commencing work, isolate the HVAC system in area where work is to be performed in accordance with approved coordination drawings.
      a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
      b. Maintain negative air pressure within work area using HEPA-equipped air filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
   2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust containment devices.
   3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

G. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
   1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.

H. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner. Electrical power service to the project office trailer and other elements and areas of the Contractor’s office and staging area is to be provided by the Contractor by means of a temporary power service with a temporary account separate from the facility electrical power service.

I. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
   1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

J. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line(s) for each field office.
   1. Provide additional telephone lines for the following:
      a. Provide a dedicated telephone line for each facsimile machine in each field office.
   2. At each telephone, post a list of important telephone numbers.
      a. Police and fire departments.
      b. Ambulance service.
      c. Contractor's home office.
      d. Architect's office.
      e. Engineers' offices.
      f. Program Manager's office.
      g. Principal subcontractors' field and home offices.
   3. Provide superintendent with cellular telephone.

K. Electronic Communication Service: Provide a desktop computer in the primary field office adequate for use by Architect and Owner to access project electronic documents and maintain electronic communications. The computer should be equipped in a manner that provides effective access of project electronic documents and use of electronic communications (e-mail), printer and scanner. Wireless internet access optional.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:
   1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
   2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Parking: Provide temporary parking areas for construction personnel.

C. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
   1. Identification Signs: Provide Project identification signs as indicated in this section.

2. Temporary Signs: Provide other signs as indicated and as required to informing the public and individuals seeking entrance to Project.
   a. Provide temporary, directional signs for construction personnel and visitors.
3. Maintain and touchup signs so they are legible at all times.
4. No other signs shall be allowed on site with the exception of those that are safety oriented. No signs serving as advertisement shall be allowed.

D. Existing Elevator Use: Use of Owner's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.
1. Do not load elevators beyond their rated weight capacity.
2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.

E. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

F. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

G. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.

H. Covered Walkway: Erect protective, covered walkway for passage of individuals through or adjacent to Project site. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction and requirements indicated on Drawings.
1. Construct covered walkways using scaffold or shoring framing.
2. Provide overhead decking, protective enclosure walls, handrails, barricades, warning signs, exit signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.
3. Paint and maintain appearance of walkway for duration of the Work.

I. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weather tight enclosure for building exterior.
1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.

J. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate occupied areas fumes and noise.
1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant plywood on construction operations side.
2. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
3. Insulate partitions to control noise transmission to occupied areas.

4. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
5. Coordinate with Dallas ISD Bond Marketing Graphics.
6. Protect air-handling equipment.
7. Provide walk-off mats at each entrance through temporary partition.

K. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
1. Prohibit smoking on school property per State Law.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.4 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.

B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
1. Protect porous materials from water damage.
2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

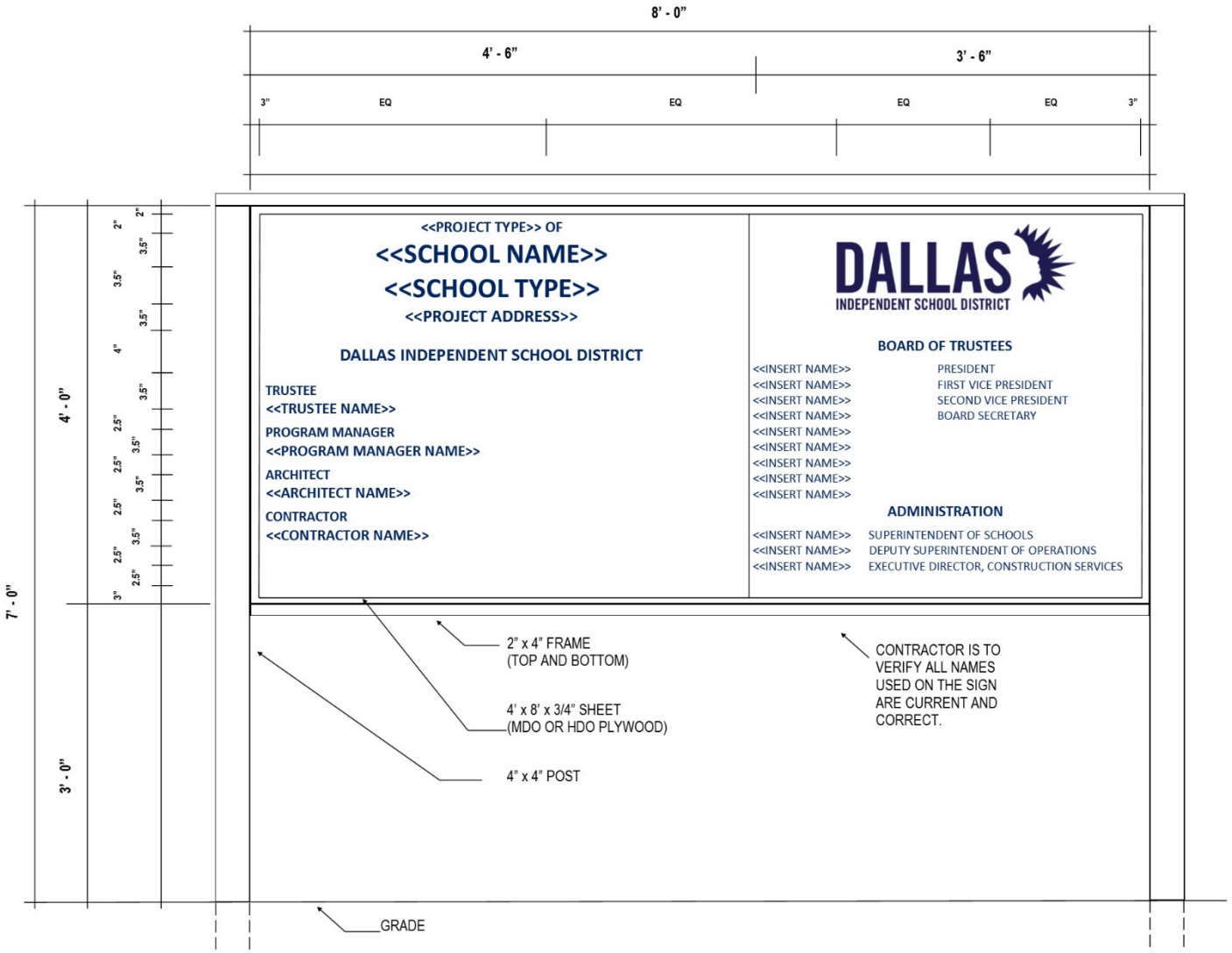
B. Maintenance: Maintain facilities in good operating condition until removal.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.

2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

E. TEMPORARY CONSTRUCTION SIGN



SIGN INSTRUCTIONS:
1. BOARD OF TRUSTEES AND ADMINISTRATORS (SUPERINTENDENT, CHIEF FINANCIAL OFFICER, DEPUTY CHIEF OF OPERATIONS) IN PLACE (SEATED) AT THE TIME OF SIGN FABRICATION.
2. PROJECT TYPE:
   - NEW CONSTRUCTION—ADDITION / RENOVATION—EXPANSION / RENOVATION -RENOVATION
3. SCHOOL TYPE:
   - ELEMENTARY SCHOOL—MIDDLE SCHOOL—HIGH SCHOOL
4. PROJECT ADDRESS PER THE PROJECT MANUAL (INCLUDES DR., ST., RD., ETC...)
5. PROGRAM MANAGER:
6. VERIFY TRUSTEE NAME AND ARCHITECT NAME WITH PROJECT MANAGER.
7. SUBMIT SIGN LAYOUT FOR OWNER'S APPROVAL PRIOR TO PRINTING.
8. BLUE FONT IS PANTONE 281C
9. OBTAIN LOGO FROM PROJECT MANAGER.

3.6 GROUNDBREAKING CEREMONY (New Schools Only)

A. At a time designated by the Owner after project award, the Owner will conduct a groundbreaking ceremony on the project site. The General Contractor will provide support and materials to the Owner for purposes of conducting that ceremony. This support will include providing, but may not be limited to, the following;

1. Land movers to be on site as a backdrop to the groundbreaking.
2. Sandpit at a location coordinated with the owner.
3. Collection of shovels and hardhats from the Construction Services office and transport them to the groundbreaking ceremony.
4. Cleaning and transportation of shovels and hardhats to the Construction Services office after the groundbreaking ceremony.
5. Bottled water for participants.
6. Temporary chairs and tables to seat up to one hundred attendees.
7. All weather access to the site and sandpit.

B. Contractor shall not be permitted to have advertising or marketing materials on site above and beyond what is provided by the Owner.

END OF SECTION 01 50 00

SECTION 01 52 14 - TEMPORARY FACILITIES FOR STUDENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 00 and 01 Specification Sections, apply to this section.

1.2 SUMMARY

A. Section includes requirements for temporary facilities (Swing Space) for the purpose of relocating students to provide temporary classroom facilities during construction activities.

B. Related Sections:
   1. Division 00 Section titled “Technical Proposal”
   2. Division 01 Section title “Temporary Facilities and Controls”

1.3 DESCRIPTION OF REQUIREMENTS

Since the school buildings will be in use during construction, the Work shall be conducted in phases as proposed in the phasing drawings. Contractor will provide temporary classroom buildings for swing space, per the requirements indicated in this section. Contractor will provide moving services to relocate movable classroom furnishings, fixtures and/or equipment in/out of each phased zone. The number of temporary buildings and classrooms which will be made available during the project shall not exceed the numbers summarized below:

SWING SPACE TYPE	ORG N/A
Maximum External Temporary Swing Space Classrooms (to be provided by Contractor)	N/A
Maximum Temporary Restrooms	N/A
Swing Space Classrooms Provided Within Existing Facilities	N/A

The Contractor can submit, as part of the proposal, alternate phasing plans that can potentially save the District time and money.

If no external or internal temporary swing space classrooms are indicated above, then Contractor will be required to schedule work during holidays, weekends, or hours other than regular school hours, and price its work accordingly. A Dallas ISD representative must be present at the school during times that the Contractor is working at the school site. Contractor will be responsible for overtime costs for Dallas ISD staff for presence at the school site outside normal hours of school operation, including holidays.

A. If students must be displaced from classroom areas due to the phasing and execution of the work according to the Contractor’s work plan, the Contractor shall be responsible for providing, on a turn-key basis, temporary facilities for those displaced students.
B. If the Contractor elects to utilize Swing Space, they must include all costs associated with the removal, transportation, installation, and dismantling, including, but not limited to:
   1. Equipment relocation
   2. Transport and setup
   3. Maintenance of the temporary facilities for the duration of their use (i.e. HVAC,

electrical, and other building repair and maintenance needed, not custodial maintenance)
4. Site work and utilities
5. ADA/TAS Accessible ramps and sidewalks
6. Stairs
7. Skirting
8. Interior finish-out
9. Miscellaneous specialties (i.e. marker boards, tack boards, flag holders, map clips, fire extinguishers)
10. Signage
11. Wall Clock and bell to interface with the existing system at the school
12. Coordination with movers for relocation of Furnishings, Fixtures, and Equipment (FF&E)
13. Breakdown, removal, and transport of the Swing Space at the completion of its use
14. Restoration of the site following removal of facilities
15. P.A. to interface with the existing system at the school

1.4 SCOPE OF WORK

The intent of this scope item is for the Contractor to dismantle and remove the District's existing portable building at the site(s) identified in this section, and relocate to the campus requiring swing space as identified in Section 10.7. Contractor shall be responsible for a turnkey dismantling, transportation and setup of these portable buildings.

Schools with existing portables to be utilized for this project and the portable count are as follows:

Name of School	Portable Details (Include ID# and Single/Double)
N/A	N/A

Removal of Existing Portables from Other Schools. Contractor shall provide an advance notice of at least five (5) days to the School Principal and the Program Manager before the temporary buildings are expected to be dismantled and demobilized from any of the above sites. Scope may also involve demolition of sidewalks, canopies, electrical, technology pathways as identified in the contract documents. Again, the intent of this scope of work is for the contractor to provide turnkey dismantling, and removal of identified portables and associated infrastructure. Refurbish site(s) where portables / sidewalks are removed.

Removal of Existing Portables scheduled for Demolition in the footprint of Construction or Staging. If a portable needs to be demolished because it is in the footprint of construction or staging, any necessary Abatement will be the responsibility of the Contractor. After any necessary Abatement, the GC will be responsible for the demolition and removal/disposal of the debris remaining. Refurbish site(s) where portables / sidewalks are removed.

Removal of Existing Portables Not Scheduled for Demolition in the footprint of Construction or Staging. If it is necessary to remove a portable building due to construction or staging at a campus and it is not scheduled for demolition, the GC will be responsible to disassemble, disconnect the portable, and deliver it and set it on blocks at a location designated by Dallas ISD Maintenance (this could be another campus). This would only require that the GC set the building in the designated location, set on blocks, level, etc. Maintenance will be responsible for setting the portable up (Skirting, walkways, utilities, fire alarm hookup, etc.) at the new location and Maintenance will also be responsible for picking up the awnings, skirting and other related items that had to be disassembled at the original location. Maintenance will also be responsible for authorizing the disconnect and any re-connect of the utilities with their requested move of portables. Where portables were removed for staging, refurbish site(s) to match existent surrounding conditions.

Portables designated to be relocated into another Dallas ISD Location If there is a Dallas ISD portable that is designated to be moved from a Dallas ISD location to a campus needing Swing Space – The GC (with contract for the campus needing the swing space) would be responsible for the disconnecting of any utilities and cabling for fire and technology. The GC, who is to move the building for swing space, will be responsible for the removal of awnings, porches, skirting, etc. and be responsible for the removal of the debris. The General Contractor would then be responsible for re-grading the area. The General Contractor would then be responsible to pick up the completely disconnected portable(s) and transport it (them) to the campus they are assigned by Dallas ISD Construction Services office and then be responsible for the setup and complete reconnection of all utilities, fire alarm, technology, etc. that would match Dallas ISD requirements. At the point the work is complete and/or the swing space is no longer necessary, the GC would be responsible for the disconnect and moving to a location designated by the Dallas ISD and would have no requirement other than to secure the moving permit and to set the portable(s) securely in place. The General Contractor would have responsibility to remove any debris from that disconnect and removal. The General Contractor is responsible for all permitting required to install the portable buildings.
NOTE: In all cases involving swing space, the Campus Principal and Facilities must be appropriately and timely notified and aware of swing space issues, including determination and disposition of portable contents.

Transportation of Existing Portables from Other Schools to the Project. Contractor shall provide turnkey transportation services, including management of any required permits, for safe transportation of existing portables from any of the above site to the project. Any removal and replacement of any fencing, or other obstacles for relocation of such buildings shall be the responsibility of the Contractor.

Installation of Portables at the Project. Provide turnkey services for delivery, set-up, maintenance, removal, and restoration of the site for temporary classroom buildings to accommodate phased construction for the Dallas ISD Construction Services office

A. Engineering: The Contractor will provide site engineered civil, utility, blocking plan/foundation plan, sidewalk design and deck/ramp design sufficient to receive a Building Permit from the City, for each site for the installation of all temporary classroom buildings. Existing canopies, sidewalks, foundation details, technology, fire alarm etc. at the schools may be used as a guide for the scope expectations also.

B. Location: The locations of the temporary classrooms are as indicated on the site plan drawings.

C. Permits: The Contractor will coordinate and obtain the permits as required by the City for placement of the classroom buildings at each site. This includes the permits required for the transportation of the classroom buildings.

D. Temp. Facilities: Roll off dumpsters will be provided by the Contractor as required for clean-up during installation and removal of swing space.

E. Clean up: Final broom sweep of the building(s) and removal of trash and debris from each site will be provided by the Contractor prior to occupancy of the swing space by the students and staff. Floor waxing or shampooing will be provided be the Contractor prior to occupancy by the students and staff. Provisions for site restoration upon completion of the delivery of the modules and/or completion of the scope of work will be provided by the Contractor. Upon the removal of the buildings all underground utilities and/or structures associated with the temporary classroom buildings will be removed and discarded. The concrete sidewalks will be removed and discarded. Rough grading will be performed and new sod will be placed to restore the area to its original condition.

F. Site Preparation: Dallas ISD has made no provisions for any site preparation and/or demolition as may be required for the delivery and/or installation of the portable buildings. Any site preparation and/or demolition that might be required of for installation of the temporary classrooms will be included in the Contractor's scope.

G. Construction Fencing: The contractor will maintain a clean and safe site environment within the limits of the temporary classroom construction area. Temporary chain link construction fencing 6' high will be installed around the perimeter of the limits of construction.

H. Sodding: Upon the removal of the buildings, the Contractor will provide sod within the limits of construction associated with the temporary classroom scope of work. Any irrigation of the new sod will be provided by Dallas ISD.

I. Site Utilities (if applicable): The Contractor will provide the site utility connections required for the temporary classroom buildings. The Contractor is responsible for consulting with the City regarding requirements for restrooms on school projects that are located in cities other than Dallas. If required by those cities, the Contractor must provide restroom services and utilities as required by local code.

J. Storm: All storm water management and any sedimentation control will be the responsibility of the Contractor. Gutters and downspouts will be installed as needed by the Contractor.

K. Sanitary (if applicable): The Contractor will install all fixtures, stub all sanitary lines below the floor and manifold to one location at the edge of the building(s). All final connections, utility company charges and impact fees that might be required will be included in the Contractor's scope of work. The Contractor is responsible for consulting with the City regarding requirements for restrooms on school projects that are located in cities other than Dallas. If required by those cities, the Contractor must provide restroom services and utilities as required by local code.

L. Water (if applicable): The Contractor will install all fixtures and stub all water lines to one location at the edge of the building(s). All final connections, utility company charges and impact that might be required will be included in the Contractor's scope of work. The Contractor is responsible for consulting with the City regarding requirements for restrooms on school projects that are located in cities other than Dallas. If required by those cities, the Contractor must provide restroom services and utilities as required by local code.

M. Natural Gas: No provisions for any gas service are anticipated at the present time.

N. Life Safety: Building(s) will be approved and inspected by the Texas Department of Licensing and Regulation. Any provisions for fire suppression, fire sprinkler system or fire rated assemblies that might be required will be included in the Contractor's scope of work.

O. Fire Alarm: The contractor will provide and install fire detection systems as required by the building code and the City.

P. Electrical: The contractor will provide and install electrical systems as required by the building code and the City. Installation and electricity consumption costs associated with the swing space will be the financial responsibility of the Contractor.

Q. Mechanical: The Contractor will supply and install the standard end mount HVAC units. The condensate from both HVAC units of a classroom building will harnessed together and discharged into a 24" diameter by 36" deep french drain filled with gravel. All condensate piping will be PVC but will be protected where directly exposed to UV radiation.

R. Internet Access: The Contractor will provide wireless internet access appropriate for the swing space. Portable technology connectivity shall be coordinated with the Technology Department.

S. Skirting: After the modules are installed, the Contractor will install full perimeter skirting around the building(s) using the same material and finish as that of the building siding to provide a consistent finish down to grade. Sections of skirting will be perforated as required for proper crawl space ventilation. Access to the crawl space will be accomplished by removing sections of the skirting.

T. Decks/Stairs: The Contractor will install landings at the exit doors of the building(s) within the limits of construction as required by code and the City. Landings will utilize pressure treated wood construction with slip resistant surface treatment and handrails.

U. Ramps: The Contractor will install handicapped accessible ramps at the exit doors of the building(s) within the limits of construction as required by code and the Local City. Ramps will utilize pressure treated wood construction with slip resistant surface treatment and handrails.

V. Sidewalks: The Contractor will install 4' wide, 4" thick, 3,000 psi concrete sidewalks to service the building(s) within the limits of construction. Sidewalks will receive a light broom finish and be poured on select fill and/or sand bed.

W. Foundation and Anchorage: The swing space facilities should be securely anchored to a foundation system which utilizes some means of structural support, as determined by a certified structural engineer. Provide construction documents that depict the foundation system as designed and certified by a structural engineer.

X. Hitch/Tires/Axles: Hitches will be removed and stored under building while tires and axles are to remain on the modules. Tires and axles will be removed only if necessary to complete the building installation due to site constraints and will also be placed under the modules.

Y. Keys. Contractor shall coordinate with the District for re-keying of all swing space buildings. Provide 10 sets of keys for each building. Doors shall be provided with hardware to enable locking of the buildings from the inside also and shall have vandal resistant hardware.

Dismantling / Removal of Temporary Buildings upon Completion of Work. Contractor shall demobilize/dismantle/ remove the temporary buildings from site only upon mutual agreement with the Program Manager and Dallas ISD. The temporary buildings shall not be removed from site unless the classrooms that are being renovated under the “Work” of the Contract have been substantially completed and all system upgrades/installation/repairs are completed to accommodate students. Under no circumstances shall the temporary buildings be demobilized if it is deemed by the Program Manager and Dallas ISD that student safety is a potential issue or if the demobilization is likely to adversely impact the student instruction schedule. Contractor shall provide an advance notice of at least five (5) days to the School Principal and the Program Manager before the temporary buildings are expected to be dismantled and demobilized from the site.

Maintenance and Final Cleaning. Dallas ISD will be responsible for the day-to-day cleaning and janitorial services such as floor cleaning, floor vacuuming, trash removal, etc. Contractor shall be responsible for other maintenance of the temporary buildings, including vandalism. Maintenance of building structure and systems (HVAC, Plumbing, Electrical, Lighting, etc.), for the duration that the buildings are on the School site shall be the responsibility of the

Contractor. Contractor shall be responsible for rendering the Project site to its original condition after removal of the temporary buildings, including cleaning and grading and ground cover, termination of the temporary facilities and connections per the requirements of the Owner, the City of Dallas and/or the relevant Government Agency or applicable code. Removal of foundations for the buildings, sidewalks, canopies, ramps etc. will be the responsibility of the Contractor.

Coordination with Project Schedule and Phasing Plan. Contractor shall provide a detailed schedule listing all relevant milestones for the installation and dismantling of swing space buildings as part of the overall project schedule. Activities may include, but are not limited to:
1. Texas Accessibility Standards (TAS) submittals, if required,
2. Procurement of permit to transport the prefabricated buildings from another school to the Project site,
3. Procurement and delivery of the prefabricated temporary buildings,
4. Coordination with the power, water, sanitary sewer and any other applicable utility companies to obtain permits and procure additional primary connections, if required.
5. Installation of canopies, sidewalks, fire alarm systems etc.

Lack of understanding of involved coordination and approval processes, and delays caused thereby shall not be grounds for claim(s) for any contract time extension(s). Contractor shall assume a reasonable time frame from the date of issuance of the Notice To Proceed for the installation of these swing space buildings, and coordinate the timing for the delivery and installation of the temporary classroom buildings with the Project schedule.

END OF SECTION 01 52 14

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Sections:

1. Division 01 Section "Allowances" for products selected under an allowance.
2. Division 01 Section "Alternates" for products selected under an alternate.
3. Division 01 Section "Substitution Procedures" for requests for substitutions.
4. Division 01 Section "References" for applicable industry standards for products specified.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 ACTION SUBMITTALS

A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of

receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.

a. Form of Approval: As specified in Division 01 Section "Submittal Procedures."
b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weather tight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
2. Refer to Divisions 02 through 49. Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
2. Products:

    a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered, unless otherwise indicated.

3. Manufacturers:

    a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered, unless otherwise indicated.
    b. Non-restricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

4. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Installation of the Work.
3. Cutting and patching.
4. Coordination of Owner-installed products.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.
8. Correction of the Work.

B. Related Sections:

1. Division 01 Section "Submittal Procedures" for submitting surveys.
2. Division 02 Section "Selective Structure Demolition" for demolition and removal of selected portions of the building.
3. Division–07 Section "Penetration Firestopping" for patching penetrations in fire-rated construction.

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 INFORMATIONAL SUBMITTALS

A. Cutting and Patching Plan: Submit plan describing procedures at least 5 days prior to the time cutting and patching will be performed. Include the following information:

1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.

3. Products: List products to be used for patching and firms or entities that will perform patching work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate how long services and systems will be disrupted.

1.5 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from the Architect before proceeding. Shore, brace, and support structural element during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection

2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that will result in increased maintenance or decreased operational life or safety. Operational elements may include the following:

   a. Primary operational systems and equipment.
   b. Fire separation assemblies.
   c. Air or smoke barriers.
   d. Fire-suppression systems.
   e. Mechanical systems piping and ducts.
   f. Control systems.
   g. Communication systems.
   h. Conveying systems.
   i. Electrical wiring systems.
   j. Operating systems of special construction.

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, reduce their capacity to perform as intended, or that will result in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:

   a. Water, moisture, or vapor barriers.
   b. Membranes and flashings.
   c. Exterior curtain-wall construction.
   d. Equipment supports.
   e. Piping, ductwork, vessels, and equipment.
   f. Noise- and vibration-control elements and systems.

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

B. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

1.6 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to the Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
3. Contractor shall be responsible for locating all underground utility lines that may be affected by the Work, including but not limited to use of technologies such as Ground Penetrating Radar (GPR). Contractor shall provide a report showing location of existing utilities before pre-dig meeting and shall retain a hard color copy of the report on site at all times. Contractor shall maintain the site markings through the duration of the project. Contractor is responsible for protecting all utility lines (underground and above ground) while performing work. Any damaged utility lines will be replaced by the Contractor at no cost to the Owner.

4. Prior to starting work, Contractor shall review and provide a report that documents operations of existing systems, including but not limited to fire alarm, security, and PA. Contractor shall also record and provide screenshots of all existing mechanical equipment and controls, from the Owner's front end operating system.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility company that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of the Contractor, submit a request for information to Architect according to requirements in Division 01 Section "Project Management and Coordination."

D. Surface and Substrate Preparation: Comply with manufacturer's recommendations for preparation of substrates to receive subsequent work.

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. General: Engage a professional engineer to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
3. Inform installers of lines and levels to which they must comply.
4. Check the location, level and plumb, of every major element as the Work progresses.

5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect and Program Manager. Submit log at project completion for project records.

3.4 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
4. Maintain minimum headroom clearance of **96 inches** in occupied spaces and **90 inches** in unoccupied spaces.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Contractor shall provide filters for all mechanical equipment (new and existing) impacted by the Contractor’s scope of work, at minimum, at the following stages of construction;
1. Construction filters at the start of construction, and as needed through-out the project to maintain proper air flow
2. MERV filters at the start of Test & Balance
3. MERV filters at Substantial Completion (filters to be dated and provide photo documentation)

D. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

E. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

F. Tools and Equipment: Do not use tools or equipment that produces harmful noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

2. Cut the work using methods that are least likely to damage work to be retained or adjoining work. Where possible review proposed procedures with the original installer; comply with the original installer’s recommendations.

B. Temporary Support: Provide temporary support of work to be cut.

C. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

D. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements of Division 01 Section "Summary."

E. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

F. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

G. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

    a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or re-hang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weather-tight condition.
6. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

3.6 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction personnel.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually

agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.

2. Pre-installation Conferences: Include Owner's construction personnel at pre-installation conferences covering portions of the Work that are to receive Owner's work. Attend pre-installation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.7 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Provide necessary daily cleaning during construction to maintain premises and adjoining public properties free from construction waste, debris and rubbish, and dust caused by operations.
2. At completion of each day, remove waste materials and rubbish; store tools, equipment, machinery and surplus materials; and clean all sight exposed surfaces.
3. If Contractor fails to clean up each day and at the completion of his Work, the Owner may do so and charge the cost thereof to the Contractor. At his next pay application a deductive change order will be processed and there is no appeal for back charges due to clean up.
4. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
5. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
6. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
   a. Utilize containers intended for holding waste materials of type to be stored.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Cleaning Materials: Use only cleaning materials recommended by manufacturer of the surface to be cleaned. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

F. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

G. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

H. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.

I. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

J. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

K. Limiting Exposures: Supervise construction operations to assure that no part of the construction, whether completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

L. During Construction:
1. Oversee cleaning and ensure that building(s) and ground(s) are maintained free from accumulations of waste materials and rubbish.
2. Sprinkle dusty debris with water.
3. During progress of Work, clean-up site and access and dispose off waste materials, rubbish and debris at least once every week.
4. Provide dump containers and locate on site for collection of waste materials, rubbish and debris on a daily basis.
5. Do not allow waste materials, rubbish and debris to accumulate and become an unsightly or hazardous condition.
6. Remove waste materials, rubbish and debris from site and legally dispose off at public or private dumping area.
7. Lower waste materials in controlled manner with as few handlings as possible; do not drop or throw materials from heights.
8. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

3.8 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: Comply with qualification requirements in Division 01 Section "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.10 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 73 00

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion.
2. Final completion.
3. Warranties.
4. Final cleaning.

B. Related Sections:
1. Division 01 Section "Execution" for progress cleaning of Project site.
2. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
3. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
4. Division 01 Section "Demonstration and Training" for requirements for instructing Owner's personnel.
5. Divisions 02 through 49 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete with request.

1. Prepare a list of items to be completed and corrected (punch list), the value of item on the list, and reasons why the Work is not complete.
2. Advise the Owner of pending insurance changeover requirement.
3. Grant the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits and similar releases.
4. Complete startup testing of systems.
5. Complete Owner’s Training. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
6. Complete final cleaning requirements, including touch-up painting.
7. Submit specific warranties 14 days after Substantial Completion.
8. Submit sign-in sheets from training sessions
9. Submit one (1) electronic copy of Operation & Maintenance (O&M) Manuals

1.4 FINAL COMPLETION – **Please refer to Attached "General Contractor Close out and Hazmat Abatement Close Out checklist" at the end of this section.**

A. Preliminary Procedures: Before requesting final inspection for determining final completion, the items listed in 1.3 of this section must be complete. The Contractor must also complete the following:

1. Submit final certifications, and similar close-out documents.
2. Prepare and submit Project Record Documents, including construction photographs, damage or settlement surveys, property surveys, and similar record information.
3. Submit test/adjust/balance report records.
4. Terminate and remove temporary facilities from project site, along with mockups, construction tools, and similar elements.
5. Complete final cleaning and repair of all areas, including touch-up painting.
6. Submit final close-out submittals.
7. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
8. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

B. Close-out submittals include, but are not necessarily limited to, as applicable:

1. Project Record Documents described in Section 01 78 39.
2. Certification of Substantial Completion (AIA Form G704)
3. Certificate of Final Completion (Exhibit D – Form of Final Completion Notice)
4. Certificate of Final Acceptance by the Architect (Exhibit H of the A/E Agreement – Form of Final Completion Certification with punch list sign-off)
5. Certificate of Final Completion by the Program Manager (Exhibit C of the PM Agreement – Form of Final Completion Certificate)
6. TEA Certificate of Project Compliance.
7. Final Change Order.
8. Final Acceptance for Payment to include acceptance of Final Change Order and therefore no work or retainage outstanding
9. Consent of Surety to Final Payment
10. City's Certificate of Occupancy
11. Contractor's Final Affidavit of Release of Liens
12. Contractor's Guarantee
13. Letter from Contractor listing all subcontractors and suppliers with contact information.
14. Transmittal listing Keys: Contractor shall prepare an itemized key list in complete detail ending in a statement that the keys were turned over, the Contractor's signature, a line stating that the keys were received and the receiver's signature. Copies of this list should be retained by the Contractor and receiver and a copy sent to the Architect, PM and Owner. Keys should be identified with tags corresponding to the approved room number designation.
15. Operating, Instruction and Maintenance Manuals for Equipment. For records, provide one (1) paper copy of all O&M manuals at final closeout.
16. Verification of training conducted: Provide copy of sign-in sheet. For records, provide one (1) DVD copy of all training sessions at final closeout.
17. Final approved submittals for HVAC Controls System, Data Cabling System, and Fire Alarm System, and Security System.

Refer to Attached "General Contractor Close out checklist" at the end of this section.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.
    c. Name of Contractor.
    d. Page number.

4. Submit list of incomplete items in the following format:

    a. PDF electronic file.

1.6 WARRANTIES

A. Submittal Time: All warranties shall commence on the date of substantial completion and copies of the Warranties be submitted no later than 14 days after substantial completion.

B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
4. Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide table of contents at beginning of document. Coordinate paragraph below if Division 01 Section "Operation and Maintenance Data" is used.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

D. Refer to attached checklist of warranties and close out customized by the Architect for each campus.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Remove tools, construction equipment, machinery, and surplus material from Project site.
d. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
e. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
f. Sweep concrete floors broom clean in unoccupied spaces.
g. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
h. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
i. Remove labels that are not permanent.
j. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

1) Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates.

k. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
l. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
m. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
n. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter upon inspection.

1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report upon completion of cleaning.

o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

p. Leave Project clean and ready for occupancy.

C. Construction Waste Disposal: Comply with waste disposal requirements in Division 01 Section "Temporary Facilities and Controls."

General Contractor Close-out Checklist

To:	<<Name>> Project Manager, Dallas ISD	**Date:**	
GC:	<<Name of GC Firm>>	**A/E Firm:**	<<Name of A/E Firm>>
Org#:	xxx	**PM:**	<<Name of PM Firm>>
School Name			

Project Type: ☐ Addition ☐ Renovations ☐ New Construction

Item #	Document Description	Primary Responsibility	Tab #	Check-Off	Remarks
I.	**FINANCIAL RECONCILIATION / FINAL PAYMENT REQUIREMENTS**				
a.	Copies of Reconciliation to Dallas ISD Financial System and Copy of Final Payment	PM			PM will collect for close-out
b.	Certificate(s) of Insurance including General Liability and (Pollution and/or Professional Liability if applicable)	PM			PM will collect for close-out
c.	Insurance Requirements at Final Completion Statement	PM			PM will collect for close-out
d.	Copy of Final Change Order	PM			PM will collect for close-out
e.	Copies of all executed Change Orders	PM			PM will collect for close-out
f.	Copies of all executed CAEAs and CAELs	PM			PM will collect for close-out with back-up information
g.	Copies of all executed AERAs	PM			PM will collect for close-out with back-up information
h.	Copies of all executed custodian overtime authorizations (Summary Recap (Hrs.)	PM			PM will collect for close-out. Include as deductive CAEA
i.	Confirmation of back charge for Prolog Converge licenses & Custodian Overtime	PM			PM will collect for close-out. Include as deductive CAEA
j.	Confirmation of back charge for technology refund (ERATE), if applicable	PM			PM will collect for close-out. Include as deductive CAEA
k.	M/WBE Contract Closeout Evaluation Form	PM			PM will collect for close-out. Include final M/WBE payment status report
II.	**PAYMENT AND PERFORMANCE BONDS**				
a.	"Consent of Surety Company to Final Payment"; AIA G707 (Confirm that Power of Attorney is attached to form.)	GC			
III.	**EVIDENCE OF PAYMENT OF DEBTS AND CLAIMS**				
a.	"Contractor's Affidavit of Payment of Debts and Claims" AIA G706	GC			
IV.	**SUBSTANTIAL COMPLETION**				
a.	AIA G704 - Certificate of Substantial Completion	A/E Dallas ISD PM			
b.	Punchlist - Issued at substantial completion	GC			
c.	Exhibit G - Form of Substantial Completion Certification	A/E			This is an Exhibit in the A/E Agreement
V.	**FINAL COMPLETION**				
a.	Exhibit H - Form of Final Competion Certification - with signed off punchlist	A/E			This is an Exhibit in the A/E Agreement
b.	TDLR - RAS report approved or A/E Letter	A/E			If the RAS report shows deficiencies, the A/E will have to confirm/explain and/or justify corrections
c.	Attachment C - Form of Program Manager's Final Completion Certificate	PM			This is an Exhibit in the PM Agreement
d.	Exhibit D - Form of Contractor's Final Completion Notice	GC			
e.	TEA - Certification of Project Compliance	A/E GC Dallas ISD PM			PM will coordinate the sign-off on this document.
VI.	**OPERATIONS AND MAINTENANCE MANUALS AND EVIDENCE OF TRAINING**				
a.	A/E's O&M Manuals confirmation letter.	GC			
b.	O&M Manuals submitted by GC to A/E	GC			Per detailed list developed by GC and reviewed by A/E and PM. One Manual per each school to be split by CSI Divisions
c.	Training Matrix, Sign-In sheet(s) and DVDs.	GC			GC is to provide a sign-in sheet for each system for which training has been provided to indicate the person, title and date of completion of the
VII.	**ATTIC STOCK / SPARE MATERIAL / KEY TRANSFER**				
a.	Signed off Transmittal Attic stock & spare material	GC			Provided by GC and received by Principal or Campus Facility Supervisor or Maintenance, as applicable
b.	Signed off Transmittal Key transfer (Accessory keys)	GC			Provided by GC and received by Principal or Campus Facilities Supervisor, as applicable
VIII.	**WARRANTIES - By SYSTEM (MEP, Fire alarm, Fire sprinkler, Roofing, Security, etc.)**				
a.	Exhibit B - Form of Contractor's Guarantee	GC			
b.	Exhibit B-2- Certification of Compliance with Contract Documents.	GC			
c.	Manufacturer's Warranty(ies)	GC			A separate "Warranties" manual should be provided for guarantees, warranties, etc.
d.	List of Subcontractors and Suppliers	GC			

IX.	**LOCAL AGENCIES APPROVALS (as applicable)**					
a.	City of Dallas - Certificate of Occupancy	GC				
b.	City of Dallas - Final Inspections (Building)	GC			Green tags colored copies	
c.	Storm Water Prevention Polution Plan, SWPPP	GC				
d.	Elevator Inspection Certificate	GC				
e.	Boiler Inspection Certificate	GC				
f.	Health Department Inspection Certificate	GC				
X.	**RECORD DOCUMENTS (DRAWINGS, SPECIFICATIONS, ETC.)**					
a.	Record Documents transmittal from GC to A/E	GC			GC is to update red-lined record drawings on a monthly basis. Final red-line record set to be provided to A/E.	
b.	A/E's receipt of Record Documents Letter	A/E			A/E is to provide a letter indicating that all record documents have been provided by the G.C.	
XI.	**GC DESIGNED DOCUMENTS**					
a.	Fire Alarm drawings	GC			Need Govermental Agency approved documents.	
b.	Security drawings	GC			Need Govermental Agency approved documents.	
c.	HVAC Controls drawings	GC			Need Govermental Agency approved documents.	
d.	Fire Sprinkler System drawings	GC			Need Govermental Agency approved documents.	
e.	Data Cabling drawings	GC			Need Govermental Agency approved documents.	
XII.	**CERTIFICATIONS**					
a.	Certification of Asbestos Free Project: Letter from GC as per AIA A201 13.11.1	GC				
b.	Certification of Lead-Free Potable Water System: Letter from GC as per AIA A201 13.12.1	GC				
XIII.	**FINAL SYSTEM REPORTS**					
a.	Final Test & Balance Report	T&B				
b.	Final Roof Inspection Report	Roof Inspector				
c.	Final HVAC Controls - CMCS Report	Dallas ISD Facilities				
XIV.	**WARRANTY INSPECTIONS**					
a.	6 month inspection shall be conducted no later than: <<Date>>					
b.	11 month inspecton shall be conducted no later than: <<Date>>					
XV.	**ACKNOWLEDGE STATEMENT**					
a.	Project Completion Acknowledgement - Signed and dated by School Principal	PM				
b.	Project Completion Notification to Dallas ISD Facilities.	Dallas ISD Project				

I have submitted the close-out documentation in compliance with applicable contract:

G.C. Firm	Print Name	Signature	Date

I have reviewed and acknowledge receipt of the close-out documentation submitted by the General Contractor and found it complete and in compliance with applicable contracts:

A/E Firm	Print Name	Signature	Date

I have reviewed and acknowledge receipt of the close-out documentation submitted by the General Contractor and the A/E and found it complete and in compliance with applicable contracts:

Program Manager	Print Name	Signature	Date

I have reviewed and acknowledge receipt of the close-out documentation submitted by the General Contractor, A/E and PM and found it complete and in compliance with applicable contracts:

Dallas Independent School District			
Owner	Print Name	Signature	Date

HAZMAT CONTRACTOR CLOSE-OUT CHECKLIST

TO:	xxxxxxxxxxxxxxx, Contract Manager, DALLAS ISD	DATE:	
CONTRACTOR:		PM/F:	
PROJECT ID / ORG:		EXTENT OF ABATEMENT:	☐ COMPLETE ☐ SPOT ☐ OTHER
CAMPUS:			
PURCHASE ORDER(S):			
PROJECT TYPE:	☐ Abatement of Exist. Bldgs in Acquired Land ☐ Abatement for Renovation Projects		

ITEM/ TAB	DOCUMENT DESCRIPTION	PRIMARY RESP	RECEIVED	REMARKS
I.	**PROJECT DOCUMENTATION and/or EVIDENCE OF COMPLIANCE**			
a.	OSHA Sampling			
b.	Waste Manifest			
c.	Daily work logs			
d.	Daily sign-in sheets			
e.	Asbestos Licensing			
f.	Respirator fit tests			
g.	Accident Report(s)			
h.	Notifications			
i.	Medical Records			
j.	Confirmation of Receipt - Letter of Completion Document	ENVIR DEPT		

I have submitted the close-out documentation in compliance with applicable contract:

JOC HAZMAT CONSTRUCTION FIRM	PRINT NAME	SIGNATURE	DATE
0			

I have reviewed and acknowledge receipt of the close-out documentation submitted by the General Contractor and found it complete and in compliance with applicable contracts:

JOC HAZMAT CONSULTANT FIRM	PRINT NAME	SIGNATURE	DATE

END OF SECTION 01 77 00

SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Operation manuals for systems, subsystems, and equipment.
3. Product maintenance manuals.
4. Systems and equipment maintenance manuals.

B. Related Sections:
1. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Division 02 Section “Demonstration and Training” for instructing Owner’s personnel in the maintenance of the products and in the operation of equipment and systems.
3. Divisions 02 through 49 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

A. Manual Content: Operations and maintenance manual content is specified in individual specification sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Where applicable, clarify and update reviewed manual content to correspond to modifications and field conditions.

B. Format: Submit operations and maintenance manuals in the following format:

1. PDF electronic file. Assemble each manual into a composite electronically-indexed file. Submit on digital media acceptable to Architect and Program Manager.

a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically-linked operation and maintenance directory.
b. Enable inserted reviewer comments on draft submittals.

2. For Facilities use, provide one (1) PDF Electronic File of all O&M manuals at substantial completion. For Permanent Records, provide one (1) paper copy of all O&M manuals at final closeout.

3. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves for paper copy. Architect will return PDF Electronic File and paper copy.

C. Initial Manual Submittal: Submit draft PDF copy of each manual at least 30 calendar days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.

D. Final Manual Submittal: Submit each manual in final form as a PDF prior to requesting inspection for Substantial Completion and at least 10 calendar days before commencing demonstration and training. Architect will return copy with comments.

1. Correct or modify each manual to comply with Architect and Program Manager's Comments. Submit copy of each corrected manual within 10 days of receipt of Comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Organization: Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Architect.
7. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Enable bookmarking of individual documents based upon file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel upon opening file.

F. Manuals, Paper Copy: Submit manual in the form of hard copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of content. Indicate volume number for each of the three required multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.4 PRODUCT MAINTENANCE MANUALS

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in the manual, identify them by product name, and arrange to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in the manual, identify by product name and arrange to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

B. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

C. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

D. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of operation and maintenance manuals.
2. Comply with requirements of newly prepared record Drawings in Division 01 Section "Project Record Documents."

E. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01 78 23

SECTION 01 78 39 - PROJECT AS-BUILTS & RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.
4. Miscellaneous record submittals.

B. Related Sections:
1. Division 01 Section "Execution" for final property survey.
2. Division 01 Section "Closeout Procedures" for general closeout procedures.
3. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
4. Divisions 02 through 49 Sections for specific requirements for project record documents of the Work in those Sections.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit one set(s) of marked-up record prints.
2. Number of Copies: Submit copies of record Drawings as follows:

a. Initial Submittal: Submit two paper copies set as well as PDF electronic files of marked-up record prints and two sets of plots from corrected record digital data files. Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
b. Final Submittal: Submit two paper copies set as well as PDF electronic files of marked-up record prints. Print each Drawing, whether or not changes and additional information were recorded.

B. Record Specifications: Submit two paper copies as well as PDF electronic files of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one paper copy set as well as PDF electronic files of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

D. Miscellaneous Record Submittals: Refer to other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one paper copy set as well as PDF electronic files of each submittal.

E. Reports: Submit written report weekly indicating items incorporated in Project record documents concurrent with progress of the Work, including modifications, concealed conditions, field changes, product selections, and other notations incorporated.

PART 2 - PRODUCTS

2.1 As-Built Drawings

A. As-Built Drawings: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

    a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    b. Accurately record information in an acceptable drawing technique.
    c. Record data as soon as possible after obtaining it.
    d. Record and check the markup before enclosing concealed installations.
    e. Cross-reference record prints to corresponding archive photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

    a. Dimensional changes to Drawings.
    b. Revisions to details shown on Drawings.
    c. Depths of foundations below first floor.
    d. Locations and depths of underground utilities.
    e. Revisions to routing of piping and conduits.
    f. Revisions to electrical circuitry.
    g. Actual equipment locations.
    h. Duct size and routing.
    i. Locations of concealed internal utilities.
    j. Changes made by Change Order or Construction Change Directive.
    k. Changes made following Architect's written orders.
    l. Details not on the original Contract Drawings.
    m. Field records for variable and concealed conditions.
    n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Utilize personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.

6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up as-built prints with Architect. When authorized, submit marked-up to Architect. The Architect will then prepare a full set of corrected digital data files of the Contract Drawings, as follows:

1. Format: Annotated PDF electronic file.
2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
3. Refer instances of uncertainty to Architect for resolution.

C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Identification: As follows:

a. Project name.
b. Date.
c. Designation "PROJECT RECORD DRAWINGS."
d. Name of Architect.
e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
5. Note related Change Orders and record Drawings where applicable.

B. Format: Submit record Specifications as a paper copy as well as in scanned PDF electronic file(s) of marked up paper copy.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, record Specifications, and record Drawings where applicable.

B. Format: Submit record Product Data as a paper copy as well as scanned PDF electronic file(s) of marked up paper copy.

1. Include record Product Data directory organized by specification section number and title, electronically linked to each item of record Product Data.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and modifications to project record documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

END OF SECTION 01 78 39

SECTION 01 79 00 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Training in operation and maintenance of systems, subsystems, and equipment.
3. Demonstration and training video recordings.

B. Related Sections:

1. Divisions 02 through 49 Sections for specific requirements for demonstration and training for products in those Sections.

1.3 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. Indicate proposed training modules utilizing manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

B. Qualification Data: For instructor.

C. Attendance Record: For each training module, submit list of participants and length of instruction time.

1.4 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module. Needs to match section on Final Completion.

1. Identification: On each copy, provide an applied label with the following information:

a. Name of Project.
b. Name and address of videographer.
c. Name of Architect.

d. Name of Contractor.
e. Date of video recording.

2. At completion of training, submit complete training manual(s) for Owner's use.

1.5 QUALITY ASSURANCE

A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

1.6 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

a. System, subsystem, and equipment descriptions.
b. Performance and design criteria if Contractor is delegated design responsibility.
c. Operating standards.
d. Regulatory requirements.
e. Equipment function.
f. Operating characteristics.
g. Limiting conditions.
h. Performance curves.

2. Documentation: Review the following items in detail:

a. Emergency manuals.
b. Operations manuals.
c. Maintenance manuals.

d. Project record documents.
e. Identification systems.
f. Warranties and bonds.
g. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

a. Instructions on meaning of warnings, trouble indications, and error messages.
b. Instructions on stopping.
c. Shutdown instructions for each type of emergency.
d. Operating instructions for conditions outside of normal operating limits.
e. Sequences for electric or electronic systems.
f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

a. Startup procedures.
b. Equipment or system break-in procedures.
c. Routine and normal operating instructions.
d. Regulation and control procedures.
e. Control sequences.
f. Safety procedures.
g. Instructions on stopping.
h. Normal shutdown instructions.
i. Operating procedures for emergencies.
j. Operating procedures for system, subsystem, or equipment failure.
k. Seasonal and weekend operating instructions.
l. Required sequences for electric or electronic systems.
m. Special operating instructions and procedures.

5. Adjustments: Include the following:

a. Alignments.
b. Checking adjustments.
c. Noise and vibration adjustments.
d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

a. Diagnostic instructions.
b. Test and inspection procedures.

7. Maintenance: Include the following:

a. Inspection procedures.
b. Types of cleaning agents to be used and methods of cleaning.
c. List of cleaning agents and methods of cleaning detrimental to product.
d. Procedures for routine cleaning
e. Procedures for preventive maintenance.
f. Procedures for routine maintenance.
g. Instruction on use of special tools.

8. Repairs: Include the following:

a. Diagnosis instructions.

b. Repair instructions.
c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
d. Instructions for identifying parts and components.
e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Division 01 Section "Operations and Maintenance Data."

B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
1. Owner will furnish an instructor to describe Owner's operational philosophy.
2. Owner will furnish Contractor with names and positions of participants.

B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner through Program Manager with at least 7 days advance notice.

C. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

B. Video Recording Format: Provide high-quality color video recordings with menu navigation in format acceptable to Architect.

C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of demonstration and training. Display continuous running time.

END OF SECTION 01 79 00

SECTION 01 91 00 – GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. The Owner will perform the Commissioning activities or has retained an independent Commissioning Authority (CxA) to coordinate Commissioning activities for this project. The objective of the Commissioning process is to verify and document that the performance of facilities, systems, and assemblies installed as part of this project meet the project's defined objectives and criteria.

B. This section outlines the general roles and responsibilities of the CxA, Owner, and General Contractor. Divisions 21, 22, 23, and 26 sections define roles and responsibilities applicable to Division 21, 22, 23, and 26 work.

C. The CxA is an independent contractor retained directly by the Owner and will coordinate all Commissioning activities with the Owner's representative.

D. Commissioning requires support from the contractors. The Commissioning Process does not relieve any contractor from their obligation to complete all portions of work in a satisfactory manner. Post contract/construction award, the Contractor shall not use any Commissioning responsibilities/obligations as justification for construction delays or requests for additional monies.

E. The General Contractor is responsible for coordinating all Commissioning activities with their Sub-Contractors.

1.2 RELATED SECTIONS

A. Division 21 Section 21 08 00 – Commissioning of Fire Suppression

B. Division 22 Section 22 08 00 – Commissioning of Plumbing Systems

C. Division 23 Section 23 08 00 – Commissioning of HVAC Systems

D. Division 26 Section 26 08 00 – Commissioning of Electrical Systems

E. Individual Division 21, 22, 23, and 26 sections contain requirements related to the Commissioning process, if applicable for that Division.

1.3 DEFINITIONS

A. *Acceptance:* A formal action, taken by a person with appropriate authority (which may/may not be contractually defined) to declare that some aspect of the project meets defined requirements, thus permitting subsequent activities to proceed. The Owner's Representative shall be responsible for evaluating acceptable criteria.

B. *Commissioning Process or Commissioning (Cx):* A quality focused process for enhancing the delivery of a project. The process focuses on verifying and documenting that the facility and all of

its systems and assemblies are planned, designed, installed, tested, operated, and maintained to meet the Owner's Requirements.

C. *Commissioning Process Activity:* A component of the Commissioning Process.

D. *Commissioning Authority (CxA):* An entity identified by the Owner who plans, schedules, and coordinates the Commissioning team to implement the Commissioning Process.

E. *Commissioning Field Report:* A written document that identifies the Commissioning activities completed during a visit to the project site. The report identifies significant findings, results, comments and questions that resulted from the visit. This is typically produced by the CxA per site visit.

F. *Commissioning Photo Log:* A log of photographs that support the items identified in the Commissioning Issues Log. The photo log numbering corresponds to the issue numbers listed in the Cx issues log.

G. *Commissioning Plan:* A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the Commissioning Process. The Cx Plan will be developed by the CxA.

H. *Commissioning Process Activities*: Components of the Commissioning Process.

I. *Commissioning Progress Report*: A written document that details activities completed as part of the Commissioning Process and significant findings from those activities, and is continuously updated during the course of a project.

J. *Commissioning Request for Information (RFI):* Form used by the Commissioning Authority to request information from the design or construction team.

K. *Commissioning Team:* The individuals and agencies who, through coordinated actions, are responsible for implementing the Commissioning Process. The Cx Team shall consist of: CxA, GC, MC, EC, TAB Contractor, Controls Contractor, Owner's Representative, A/E Representatives and equipment suppliers (as needed).

L. *Commissioning Testing*: The evaluation and documentation of the equipment, assemblies, any building/equipment controls, and systems delivery and condition, installation, proper function according to the manufacturer's specifications and project documentation to meet the design criteria.

M. *Construction Team:* The General Contractor, related sub-contractors, and other contractors working for the Owner during the Construction Phase.

N. *Construction Documents*: This includes a wide range of documents, which will vary from project to project, and with the Owner's needs and regulations, laws, and jurisdictional requirements. Construction documents usually include the project manual (specifications), plans (drawings), and general terms and conditions of the contract.

O. *Contract Documents*: This includes a wide range of documents, which will vary from project to project and with the owner's needs, regulations, laws, and jurisdictional requirements. Contract documents frequently include price agreements; construction management process; subcontractor agreements or requirements; requirements and procedures for submittals, changes, and other construction requirements; timeline for completion; and the construction documents.

P. *Commissioning Issues Log:* A formal document, created and maintained by the CxA, and ongoing record of problems or concerns identified through/during the construction phases which deviate from the project's construction documents, applicable codes and/or normal construction industry practices and their resolution. Items on this issues log should be reviewed by the GC and corrected in a timely manner by the applicable trades and contractors.

Q. *Coordination Drawings:* Drawings showing the work of all trades to illustrate that equipment can be installed in the space allocated without compromising equipment function or access for maintenance and replacement. These drawings graphically illustrate and dimension manufacturers' recommended maintenance clearances.

R. *Design Review (Peer)*: An independent and objective technical review of the design of the project or a part thereof, conducted at specified stages of design completion by one or more qualified professionals, for the purpose of enhancing the quality of the design and to determine compliance with regulations, codes, or other standards administered by the Authority having Jurisdiction. The CxA may perform a Design Review during the early stages of design.

S. *Design Review (Commissioning)*: A review of the design documents to determine compliance with the Owner's Requirements and/or Basis of Design, including coordination between systems and assemblies being Commissioned, features and access for testing, Commissioning and maintenance, and other reviews required by the Owner.

T. *Facility Guide*: A basic building systems description and operating plan with general procedures and confirmed facility operating conditions, set points, schedules, and operating procedures for use by facility operations to properly operate the facility.

U. *Final Commissioning Report*: A document that records the activities and results of the Commissioning Process and is developed from the final Commissioning Plan with all of its attached appendices.

V. *Functional Performance Test (FPT):* A written protocol that defines methods, personnel, and expectations, for tests conducted on components, equipment, assembles, systems, and interfaces among systems. These documents shall be developed and provided by the CxA and shall require pre- approval by the Owner's Representative.

W. *Pre-Functional Checklist (PFC):* A form used by the installing contractors to verify that appropriate components are on-site, ready for installation, correctly installed, started up, tested and balanced, in compliance with the owner's project requirements, and is ready for Functional Performance Testing. These documents shall be developed and provided by the CxA and shall require pre-approval by the Owner's Representative.

X. *Submittal Review*: A Commissioning review of the equipment submittals for relevant mechanical, electrical, plumbing and energy consuming equipment and systems.

Y. *Test Procedure*: A written protocol that defines methods, personnel, and expectations for tests conducted on components, equipment, assemblies, systems, and interfaces among systems to verify compliance with the Owner's Project Requirements.

1.4 ROLES AND RESPONSIBILITIES

A. Commissioning Authority (CxA)
   1. Develop a Commissioning Plan outlining the organization, schedule, and documentation requirements of the Commissioning Process.

2. Coordinate and direct the Commissioning activities in a logical, sequential and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications with the Cx team, and frequently update project timelines and schedules for Cx activities.
3. The CxA is not responsible for the design concept, design criteria, compliance with codes, site safety, construction means and methods, review or approval of change orders, design or general construction scheduling, cost estimating, or construction management.
4. Review contract documents for completeness and quality.
5. Perform focused reviews of the design, drawings and specifications at various stages of development (during schematic design, design development and contract document phases).
6. Develop full Commissioning specifications for all Commissioned equipment (Owner may provide the specifications). Coordinate them with, and integrate into, the specifications of the architect and engineers.
    a. The Commissioning specification will include:
        1) a detailed description of the responsibilities of all parties
        2) details of the Commissioning process
        3) reporting and documentation requirements, including formats
        4) alerts to coordination issues, deficiency resolution
        5) construction checklist and startup requirements
        6) subcontractors' Pre-Functional Checklists (PFC) Forms and responsibilities
        7) the Functional Performance Testing (FPT) Forms and process
        8) specific Functional Performance Test requirements, including testing conditions and acceptance criteria for each piece of equipment to be Commissioned
7. The CxA may assist with problem solving, non-conformance or deficiencies, but ultimately that responsibility resides with the General Contractor (GC) and the Architect/Engineer (A/E). The primary role of the CxA is to oversee the Commissioning process. This includes site observations of installation of Commissioned systems and equipment, development and coordination of the execution of a PFC and FPT testing plan and observation and documentation of performance that systems are functioning in accordance with the Owner's Requirements, design intent and in accordance with the Contract Documents. The Contractors will provide all tools and personnel to start, check-out and test equipment and systems, except as noted in this section.
8. Coordinate the Commissioning work and work with the GC to incorporate Commissioning activities into the master project schedule maintained by the GC.
9. Update and revise the Commissioning Plan as required.
10. Plan and conduct a Commissioning scoping meeting and other Commissioning meetings with the Cx team. The CxA will record meeting minutes for Cx meetings facilitated by the CxA and distribute them to all Cx Team members.
11. Request and review additional information required to perform Commissioning tasks, including installation, operations and maintenance (IOM) manuals and materials, contractor start-up and checkout procedures. Document results and incorporate into the Commissioning plan.
12. Review Contractor submittals applicable to systems being Commissioned, for compliance with the Owner's requirements and for coordination with the Commissioning Process. The CxA review provides information to the Design Team but is not a review for acceptance or rejection of the submitted equipment or system; acceptance or rejection of any submittal remains the responsibility of the Design Team.
13. Conduct periodic construction observations to verify that systems and equipment are installed consistently with Project's requirements. Document deficiencies and distribute to Cx Team members in a timely manner.
14. Attend selected planning and job-site meetings to obtain information on construction progress.

15. With necessary assistance and review from installing contractors, write and distribute the Pre-Functional Checklists and Functional Performance Test procedures for systems and equipment.
16. Approve Pre-Functional Checklists completed by GC by selected site observation visits and spot checking to confirm that systems and equipment are ready for Functional Performance Tests.
17. Review start-up and TAB reports to confirm included systems are ready for Functional Performance Testing.
18. Coordinate, witness and document Functional Performance Testing by installing contractors. Coordinate retesting as necessary until satisfactory performance is achieved per design specifications.
19. Coordinate, witness and document required seasonal or deferred Functional Performance Testing and any deficiency corrections required.
20. Review equipment warranties and confirm that they are project specific and clearly define the Owner's responsibilities if any.
21. Oversee and review the training of the Owner's operating personnel.
22. Review O&M manuals submitted by the GC.
23. Provide a final Commissioning report for review and acceptance by the Owner's Representative.
24. The CxA is not responsible for construction means and methods or for site safety and security.
25. The CxA will not authorize or approve construction cost amendments, changes to the construction schedule, or changes to the contract documents.
26. Participate in the TAB Field verification process using a sampling method. Document the verification using TAB FPTs.

B. General Contractor (GC) and Sub-Contractors
1. The GC is responsible for coordinating all Commissioning activities of the sub-contractors. Commissioning activities may be completed by the Mechanical Contractor (MC), Electrical Contractor (EC), Controls Contractor (CC), or Test and Balance (TAB) contractor, but the GC is ultimately responsible for completion of all Cx related tasks.
2. Facilitate the coordination of the Commissioning work by the CxA and incorporate Commissioning activities into the master schedule.
3. Furnish a copy of all construction documents, addenda, change orders, Requests for Information (RFIs), approved submittals, shop drawings, Architect's Supplemental Instructions (ASIs), and IOMs, related to Commissioned systems and equipment to the CxA.
4. In each purchase order or written subcontract, include any requirements for Commissioning.
5. Ensure that all sub-contractors execute their Commissioning responsibilities according to the Contract Documents, responsibilities and schedule.
6. The GC shall designate a staff member who will be knowledgeable and responsible for the construction of the Commissioned systems (typically the site superintendent) to be their active representative on the Commissioning team. This person shall attend the Commissioning scoping meeting and other necessary meetings scheduled by the CxA to facilitate the Commissioning process.
7. Each sub-contractor shall designate a staff member who will be knowledgeable and responsible for the construction of the Commissioned systems (typically the trade superintendent) to be their active representative on the Commissioning team. This person shall attend the Commissioning scoping meeting and other necessary meetings scheduled by the CxA to facilitate the Commissioning process.
8. Coordinate and share the issues identified on the Cx Issues Log with the appropriate trade sub-contractors. Respond in writing to the CxA and Owner's Representative with the contractor's response, appropriate trade responsible for the corrective action and anticipated completion date for the corrective action.

9. Follow up with the subcontractors as to the status of the corrective actions to the items on the Cx Issues Log, and update the CxA.
10. The GC's designated Cx team staff member shall personally examine, witness and verify that all issues are corrected and complete when the sub-contractor states they have "corrected" an item on the Cx Issues Log.
11. Notify the CxA one week in advance of all equipment start-ups and tests required by the Contract Documents.
12. Submit test results for tests required by the Contract Documents, including (but not limited to) duct leakage tests, hydronic system pressure tests, generator tests, etc. as applicable to the Commissioning scope.
13. Receive the Pre-Functional Checklist forms from the CxA. Create a "master" Pre-Functional Checklist document binder containing all checklists for the project that shall remain at the project site.
14. Coordinate and distribute copies of the Pre-Functional Checklists to all relevant subcontractors.
15. Notify the CxA when Pre-Functional Checklists are completed.
16. Remedy any deficiencies identified in the Pre-Functional Checklists and notify the CxA (in writing) that deficiencies have been addressed.
17. Notify the CxA when TAB activities will be taking place and have been completed. Provide the CxA with TAB report(s).
18. Participate in TAB verification, which may include repeating selected measurements contained in the TAB report(s).
19. Coordinate with subcontractors to ensure qualified technicians are available for performing the Functional Performance Test procedures under direction of the CxA.
20. Coordinate the training of Owner personnel.
21. Verify that subcontractors prepare and submit O&M manuals, according to the Contract Documents, including clarifying and updating the original sequences of operation to as-built conditions.
22. Ensure that subcontractors execute seasonal or deferred Functional Performance Testing, witnessed by the CxA, according to the specifications.
23. Ensure that subcontractors correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.
24. Gather and submit all project closeout documentation, including submittals, O&M manuals, as-built drawings, warranties, etc. to CxA for review.

C. Owner
1. Arrange for facility operating and maintenance personnel to attend various field Commissioning activities and field training sessions according to the Commissioning (Cx) Plan.
2. Provide final approval for the completion of the Commissioning requirements.
3. Coordinate site visits and meetings with the CxA.
4. Review and comment on Commissioning documentation such as the Cx plan, field reports, PFC & FPT Forms, and Cx Issue Logs.
5. Provide interpretations and clarifications of the Owner’s Requirements.
6. Provide input and direction on Commissioning-related recommendations that arise from the Commissioning process which may enhance the operation of the building but are not included in the project documents and may be an additional project cost. If the Owner is in agreement with Commissioning recommendations, they are to direct the Design Team to review and issue the appropriate directive to add that scope and maintain the Design Team's responsibility for all construction documents.

D. Design Team (Architect/Engineer)
1. Perform normal submittal review, construction observation, as-built drawing preparation, O&M manual preparation, etc., as contracted with Owner.
2. Fulfill all obligations specified in the contract documents, including reviewing and approving submittals, conducting construction observation, issuing addenda and clarifications,

responding to RFIs, issuing punchlists, and conducting substantial and final completion walkthroughs. Review and provide comments on all recommendations.

3. Provide any design narrative documentation requested by the CxA.
4. Prepare and submit final as-built design intent documentation for inclusion in the Systems Manual.
5. Review and approve the O&M manuals.
6. Coordinate resolution of design non-conformance and design deficiencies identified during the project.
7. Assist (along with the contractors) in clarifying the operation and control of Commissioned equipment in areas where the specifications, control drawings or equipment documentation is not sufficient for writing detailed testing procedures.
8. Participate in the resolution of system deficiencies identified during Commissioning.
9. Notify the CxA of substantive changes to the Contract Documents.
10. Provide clarifications to Contract Documents as required.
11. Review the Design Team Commissioning Issues Log and respond to all items in a timely manner. Update contract documents as required to address Commissioning items identified.
12. Review Commissioning suggestions identified on the Design Team Commissioning Issues Log for impact to the design intent. If the design team is in agreement with the suggestion, they are to assist in reviewing the suggestion with the owner for their review and decision if it should be added to the project.
13. The design team shall review all shop drawing and submittal comments from the CxA.

1.5 SCOPE OF WORK

A. Refer to Section 21 08 00 for listing of fire suppression systems to be Commissioned and requirements.

B. Refer to Section 22 08 00 for listing of plumbing systems to be Commissioned and requirements.

C. Refer to Section 23 08 00 for listing of HVAC systems to be Commissioned and requirements.

D. Refer to Section 26 08 00 for listing of Electrical Systems to be Commissioned and requirements.

1.6 COMMISSIONING DOCUMENTATION

A. General

1. Timely and accurate documentation of Commissioning activities is essential for the Commissioning process to be effective. To this end, all Commissioning activities conducted by the contractors shall be documented as outlined below and in Part 3 Execution of this specification.
2. Contractor Commissioning responsibilities on Project Management Software include the following items:
    a. Commissioning Schedule
    b. Construction Issues
    c. Pre-Functional Checklists
    d. Functional Performance Test Forms
3. The Architect, Engineers, GC, subcontractors, and owner will be responsible for responding within five business days of an inquiry being assigned to them.
    a. The owner(s) or their designated responsible party will be one of the final designated personnel in the approval process that will sign off before an item can be closed out.
    b. All of the aforementioned entities will be responsible for the same response time in the identified field punch software.

c. The punch list and open Commissioning items will be tied to identified retention dollars that will not be paid until all open issues are resolved.
d. Owner-Insite will be the designated software that will be used by all Cx agents and used for MEP items identified by the Cx agent and Owner.

4. The Pre-Functional Checklists shall be completed by each respective trade contractor involved with the installation of any Commissioned systems and equipment.
5. The Functional Performance Tests will be completed by the CxA as they witness the test(s) conducted by the contractors.
6. All Contractor Commissioning Documents prepared by the contractors will be fully completed in a neat and workmanlike manner so as to be fully legible. Documentation which, at the CxA's discretion, is incomplete or less than fully legible shall be deemed unacceptable.
7. Commissioning procedures and tests, which are rejected by the CxA due to incomplete, or illegible contractor documentation shall be repeated by the contractor and new Contractor Commissioning Documents shall be prepared to the Commissioning Team's satisfaction at no additional cost to the Owner.
8. Procedures deemed unacceptable by the Commissioning Team after being repeated due to inadequate documentation may be subject to completion by the CxA, at a cost to the contactor as outlined in item Section 3.8 "Cost of Re-Evaluation" below.
9. All Contractor Commissioning Documents shall be completed on the job-site concurrent with the activities being documented. Remedial documentation of Commissioning activities either off-site or after the procedures have been completed is unacceptable.
10. All Contractor Commissioning Documents will be submitted to the CxA for review and acceptance upon completion.

B. Contractor Commissioning Process Status Tracking
1. Contractors shall be responsible for monitoring the progress of their Commissioning activities. The contractor will update the status of meetings, issues, re-scheduling, checklists and tests.
2. The contractors shall regularly update and upload drawings or pictures as Commissioning activities are completed so as to provide a readily available report to CxA regarding current status of the contractors Commissioning activities.

C. Record Drawings
1. Contractors shall regularly update a 'redlined' set of record drawings showing Commissioned systems as work is being installed so that the drawings remain current with the field work, and as required in Division 01, 21, 22, 23, and 26 of the project specifications.
2. Redlining record drawings at the end of construction shall not be acceptable.
3. The Contractors up-to-date, in-progress redlines shall be kept on-site in the Contractor's field office and available for review by the Cx Team.

D. Access to Contractor Documentation
1. Contractors shall provide the CxA with access to shop drawings, coordination drawings, equipment cut-sheets, schematics, in-progress record drawings, manufacturers installation-operation-maintenance manuals, startup reports, etc. to assist the CxA in execution of the Cx process.

1.7 COORDINATION

A. The CxA shall receive a copy of all construction documents, project schedules, addenda, change orders, and appropriate approved submittals and shop drawings directly from the GC.

B. The CxA shall disseminate written information and documents to all responsible parties relative to the nature and extent of the Cx communication.

C. The CxA is primarily responsible to the Owner and, as such, shall regularly apprise the GC and the Owner of progress, pending problems and/or disputes, and shall provide regular status reports on progress with each system. Any potential change in the contractual and/or financial obligations of the owner (credits, change orders, schedule changes, etc.) shall be identified and quantified as soon as possible.

D. The CxA shall coordinate the schedule of Commissioning activities with the construction schedule. It is possible that some procedures will be completed before the entire system is completed.

1.8 SCHEDULE

A. Commissioning of systems shall proceed per the criteria established in the specific sections that follow, with activities to be performed on a timely basis. The CxA shall be available to respond promptly to avoid construction delays.

B. Start-up and testing of systems may proceed prior to final completion of systems to expedite progress. However, testing and checkout services that are the primary responsibility of the contractor / vendor will not proceed in advance of their testing and checkout.

C. Problems observed shall be addressed immediately, responsible parties notified, and actions to correct deficiencies coordinated in a timely manner.

D. Contractor schedules and scheduling is the responsibility of the GC. The CxA shall provide Commissioning scheduling information to the GC for review and planning activities.

1.9 REFERENCE STANDARDS

A. Industry standards and guidelines are a guide to the Commissioning process and are hereby incorporated and will be applied as appropriate. Reference standards and guidelines include, but are not limited, to the following:

B. References:
1. ASHRAE Standard 202-2013: Commissioning Process for Buildings and Systems
2. ASHRAE Guideline 0-2005: The Commissioning Process
3. ASHRAE Guideline 1.1-2007: HVAC&R Technical Requirements for The Commissioning Process
4. ACG Commissioning Guideline (current version)
5. NEBB Commissioning Standard (current version)
6. BCxA Building Commissioning Handbook (current version)

2.0 SUBSTANTIAL COMPLETION

A. “Certificate of Substantial Completion” will not be signed by the Dallas ISD unless the CxA and the Owner’s Representative are in agreement that all Equipment and Systems to be Commissioned are installed and operational, and any open Cx Issues Log items have been identified as minor. Any open Cx Issues Log items shall be resolvable within 21 days.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. All industry standard test equipment required for performing the specified tests shall be provided by the applicable contractor (as specified) and shall be approved by the CxA. Any necessary proprietary vendor specific test equipment shall be provided by that vendor or manufacturer.

B. Any portable or hand-held setup / calibration devices required to initialize the control system shall be made available by the control vendor to the CxA (at no additional cost to the Owner or CxA).

C. The instrumentation used in the Commissioning process shall meet the following standards:
   1. Be of sufficient quality and accuracy to test and/or measure system performance within the tolerances required.
   2. Be calibrated at the manufacturer's recommended intervals (typically within the previous 12 months) with calibration tags permanently affixed to the instrument
   3. Be maintained in good repair and operating condition throughout the duration of use on this project.
   4. Be immediately re-calibrated or repaired if dropped and/or damaged in any way during use on this project.

PART 3 - EXECUTION

3.1 COMMISSIONING PLAN AND SCHEDULE

A. The CxA shall generate a project specific Commissioning plan which identifies Cx tasks, roles and responsibilities for the Cx process. The CxA will submit a Cx schedule for the Commissioning process which shall be integrated into the construction schedule by the GC.

3.2 CONSTRUCTION OBSERVATION

A. This is an additional and separate activity from that provided by the design team. Construction observation is required as part of the Commissioning and coordination process to be provided by the CxA. Field Observation reports will be maintained and distributed by the CxA to all Cx Team members.

3.3 COMMISSIONING ISSUES LOGS

A. As part of the Commissioning process, all issues will be recorded on the Project Management Software. The PM Software will divide the issues as follows.

   1. Construction Commissioning Issues
      a. This log is also a part of the Web-Based Project Management Software. It is a formal and ongoing record of problems or concerns pertaining to the installation of the Commissioned systems and equipment which identifies where the contractors have deviated from the OPR, contract documents, applicable codes or normal industry construction practices. It is the GC's responsibility to regularly login and retrieve this log from the Web-Based Project Management Software, follow up and review each item on the list with the appropriate trades, and respond to the CxA with feedback within 5 business days from the issuance of the log from the CxA.

b. Team members will be given access through the Web Based Project Management Software to comment on issues. This is where the GC should provide feedback which includes the following sections:
    1) Response/Action: This is the contractor's response to the issue identified by the CxA.
    2) Trade: This identifies the specific contractor responsible for the correction of the issue. The issue will be assigned to that contractor or subcontractor.
    3) Expected Completion Date: This is the date which the GC and subcontractor agree the issue will be resolved by. This provides information back to the CxA as to when items should be corrected by for spot checking the correction of issues.
c. The GC shall provide feedback and updates to the construction Cx issues log to the CxA within 5 business days from its issuance from the CxA.
d. The CxA will maintain the master cx long on the Web Based Project Management Software.

3.4 PRE-FUNCTIONAL CHECKLISTS

A. The Commissioning Authority shall develop the Pre-Functional Checklists (PFCs) and distribute them to the GC for use by the sub-contractors.

B. The sub-contractors shall complete the checklists and submit them to the GC as they are completed or uploaded to the Web Based Project Management Software.

C. PFCs consist of a series of field observations and verification checks conducted by the contractors during the installation of Commissioned equipment to verify the following:
    1. Installed equipment matches the specifications and approved submittals
    2. Equipment is installed per the specifications, drawings and manufacturer's recommendations.
    3. Utility connections to equipment, such as electrical, steam, chilled water, etc. have been successfully completed.
    4. Equipment is ready for start-up per manufacturer's guidelines.

D. Contractors should expect to complete one (1) PFC for each piece of equipment covered by the Commissioning process such as pumps, fans, air handling units, terminal units, control panels, and lighting control panels.

E. PFCs for mechanical equipment will include verification of the safety devices intended to stop and/or prevent equipment operation unless minimum safety standards or conditions are met. These may include adequate oil pressure, proof-of-flow, non-freezing conditions, maximum static pressure, maximum head pressure, etc. The CxA shall observe the actual performance of safety shutoffs in a real or closely simulated condition of failure.

F. Systems may include safety devices and components that control a variety of equipment operating as a system. Interlocks may be hard-wired or operate from software. Operation of these interlocks shall be verified by the CxA.

G. Additional checklists will be required to verify installation of distribution systems such as piping, ductwork, electrical wire and conduit, etc. The number of required PFCs will vary from system to system, but will typically be limited to one form per system per floor or zone.

H. The PFC used for this project will be finalized by the CxA after receipt of equipment Installation, Operation & Maintenance (IOM) Manuals from the Contractors.

I. PFCs shall be completed by the contractor and maintained on-site per the requirements of this specification, Section 1.6 "Commissioning Documentation".

3.5 CONTRACTOR STARTUP TESTING

A. The contractors shall conduct all startup testing as required by the specifications, equipment manufacturer, the manufacturer's installation, operations and maintenance manual or as necessary to verify all equipment is properly installed and fully operational.

B. Startup testing shall be documented. Appropriate documentation shall be by the contractor and/or the manufacturer's representative or entity specified in the construction documents.

C. The startup testing shall be documented using the contractors or manufacturer's standard forms and an electronic copy of the form shall be provided to the CxA or uploaded to the Web Based Project Management Software under the appropriate PFC.

3.6 TESTING AND BALANCING

A. Testing, Adjusting, and Balance Contractor (TAB) Requirements
   1. Air and water balance shall be accomplished by an independent test and balance firm. The test and balance firm shall come back after the final balancing report is approved to work with the CxA and spot check this work to verify accuracy of results. Refer to Division 23 for acceptance criteria.
   2. Test and Balance contractor to provide the final balancing report to the CxA.
   3. The TAB contractor shall be responsible for successful completion and documentation of all TAB activities specified in the Division 23.
   4. Prior to the start of TAB activities, the TAB contractor shall submit a proposed TAB plan, procedures and documentation to the CxA and A/E for review. TAB procedures shall be submitted to allow sufficient time for CxA review and approval prior to the start of TAB activities.
   5. After this review, and prior to start of field work, the TAB contractor will attend one or more planning meetings as required with the Commissioning Team to review and discuss outstanding issues relating to TAB procedures and forms, discuss resolution of issues identified during the TAB contractor’s plan review and field inspections, and to coordinate field work.
   6. Prior to the start of fieldwork, the TAB contractor shall issue a final set of TAB procedures and TAB forms which incorporate any comments received during the Commissioning Team review.
   7. The TAB contractor shall have at least one certified field technician on site whenever TAB work is being performed. The certified technician shall be responsible for the quality of the work of any non-certified technicians.
   8. The TAB contractor is responsible to notify the GC, who in turn shall notify the Commissioning Team, a minimum of two (2) weeks in advance of the time for start of TAB work to allow the CxA and A/E time to assess system readiness.
   9. The TAB contractor will work cooperatively with the CxA.
   10. The TAB contractor shall coordinate with the controls contractor to ensure that changes made to the control system during TAB (flow coefficients, duct areas, etc.) are archived and become the default or initial values for these parameters.
   11. The TAB contractor shall provide daily lists of issues and/or problems identified during TAB work to the GC, CxA and A/E for follow-up & resolution with the appropriate contractors.
   12. Participate in verification of the TAB report, which will consist of repeating any selected measurement contained in the TAB report where required by the CxA for verification or diagnostic purposes.

13. A TAB Final Acceptance Inspection shall be conducted by the A/E, Owner's Representative and CxA and will include a field verification of at least 5% of the TAB contractor's field readings.
14. The TAB contractor will provide technicians, equipment and instrumentation to support the field verification.
15. Instruments used for the field verification shall be the same instruments (by model and serial number) that were used for the original TAB work.
16. The TAB Contractor shall provide test equipment calibration certifications to the Owner's Representative or the CxA upon request.

3.7 FUNCTIONAL PERFORMANCE TEST PROCEDURES

A. Scope
1. Functional Performance Test (FPT) procedures are executed after Commissioned equipment and systems have been installed, started-up, balanced and are fully operational. The goal of these procedures is to conclusively verify that Commissioned equipment, sub-systems and major systems operate and perform per the design intent, and the project specifications.
2. Equipment-level FPTs will be used to verify operation and capacity of selected equipment such as boilers, chillers cooling towers, pumps, exhaust fans, air handling units, etc.
3. System-level FPTs will verify the following aspects of system operation.
    a. System operation under both normal and alternate operating conditions and modes.
    b. Interactions between equipment and sub-systems.
    c. Operation of safeties and interlocks.
    d. Control system operation, response time, stability and tuning.
    e. System response to abnormal and/or emergency conditions such as fire, equipment failure and power outages, and associated Alarms.
    f. All control sequence of operation strategies, alarm generation and reporting shall also be reviewed and proper operation verified by the CxA.
    g. The central work station graphics, point assignments, alarm messages, and logging functions shall be verified.

B. Functional Performance Test Forms
1. The FPTs used for this project will be created, utilized and finalized by the CxA after receipt of approved contractor submittals.

C. Contractor Requirements
1. The Cx team will, in a joint effort, coordinate and schedule FPT activities.
2. Scheduling of FPTs shall be contingent on notification from the affected contractor(s) to the GC and CxA that equipment and systems are ready for checkout.
3. Other prerequisites for execution of FPTs shall include the following:
    a. All Contractor Startup Procedures and Cx Pre-Functional Checklists have been completed and documented.
    b. TAB has been completed.
    c. All Cx Issues Log items identified as affecting equipment or system performance or operations have been resolved.
4. Prior to claiming readiness for FPT, the Controls Contractor shall ensure that the following items are completed and documented:
    a. Point-to-point checkouts have been verified and documentation has been submitted to the CxA.
    b. Verify that network communication between all devices and systems is established
    c. Sequence of Operation checkouts are completed.
    d. Printed and annotated trend logs and alarm histories establishing acceptable operation including
        1) Stable control

2) Recovery from upset/changes (e.g., from setback)
3) Special and/or seasonal modes
4) Emergency and alarm modes including loss/restoration of power

5. Execution of the FPTs will be conducted by the contractors providing and installing the equipment and systems being Commissioned and shall be witnessed by the CxA. The Controls Contractor shall verify/validate the BAS Sequences of Operations to the satisfaction of the CxA.
6. Typical activities during FPT execution will include the following:
   a. Starting/stopping equipment
   b. Energizing/de-energizing electrical distribution gear
   c. Opening/closing valves and dampers
   d. Manipulating BAS inputs, outputs and set points
   e. Setup, collection and downloading of BAS trend data
   f. Test all modes of operation (normal, failure, backup, emergency, etc.)
   g. Confirmation of required alarms sent to BA
   h. Written verification of equipment set-points (temperatures, flow rates, etc.)
7. The Contractor(s) shall maintain full responsibility for the facility, equipment and systems operated during the FPTs, maintain all guarantees and warranties, and shall repair any damage to the facility caused during the FPTs.
8. Contractors shall conduct seasonal FPTs as necessary. This includes performing FPTs on equipment during the season it is intended to operate (i.e. test cooling equipment during the peak cooling season and test heating equipment during the peak heating season, etc.). All seasonal FPTs shall be witnessed by the CxA.
9. Tools, test equipment and instrumentation required for completion of the FPTs shall be provided by the contractor. All instruments shall meet the requirements of Part 2 of this specification.
10. FPT acceptance shall confirm the performance of systems to the extent of the design intent. When a system is accepted, the Owner shall be assured that the system is complete, works as intended, is correctly documented, and operator training has been performed.

3.8 COST OF RE-EVALUATION

A. The cost for Contractors to re-evaluate any Commissioning Procedures due to open issues shall be bore by the contractors.

B. The CxA will be available for two attempts of the Functional Performance Tests (one initial and one re-try) with minimal follow-up where necessary (due to deficiencies, systems not ready, incomplete work, etc.) to try to accomplish each test as part of the contract. When additional work is required because systems are not ready or because they do not successfully pass the FPT after they have been indicated as ready, the contractor will be charged for the CxA's additional reasonable re-testing costs. Additional fees will be paid to the CxA by the Owner and shall be reimbursed by the Contractor.

C. Any required re-testing by any contractor shall not be allowed as a justified reason for a claim of delay or for a time extension by the contractor or for a request for additional monies.

3.9 SOFTWARE DOCUMENTATION REVIEW

A. Review detailed software documentation for all DDC control systems. This includes review of vendor documentation, their programming approach, and the specific software routines applied to this project. Discrepancies in programming approaches and/or sequences shall be reported and coordinated in order to provide the Owner with the most appropriate, simple, and straightforward approach to software routines.

3.10 OPERATING AND MAINTENANCE (O&M) MANUALS

A. The CxA shall review the draft form of the O&M manuals provided by the Division 21, 22, 23, and 26 contractors. The review process shall verify that O&M instructions meet specifications and are included for all equipment furnished by the contractor, and that the instructions and wiring diagrams are project specific (edited where necessary) to the actual equipment provided for this project.
   1. Published literature shall be specifically oriented to the provided equipment indicating required operation and maintenance procedures, parts lists, assembly/disassembly diagrams, and related information.
   2. The contractor shall incorporate the standard technical literature into system specific formats for this facility as designed and as actually installed. The resulting O&M information shall be project and system specific, concise, to the point, and tailored specifically to this facility. The Commissioning Authority shall review and edit these documents as necessary for final corrections by the contractor.

B. The O&M manual review, and coordination efforts MUST be completed prior to Owner training sessions, as these documents are to be utilized in the training sessions.

C. In addition to the O&M manual requirements within specification Division 21, 22, 23, and 26, O&M manuals shall include at a minimum the following:
   1. An equipment data sheet with the equipment name tag, model number, serial number and any other relevant information for the equipment.
   2. A copy of the approved submittal, indicating the exact make and model of the equipment installed.
   3. A copy of the manufacturer's IOM manual
   4. A copy of all warranty's
      a. If not included on warranty certificate, provide the start/end dates of warranty period, descriptions of what is and isn’t covered and contact information for warranty claims.

3.11 RECORD DRAWINGS

A. The Commissioning Authority shall review the as-built contract documents to verify incorporation of both design changes and as-built construction details. Discrepancies noted shall be corrected by the appropriate party.

3.12 EXCLUSIONS

A. Responsibility for construction means and methods: The CxA is not responsible for construction means, methods, job safety, or any construction management functions on the job site.

B. Hands-on work by the CxA: The contractors shall provide all services requiring tools or the use of tools to start-up, test, adjust, or otherwise bring equipment and systems into a fully operational state. The CxA shall coordinate and observe these procedures (and may make minor adjustments), but shall not perform construction or technician services other than verification of testing, adjusting, balancing, and control functions.

END OF SECTION 01 91 00

DALLAS INDEPENDENT SCHOOL DISTRICT

ORG 274 – MARY MCLEOD BETHUNE ELEMENTARY SCHOOL

HAZMAT REPORT – LCA ENVIRONMENTAL

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16 June 2022 LCA Project 220503

Dallas Independent School District
c/o Mr. Aijaz Khan, PE, CEM, LEED-AP
Senior Project Manager
Dikita Bond Program Management
9400 Central Expressway, 8th Floor
Dallas, TX 75231

RE: **Pre-Renovation Inspection for Asbestos-Containing Building Materials (ACBM) for Bond 2020 ORG # 274 – Mary McLeod Bethune Elementary School (Project Site)**
1665 Duncanville Road, Dallas, TX 75211

Dear Mr. Khan,

LCA Environmental, Inc. (LCA) has completed a pre-renovation asbestos inspection of Mary McLeod Bethune Elementary School (Project Site) located at 1665 Duncanville Road in Dallas, Texas. The inspection was performed to comply with U.S. EPA regulations 40 CFR 61, Subpart M - National Emissions Standard for Hazardous Air Pollutants (NESHAP) and the Texas Asbestos Health Protection Rules (TAHPR) which require that, prior to any construction, renovation, or demolition, the area where the work is to be performed shall be inspected by a properly trained and licensed individual for the presence of asbestos-containing building materials (ACBM) that may be disturbed during the work. This inspection was not intended to fully comply with the Asbestos Hazard Emergency Response Act (AHERA), 40 CFR 763. However, the results of this inspection are intended to be integrated into the existing AHERA documentation for the Project Site. This work has been performed for Dallas Independent School District (Client). This inspection scope of work was limited to accessible building materials which would be impacted by planned renovations based on information provided by Client prior to the site visit which included schematic design drawings and proposed scope by E. Evans Associates, Inc. dated 14 December 2021.

Project Site Observations

LCA was provided with a previous inspection report written by Primera Professional Services Group, LLC for the Project Site facility. Reportedly, the Project Site was constructed in 1996 and is inclusive of 74,250 ft². LCA's pre-renovation inspection was based upon a review of both the provided inspection report and the aforementioned schematic drawings. Previously identified ACBM which would be impacted by planned renovations was identified and previously un-sampled suspect building materials were identified and sampled in accordance with AHERA and TAHPR.

On 01 June 2022, LCA's EPA accredited and Texas Department of State Health Services (TDSHS)-licensed asbestos inspectors Edward Barganier and Thomas Hale, conducted the asbestos inspection. The asbestos inspection included the following:

- Bulk samples were collected and analyzed to confirm or rebut the presence of asbestos within the samples collected. The screening was limited to accessible building materials to be impacted by planned renovations based on the information made available to LCA prior to the site visit.
    - Building materials that had been adequately documented as previously sampled in the previous report were not re-sampled. The available sample and material information was incorporated into this report.

- Bulk samples collected by LCA were delivered for analysis by EPA-endorsed Polarized Light Microscopy/Dispersion Staining (PLM/DS) Methodology at a National Voluntary Laboratory Accreditation Program (NVLAP)-accredited laboratory. This analytical method is used to determine asbestos content as a percentage.

- The report of LCA's inspection presents observations, a summary of the materials sampled, results of the laboratory analysis, and photographic documentation of sampled materials.
    - Note that the intent of this report is to identify and quantify ACBM that would be impacted by planned renovations. Thus, the tables and drawings herein do not identify and/or quantify all ACBM at the Project Site.

Previously un-sampled suspect materials sampled by LCA and analyzed for asbestos content included:

SUMMARY OF SAMPLED BUILDING MATERIALS	
3 samples of roof flashing with silver sealant	3 samples of roof sealant (black)
3 samples of shingle roof system	3 samples of 12"x 12" vinyl floor tile
3 samples of ceramic tile system	3 samples of CMU with block filler
3 samples of exterior sealant	6 samples of exterior window caulk

Conclusions

LCA collected a total of 27 samples, which were analyzed by Moody Labs, LLC, an accredited analytical laboratory under NVLAP and licensed by TDSHS.

No asbestos was detected in the samples collected and submitted for laboratory analysis. Therefore, the building materials sampled in this asbestos inspection are not ACBM as defined by the National Emission Standards for Hazardous Air Pollutants (NESHAP 40 CFR 61 Subpart M) and the Texas Asbestos Health Protection Rules (TAHPR §296).

Below is a table of materials newly identified as ACBM that may be impacted by planned renovations:

SUMMARY OF IDENTIFIED ACBM						
HA Designation	**IDENTIFIED ACBM**	**ACBM TYPE & CONDITION**			**FRIABLE/ NON-FRIABLE**	**APPROXIMATE QUANTITY of ACBM AND LOCATIONS**
		TYPE	**DC**	**PD**		
No asbestos was identified in the samples collected and submitted for analysis.						

Below is a table of previously identified asbestos-containing building materials (ACBM) that may be impacted by planned renovations.

SUMMARY OF PREVIOUSLY IDENTIFIED ASBESTOS-CONTAINING BUILDING MATERIALS TO BE IMPACTED BY PLANNED RENOVATIONS					
IDENTIFIED ACBM	**ACBM TYPE & CONDITION**			**FRIABLE/ NON-FRIABLE**	**APPROXIMATE QUANTITY* of ACBM TO POTENTIALLY BE IMPACTED AND LOCATIONS**
	TYPE	**DC**	**PD**		
No asbestos was identified in the provided Primera inspection report.					

ACBM Type
S - Surfacing
TSI - Thermal System Insulation
Misc - Miscellaneous
F – Friable
NF – Non-friable

DC (Damage Condition)
ND - No Damage
D – Damage
SD - Significant Damage

PD (Potential Damage)
LPD – Limited Potential for Damage
PD – Potential for Damage
PSD – Potential for Significant Damage

*Quantities mentioned in the above table presented are estimates of materials to be impacted by proposed renovations as depicted in a proposed project scope dated 14 December 2021, by E. Evans Associates, Inc. Total quantities of identified ACBM should be verified during subsequent AHERA compliance 6-month surveillance and 3-year re-inspections.

See attached figures for further details regarding ACBM location and extent.

Recommendations

LCA's inspection was limited to accessible suspect building materials that would be impacted by planned renovations based on the limited information made available to LCA prior to the site

visit. LCA recommends that, once completed renovation plans are available, LCA be retained to review the plans and, if necessary, conduct additional sampling and/or revise the inspection appropriately.

Limitations

The findings and opinions of this asbestos inspection are not scientific certainties, but rather opinions based on our professional judgment concerning the significance of the data gathered during the course of the re-inspection. LCA does not represent that the Project Site contains no hazardous or toxic materials, wastes, or other latent conditions beyond the observations made by LCA during the Project Site inspection.

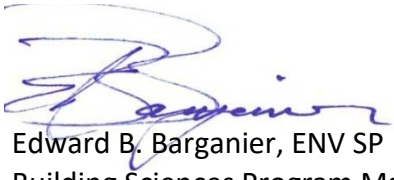
LCA is not responsible for any omissions or inaccuracies of any sort that arise as a result of the Client's failure or inability to provide Project Site information or data. LCA makes no warranties or representations, expressed or implied, beyond those expressed in the Master Contract for Services and this report.

LCA performed a pre-renovation asbestos inspection of the Project Site and only those ACBM that are specifically discussed in this document were identified or addressed during this project. It is possible that other ACBM may exist at the Project Site in areas that were not seen, were concealed, were otherwise inaccessible (e.g., behind walls, above ceilings, inside old air ducts, etc.) or were not impacted by the scope of the planned renovations. Building materials such as concrete, steel, plastic, glass and paint were not sampled. The identification or addressing of other potential asbestos-containing materials was outside the scope of service of this contract. LCA assumes no responsibility or liability for any asbestos-containing building materials at the facility.

This asbestos inspection report has been prepared for the exclusive use of DISD and its direct representatives and associates, to assist with their efforts to identify asbestos-containing building material connected with the Project Site. LCA does not authorize the use of this report for any purpose other than that for which it is prepared.

Submitted by,

Thomas Hale, MAC
EPA Accredited Asbestos Inspector
TDSHS Asbestos Inspector 602545



Edward B. Barganier, ENV SP
Building Sciences Program Manager
TDSHS AIC 105519

Attachments: LCA Licenses and Certifications
Laboratory Analysis Reports 22B-06086
Figures 1-2 – Sample Location Plans

Texas Department of State Health Services

LYNN CLARK ASSOCIATES INC DBA
LCA ENVIRONMENTAL INC

is certified to perform as an

Asbestos Consultant Agency

in the State of Texas and is hereby governed by the rights, privileges and responsibilities set forth in Texas Occupations Code, Chapter 1954 and Title 12, Texas Administrative Code, Chapter 295 relating to Texas Asbestos Health Protection, as long as this license is not suspended or revoked.

License Number: 100285

Expiration Date: 12/15/2023

John Hellerstedt, M.D.,
Commissioner of Health

Control Number: 97420

(Void After Expiration Date)

VOID IF ALTERED NON-TRANSFERABLE

SEE BACK

Texas Department of State Health Services

Asbestos Individual Consultant

EDWARD B BARGANIER

License No. **105519**

Control No. **97788**

Expiration Date: **9-Nov-2022**

Texas Department of State Health Services

Asbestos Inspector

THOMAS A HALE

License No. **602545**

Control No. **99902**

Expiration Date: **18-Apr-2023**

PLM Summary Report

Moody Labs
2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : LCA Environmental, Inc. - Dallas, TX
Project : DISD, Bethune Elementary
Project # : 220503
Identification : Asbestos, Bulk Sample Analysis
Test Method : Polarized Light Microscopy / Dispersion Staining (PLM/DS)
EPA Method 600 / R-93 / 116

Lab Job No. : 22B-06086
Report Date : 06/09/2022
Sample Date : 06/01/2022

On 6/1/2022, twenty seven (27) bulk material samples were submitted by a representative of LCA Environmental, Inc. - Dallas, TX for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

Sample Number	Client Sample Description / Location	Asbestos Content
1-1A	Roof Flashing with Sealant (Silver), Roof, Southeast Parapet North	None Detected - Silver Paint None Detected - Flashing/Sealant None Detected - Roof Membrane
2-1B	Roof Flashing with Sealant (Silver), Roof, Unit SF 2	None Detected - Silver Paint None Detected - Flashing/Sealant None Detected - Roof Membrane
3-1C	Roof Flashing with Sealant (Silver), Roof, Southeast Parapet Center	None Detected - Silver Paint None Detected - Flashing/Sealant None Detected - Roof Membrane
4-2A	Roof Sealant (Black), Roof, Southeast Parapet South	None Detected - Sealant
5-2B	Roof Sealant (Black), Roof, Unit SF 2	None Detected - Sealant
6-2C	Roof Sealant (Black), Roof, Southwest Area Vent Hood	None Detected - Sealant
7-3A	Shingle Roof System, Portable 1520, East	None Detected - Roofing Shingle
8-3B	Shingle Roof System, Portable 1520, North	None Detected - Roofing Shingle
9-3C	Shingle Roof System, Portable 1520, West	None Detected - Roofing Shingle
10-4A	12" x 12" Vinyl Floor Tile (Gray, Mottled) with Mastic, Main Entrance at Doors	None Detected - Floor Tile None Detected - Yellow Mastic None Detected - Black Mastic
11-4B	12" x 12" Vinyl Floor Tile (Gray, Mottled) with Mastic, Main Entrance at Doors	None Detected - Floor Tile None Detected - Yellow Mastic None Detected - Black Mastic
12-4C	12" x 12" Vinyl Floor Tile (Gray, Mottled) with Mastic, Main Entrance at Doors	None Detected - Floor Tile None Detected - Yellow Mastic None Detected - Black Mastic
13-5A	Ceramic Tile System, Principal Restroom	None Detected - Ceramic Tile None Detected - Grout None Detected - Adhesive

PLM Summary Report

Moody Labs
2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : LCA Environmental, Inc. - Dallas, TX
Project : DISD, Bethune Elementary
Project # : 220503
Identification : Asbestos, Bulk Sample Analysis
Test Method : Polarized Light Microscopy / Dispersion Staining (PLM/DS)
EPA Method 600 / R-93 / 116

Lab Job No. : 22B-06086
Report Date : 06/09/2022
Sample Date :06/01/2022

On 6/1/2022, twenty seven (27) bulk material samples were submitted by a representative of LCA Environmental, Inc. - Dallas, TX for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

Sample Number	Client Sample Description / Location	Asbestos Content
14-5B	Ceramic Tile System, Principal Restroom	None Detected - Ceramic Tile None Detected - Grout None Detected - Adhesive None Detected - Thinset
15-5C	Ceramic Tile System, Principal Restroom	None Detected - Ceramic Tile None Detected - Grout None Detected - Adhesive None Detected - Thinset
16-6A	CMU with Block Filler, Boiler Room at Window	None Detected - CMU None Detected - Paint
17-6B	CMU with Block Filler, Boiler Room at Window	None Detected - CMU None Detected - Paint
18-6C	CMU with Block Filler, Boiler Room at Interior Wall	None Detected - CMU None Detected - Paint
19-7A	Exterior Sealant, North of Grease Trap	None Detected - Sealant
20-7B	Exterior Sealant, North of Grease Trap	None Detected - Sealant
21-7C	Exterior Sealant, Southwest of Grease Trap	None Detected - Sealant
22-8A	Exterior Window Caulk (Red), Cafeteria, Southeast Window	None Detected - Caulking
23-8B	Exterior Window Caulk (Red), Cafeteria, Southeast Window	None Detected - Caulking
24-8C	Exterior Window Caulk (Red), Cafeteria, Northwest Window	None Detected - Caulking
25-9A	Exterior Window Caulk (Beige), Library Curved Windows, West	None Detected - Caulking
26-9B	Exterior Window Caulk (Beige), Library Curved Windows, Southwest	None Detected - Caulking
27-9C	Exterior Window Caulk (Beige), Library Curved Windows, South	None Detected - Caulking

PLM Summary Report

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client :	LCA Environmental, Inc. - Dallas, TX	Lab Job No. :	22B-06086
Project :	DISD, Bethune Elementary	Report Date :	06/09/2022
Project # :	220503	Sample Date :	06/01/2022
Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA Method 600 / R-93 / 116		

On 6/1/2022, twenty seven (27) bulk material samples were submitted by a representative of LCA Environmental, Inc. - Dallas, TX for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

Sample Number	Client Sample Description / Location	Asbestos Content

NVLAP Testing NVLAP Lab Code 102056-0

Analyst(s): Tommie Smith

Lab Manager : Heather Lopez — Approved Signatory :

Lab Director : Bruce Crabb — Approved Signatory :

Thank you for choosing Moody Labs

Moody Labs
2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

PLM Detail Report

Supplement to PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : LCA Environmental, Inc. - Dallas, TX
Project : DISD, Bethune Elementary
Project # : 220503

Lab Job No. : 22B-06086
Report Date : 06/09/2022

Sample Number	Layer	% Of Sample	Components	% of Layer	Analysis Date	Analyst
1-1A	Silver Paint (Silver)	1%	Pigment / Binders	100%	06/09	TS
	Flashing/Sealant (Black)	34%	Calcite	30%		
			Tar Binders	70%		
	Sand Layer (Grey)	10%	Aggregate	100%		
	Roof Membrane (Black)	55%	Synthetic Fibers	10%		
			Calcite	30%		
			Tar Binders	60%		
2-1B	Silver Paint (Silver)	5%	Pigment / Binders	100%	06/09	TS
	Flashing/Sealant (Black)	37%	Calcite	30%		
			Tar Binders	70%		
	Sand Layer (Grey)	3%	Aggregate	100%		
	Roof Membrane (Black)	55%	Synthetic Fibers	10%		
			Calcite	30%		
			Tar Binders	60%		
3-1C	Silver Paint (Silver)	5%	Pigment / Binders	100%	06/09	TS
	Flashing/Sealant (Black)	30%	Calcite	30%		
			Tar Binders	70%		
	Sand Layer (Grey)	10%	Aggregate	100%		
	Roof Membrane (Black)	55%	Synthetic Fibers	10%		
			Calcite	30%		
			Tar Binders	60%		
4-2A	Sealant (Black)	100%	Cellulose Fibers	5%	06/09	TS
			Calcite	25%		
			Tar Binders	70%		
5-2B	Sealant (Black)	100%	Cellulose Fibers	5%	06/09	TS
			Calcite	25%		
			Tar Binders	70%		
6-2C	Sealant (Black)	100%	Cellulose Fibers	5%	06/09	TS
			Calcite	25%		
			Tar Binders	70%		

Moody Labs
2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

PLM Detail Report

Supplement to PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : LCA Environmental, Inc. - Dallas, TX
Project : DISD, Bethune Elementary
Project # : 220503

Lab Job No. : 22B-06086
Report Date : 06/09/2022

Sample Number	Layer	% Of Sample	Components	% of Layer	Analysis Date	Analyst
7-3A	Sand Layer (Brown)	10%	Aggregate	100%	06/09	TS
	Roofing Shingle (Black)	90%	Glass Wool Fibers	25%		
			Calcite	30%		
			Tar Binders	45%		
8-3B	Sand Layer (Brown)	10%	Aggregate	100%	06/09	TS
	Roofing Shingle (Black)	90%	Glass Wool Fibers	25%		
			Calcite	30%		
			Tar Binders	45%		
9-3C	Sand Layer (Brown)	10%	Aggregate	100%	06/09	TS
	Roofing Shingle (Black)	90%	Glass Wool Fibers	25%		
			Calcite	30%		
			Tar Binders	45%		
10-4A	Floor Tile (Gray)	96%	Calcite / Vinyl Binders	100%	06/09	TS
	Yellow Mastic (Yellow)	1%	Glue Binders	100%		
	Black Mastic (Black)	3%	Tar Binders	100%		
11-4B	Floor Tile (Gray)	96%	Calcite / Vinyl Binders	100%	06/09	TS
	Yellow Mastic (Yellow)	1%	Glue Binders	100%		
	Black Mastic (Black)	3%	Tar Binders	100%		
12-4C	Floor Tile (Gray)	96%	Calcite / Vinyl Binders	100%	06/09	TS
	Yellow Mastic (Yellow)	1%	Glue Binders	100%		
	Black Mastic (Black)	3%	Tar Binders	100%		
13-5A	Ceramic Tile (White)	88%	Sintered Clays	100%	06/09	TS
	Grout (White)	10%	Aggregate	65%		
			Cement Binders	35%		
	Adhesive (Yellow)	2%	Calcite	40%		
			Glue Binders	60%		

Moody Labs
2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

PLM Detail Report

Supplement to PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : LCA Environmental, Inc. - Dallas, TX
Project : DISD, Bethune Elementary
Project # : 220503

Lab Job No. : 22B-06086
Report Date : 06/09/2022

Sample Number	Layer	% Of Sample	Components	% of Layer	Analysis Date	Analyst
14-5B	Ceramic Tile (White)	76%	Sintered Clays	100%	06/09	TS
	Grout (White)	2%	Aggregate	65%		
			Cement Binders	35%		
	Adhesive (Yellow)	2%	Calcite	40%		
			Glue Binders	60%		
	Thinset (Yellow)	5%	Calcite	40%		
			Glue Binders	60%		
	DW Paper Facing (Tan)	5%	Cellulose Fibers	100%		
	Drywall Material (Off-White)	10%	Cellulose Fibers	5%		
			Gypsum / Binders	95%		
15-5C	Ceramic Tile (White)	92%	Sintered Clays	100%	06/09	TS
	Grout (White)	2%	Aggregate	65%		
			Cement Binders	35%		
	Adhesive (Yellow)	2%	Calcite	40%		
			Glue Binders	60%		
	Thinset (Yellow)	4%	Calcite	40%		
			Glue Binders	60%		
16-6A	CMU (Grey)	97%	Aggregate	65%	06/09	TS
			Cement Binders	35%		
	Paint (Off-White)	3%	Pigment / Binders	100%		
17-6B	CMU (Grey)	97%	Aggregate	65%	06/09	TS
			Cement Binders	35%		
	Paint (Off-White)	3%	Pigment / Binders	100%		
18-6C	CMU (Grey)	97%	Aggregate	65%	06/09	TS
			Cement Binders	35%		
	Paint (Off-White)	3%	Pigment / Binders	100%		
19-7A	Sealant (White)	100%	Calcite	40%	06/09	TS
			Binders / Fillers	60%		
20-7B	Sealant (White)	100%	Calcite	40%	06/09	TS
			Binders / Fillers	60%		

Moody Labs
2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

PLM Detail Report

Supplement to PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : LCA Environmental, Inc. - Dallas, TX
Project : DISD, Bethune Elementary
Project # : 220503

Lab Job No. : 22B-06086
Report Date : 06/09/2022

Sample Number	Layer	% Of Sample	Components	% of Layer	Analysis Date	Analyst
21-7C	Sealant (Grey)	100%	Calcite	40%	06/09	TS
			Binders / Fillers	60%		
22-8A	Caulking (Red)	100%	Binders / Fillers	100%	06/09	TS
23-8B	Caulking (Red)	100%	Binders / Fillers	100%	06/09	TS
24-8C	Caulking (Red)	100%	Binders / Fillers	100%	06/09	TS
25-9A	Caulking (Beige)	100%	Calcite	50%	06/09	TS
			Binders / Fillers	50%		
26-9B	Caulking (Beige)	100%	Calcite	50%	06/09	TS
			Binders / Fillers	50%		
27-9C	Caulking (Beige)	100%	Calcite	50%	06/09	TS
			Binders / Fillers	50%		

Moody Labs

Chain of Custody

Lab Job # 226-060860 PLM 27
Lab Job # _____
Lab Job # _____

AFTER HOURS / WEEKEND WORK: ☐ YES ☐ NO
Please call in advance for after hours / immediate pricing & availability

ASBESTOS PLM

Bulk ☐ Immediate ☐ 1 day ☐ 2 day ☐ 3 day ☒ 5 day
☐ **Analyze All** ☒ **Positive Stop**

PCM Air (7400)

☐ Immediate ☐ 1 day ☐ 2 day ☐ 3 day ☐ 5 day
Analyze Blanks ☐ **Yes** ☐ **No**

TOTAL DUST(0500/0600)

☐ 1 day ☐ 2 day

ASBESTOS TEM

Air AHERA Method ☐ Late Night* ☐ 6 hr ☐ 12 hr ☐ 24 hr
Air 7402 (Modified) ☐ 1 day ☐ 2 day ☐ 3 day
Bulk ☐ 1 day ☐ 2 day ☐ 3 day ☐ 5 day
Water/Wipe/Micro Vac ☐ 1 day ☐ 2 day ☐ 3 day
Analyze Blanks ☐ **Yes** ☐ **No**

*Late night analysis surcharges apply

MOLD

Direct Exam ☐ Immed ☐ 1 day ☐ 2 day ☐ 5 day
Standard Air ☐ Immed ☐ 1 day ☐ 2 day ☐ 5 day
Expanded Air ☐ Immed ☐ 1 day ☐ 2 day ☐ 5 day
Culture** ☐ 10-14 days
TPC w/ Yeast & Mold (TYMC)** ☐ 5 day
Analyze Blanks ☐ **Yes** ☐ **No**

BACTERIA**

Total Plate Count (TAMC) ☐ 2 day
Coliform & E. coli (P/A) ☐ 1 day
Staphylococcus aureus ☐ 1 day

Please note Bateria / Mold Culture turnarounds are approximate and subject to analytical requirements

OTHER: _____

Billing Company / City: LCA Environmental, Inc. # of Samples: 27 Sample Date: 6/1/22

Project: DISD - BETHUNE ELEMENTARY Project #: 220503

Contact Information: Name: Thomas Hale Phone #: 972-241-6680 ext 134

E-mail Results to: hale@LCAenvironmental.com, barganier@LCAenvironmental.com Mobile #: 214-403-8298

Invoice Address: _____ P.O. #: _____

Please review paperwork and samples before submitting to lab. Unsealed / improperly packaged / damaged / expired samples or excessive administrative requests may incur additional fees

Notes: _____

Sample #	Sample Description	Vol. / Area (if applicable)	Location / Notes
1 - 1A	ROOF FLASHING W/ SILVER SEALANT		ROOF SE PARAPET N.
2 - 1B	↓		↓ UNIT SF 2
3 - 1C	↓		↓ SE PARAPET CNTR
4 - 2A	ROOF SEALANT (BLACK)		ROOF SE PARAPET SOUTH
5 - 2B	↓		↓ UNIT SF 2
6 - 2C	↓		↓ SW AREA VENT HOOD
7 - 3A	SHINGLE ROOF SYSTEM		PORTABLE 1520 EAST
8 - 3B	↓		↓ NORTH
9 - 3C	↓		↓ WEST
10 - 4A	12"x12" VFT (GRAY MOTTLED) W/ MASTIC		MAIN ENTRANCE AT DOORS
11 - 4B	↓		↓
12 - 4C	↓		↓
13 - 5A	CERAMIC TILE SYSTEM		PRINCIPAL RESTROOM
14 - 5B	↓		↓
15 - 5C	↓		↓

Released By:	Date / Time:	Received By:	Date / Time:
[signature]	6/1/22 1:02	[signature]	6/1/22 1402
Released By:	Date / Time:	Received By:	Date / Time:

Moody Labs

Chain of Custody

Lab Job # 22b-060886
Lab Job #
Lab Job #

DISD-
Project: BETHUNE ELEMENTARY Project #: 220503 **Page** 2 **of** 2

	Sample Description	Vol. / Area (if applicable)	Location / Notes
16 - 6A	CMU W/BLOCK FILLER		BOILER RM AT WINDOW
17 - 6B	〃		〃
18 - 6C	〃		〃 INTERIOR WALL
19 - 7A	EXTERIOR SEALANT		NORTH OF GREASE TRAP
20 - 7B	〃		〃
21 - 7C	〃		SW OF GREASE TRAP
22 - 8A	EXTERIOR WINDOW CAULK (RED)		CAFETERIA SE WINDOW
23 - 8B	〃		〃
24 - 8C	〃		〃 NW WINDOW
25 - 9A	EXTERIOR WINDOW CAULK (BEIGE)		LIBRARY CURVED WINDOWS WEST
26 - 9B	〃		〃 〃 SW
27 - 9C	〃		〃 〃 SOUTH

Non-ACBM Sample Location

ACBM Sample Location

Positive Stop Sample Location

Figure 1
Sample Location Plan
Bethune Elementary School – First Floor Renovation Areas

Prepared For:
Dallas Independent School District

LCA Project Number: 220503

SHEET 1 OF 2

SCALE NTS

DRAWN: RPL

15 June 2022

Revised:

REV

Non-ACBM Sample Location

ACBM Sample Location

Positive Stop Sample Location

REV	
Figure 2 Sample Location Plan Bethune Elementary School – Roof / Portables Renovation Areas	SHEET 2 OF 2
Prepared for: Dallas Independent School District	SCALE NTS
LCA Project Number: 220503	
DRAWN: RPL	15 June 2022
Revised:	

LCA Environmental

LEAD-BASED PAINT SCREENING

Mary McLeod Bethune Elementary School – Renovation Areas
1665 Duncanville Road, Dallas, Texas

PREPARED FOR:
Mr. Mr. Aijaz Khan, PE, CEM, LEED-AP
Senior Project Manager
Dikita Bond Program Management
9400 Central Expressway, 8th Floor
Dallas, TX 75231

PREPARED BY:
LCA Environmental, Inc.
13221 Bee Street
Dallas, Texas 75234
(972) 241-6680

DATE: 16 June 2022

Table of Contents

1.0 EXECUTIVE SUMMARY 3

2.0 SCOPE OF WORK 3

3.0 LBP SCREENING 4

3.1 METHODOLOGY 4
3.2 FINDINGS 5
Lead-Based Paint ≥1.0 mg/cm^2 5
Lead-Containing Paint <1.0 mg/cm^2 5
Materials with No Detectable Lead 6

4.0 CONCLUSIONS AND RECOMMENDATIONS 6

4.1 LEAD-BASED PAINT 6

LIST OF APPENDICES

A. Photographic Documentation

B. LBP XRF Readings

C. Licensing and Certifications

1.0 EXECUTIVE SUMMARY

LCA Environmental, Inc. (LCA) has completed a lead-based paint (LBP) screening limited to coated building materials that would be impacted by planned renovations at the property located at 1665 Duncanville Road, Dallas, Texas. Based on the figures prepared by E. Evans Associates, Inc. dated 14 December 2021, LCA understands the planned renovations are limited to the following Project Site areas:

- Roof
- Main entrance and offices
- Library at curved window wall
- Boiler Room
- Cafeteria windows
- Grease trap area
- Portables

The intent of this inspection and screening is to identify the presence of LBP in the renovation areas (Project Site) prior to planned renovations.

A lead-paint screening does not follow the Housing and Urban Development (HUD) protocols for a lead-based paint assessment in target housing or child occupied facilities. A visual survey was performed on the Project Site. The purpose of the visual survey is to identify suspect homogeneous materials so that representative painted surfaces could be analyzed utilizing an X-ray Fluorescent (XRF) instrument. Homogeneous areas were determined by differentiating painted surfaces by color and use. Representative readings of suspect painted surfaces were then collected.

This report is intended to be used for the purposes of identifying LBP at the Project Site and complying with the OSHA Hazard Communication Standard (29 CFR 1926.59) regarding disclosure of potential hazards.

2.0 SCOPE OF WORK

Task 1 - Lead-Based Paint (LBP) Screening

LCA performed a LBP screening of painted surfaces at the Project Site. LCA's TDSHS-licensed Lead Inspector/Risk Assessor performed a LBP screening to identify the presence of LBP on representative surfaces of suspect LBP-coated materials at the Project Site. Field identification of potential LBP was performed utilizing a hand-held X-Ray Fluorescence (XRF) analyzer. The Screening was limited to accessible coatings/paint at the Project Site.

The intent of the screening was to identify LBP for subsequent abatement and/or to provide sufficient information for the building maintenance and/or contractors to select OSHA compliant methods and protections during subsequent Project Site repairs/renovations and disposal activities. The screening

is not intended to comply with the requirements of HUD which regulates LBP in target housing that is federally owned and target housing receiving federal assistance.

3.0 LBP SCREENING

On 06 June 2022, Mr. Thomas Hale, a TDSHS-licensed employee of LCA, was present at the subject property to evaluate suspect LBP at the Project Site. Homogeneous areas were evaluated by color and use. Readings were collected from representative accessible surfaces.

3.1 METHODOLOGY

Presently, there are no federal environmental regulations that require LBP to be identified or abated in the workplace based upon non-occupational (incidental) exposures. On a federal level and per EPA regulations, lead-based paint is defined as a surface coating or paint containing lead 1.0 milligram per square centimeter (mg/cm^2) or greater, or 0.5% or greater by weight (US EPA Toxic Substance Control Act, Section 401). Based on regulations contained in the Lead-Based Paint Poisoning Prevention Act (LBPPPA) and promulgated by the Consumer Product Safety Commission (CPSC), lead-based paint is defined as paint containing more than 0.06% lead as of June 1977. In 1978, the CPSC banned the sale of lead-based paint to consumers. Based on these dates, Congress in 1987 amended the LBPPPA to require inclusion of intact paint in the definition of immediate hazard and to establish a building construction cutoff date of 1978. Therefore, buildings constructed prior to 1978 are more likely to contain LBP.

The Occupational Safety and Health Administration (OSHA) established the Lead Standard for the Construction Industry, 29 CFR 1926.62, which applies to all construction work where an employee may be exposed to lead. Activities which cause potential exposure include demolition and salvage of structures where lead or material containing lead are present and removal or encapsulation of materials containing lead, as well as alterations and repairs including painting and decorating. The standard defines the occupationally permissible exposure limit and specific requirements for construction work with lead materials. OSHA does not have a lead in paint action level in their current construction lead standard. OSHA considers the lead regulation enforceable if the presence of any lead in paint at detectable concentrations is present when demolition or renovation activities are performed. Any abatement of the lead-based paint or cutting, sanding, and/or grinding of the structures painted with LBP should be performed in accordance with OSHA regulations.

A lead-paint screening does not follow the HUD protocols for a lead-based paint assessment in target housing or child occupied facilities. The following protocol was utilized for the lead screening:

A visual survey was performed at the Project Site. The purpose of the visual survey is to identify suspect homogeneous materials so that representative XRF readings could be obtained. Homogeneous areas were determined by differentiating painted surfaces by color and use. Representative instrument readings of suspect painted surfaces were then collected.

Instrument readings were collected using the following protocols:

- An industry standard XRF, manufactured by Innov-X Systems, Inc., was utilized. Prior to initial sampling, the instrument was calibrated against the standards of the National Institute of Standards and Testing (NIST).

The actual number of instrument readings collected is dependent on the number of varied color and uses of paint encountered during the survey. Age, renovation history and changes in occupancy can cause wide variance in types of finishes encountered, and thus, the necessary number of readings collected.

The condition of suspect LBP tested was determined during the screening. The general condition, location and color of identified LBP is noted in the report. Recommendations are included for all LBP and lead-containing paint identified during the screening.

A LBP screening is appropriate for facilities which do not fit the HUD definition of "target housing" or "child-occupied facilities". Unlike a HUD-compliant LBP survey, which surveys each individual surface of a structure, a LBP screening identifies homogeneous areas (colors and uses) of paint identified as LBP or lead-containing paint (LCP).

3.2 FINDINGS

Lead-Based Paint ≥1.0 mg/cm^2

No lead-based paint ≥1.0 mg/cm^2 was identified at the time of the screening.

Lead-Containing Paint <1.0 mg/cm^2

LEAD-BASED PAINT ≥1.0 mg/cm^2					
Sample Number	**Pb**	**Location**	**Component**	**Color**	**Condition**
9	0.03	Library	Exterior window cage	Red	Intact
18	0.09	Cafeteria	Bike rack	Gray	Intact
21	0.01	Entry vestibule	Window frame	Blue	Intact
25	0.11	Main entrance	Column	Gray	Intact
35	0.01	Portables	Sidewalk rails	Black	Intact

Materials with No Detectable Lead

LEAD FREE PAINT 0.0 mg/cm^2			
Sample Number	**Location**	**Component**	**Color**
3	Roof	Parapet cap	Red
4	Roof	Parapet cap	Tan
5	Boiler room	Wall	White
6	Boiler room	Door	Red
7	Boiler room	Doorframe	Red
8	Library	Exterior window frame	Red
10	Library	Interior window frame	Blue
11	Library	Windowsill	Varnish
12	Library	Wall	White
13	Cafeteria	Wall	White
14	Cafeteria	Wall	Blue
15	Cafeteria	Interior window frame	Blue
16	Cafeteria	Windowsill	Varnish
17	Cafeteria	Exterior window frame	Red
19	Entry vestibule	Wall	White
20	Entry vestibule	Door	Blue
22	Office Manager's office	Wall	White
23	Office Manager's restroom	Ceramic tile	Multiple
24	Office Manager's restroom	Door	Varnish
26	Main entrance	Exterior window frame	Red
27	Main entrance	Main door	Black
28	Portable 1520	Exterior wall	Tan
29	Portable 1520	Skirt	Red
30	Portable 1520	Door	Brown
31	Portable 1529	Wall	White
32	Portable 1529	Shelf	Mustard
33	Portable 1529	Stair rail	Brown
34	Portable 1660	Exterior window frame	Brown
36	Portable 1596	Shelf	Varnish

See Appendix A – Photographic Documentation and Appendix C – XRF Readings for further details.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 LEAD-BASED PAINT

LCA took 34 XRF readings of Project Site surfaces. Of those readings, **none** were found to be LBP (contains greater than or equal to 1.0 mg/cm^2 lead).

The OSHA Lead in Construction Standard states that "negative" readings (i.e. those below the HUD/EPA definition of what constitutes LBP [1.0 mg/cm^2, 5,000 mg/kg, or 0.5% lead by weight] **do not** relieve contractors from performing exposure assessments (personal air monitoring) on their employees per the OSHA Lead Standard, and should not be interpreted as lead free. Although a reading may indicate "negative", airborne lead concentrations still may exceed the OSHA Action Level or the OSHA Permissible Exposure Limit (PEL) depending on the work activity.

Due to the fact that lead-containing paint was identified on five surfaces, lead safe work practices should be employed for all work activities that may impact the lead-containing paint.

LIST OF APPENDICES

A. Photographic Documentation

B. LBP XRF Readings

C. Licensing and Certifications

APPENDIX A

Photographic Documentation

PHOTOGRAPIC DOCUMENTATION

Photo 1: View of Bethune Elementary School. No LBP was identified during the LBP screening.

APPENDIX B

LBP XRF Readings

XRF Readings
Bethune Elementary School - Renovation Areas
06 June 2022

Date	Reading	Mode	Pass/Fail	LBP Result	Pb (mg/cm^2)	Location	Component	Color	Substrate	Condition
6/6/2022	1	Standardization	PASS							
6/6/2022	2	Calibration	PASS	Positive	1.06			Red		
6/6/2022	3	Lead Paint	PASS	Negative	0	Roof	Parapet Cap	Red	Metal	Intact
6/6/2022	4	Lead Paint	PASS	Negative	0	Roof	Parapet Cap	Tan	Metal	Intact
6/6/2022	5	Lead Paint	PASS	Negative	0	Boiler Room	Wall	White	CMU	Intact
6/6/2022	6	Lead Paint	PASS	Negative	0	Boiler Room	Door	Red	Metal	Intact
6/6/2022	7	Lead Paint	PASS	Negative	0	Boiler Room	Doorframe	Red	Metal	Intact
6/6/2022	8	Lead Paint	PASS	Negative	0	Library	Exterior Window Frame	Red	Metal	Intact
6/6/2022	9	Lead Paint	PASS	Negative	0.03	Library	Exterior Window Cage	Red	Metal	Intact
6/6/2022	10	Lead Paint	PASS	Negative	0	Library	Interior Window Frame	Blue	Metal	Intact
6/6/2022	11	Lead Paint	PASS	Negative	0	Library	Windowsill	Varnish	Wood	Intact
6/6/2022	12	Lead Paint	PASS	Negative	0	Library	Wall	White	Drywall	Intact
6/6/2022	13	Lead Paint	PASS	Negative	0	Cafeteria	Wall	White	Drywall	Intact
6/6/2022	14	Lead Paint	PASS	Negative	0	Cafeteria	Wall	Blue	Drywall	Intact
6/6/2022	15	Lead Paint	PASS	Negative	0	Cafeteria	Window Frame	Blue	Metal	Intact
6/6/2022	16	Lead Paint	PASS	Negative	0	Cafeteria	Windowsill	Varnish	Wood	Intact
6/6/2022	17	Lead Paint	PASS	Negative	0	Cafeteria	Exterior Window Frame	Red	Metal	Intact
6/6/2022	18	Lead Paint	PASS	Negative	0.09	Cafeteria	Bike Rack	Gray	Metal	Intact
6/6/2022	19	Lead Paint	PASS	Negative	0	Entry Vestibule	Wall	White	Drywall	Intact
6/6/2022	20	Lead Paint	PASS	Negative	0	Entry Vestibule	Door	Blue	Metal	Intact
6/6/2022	21	Lead Paint	PASS	Negative	0.01	Entry Vestibule	Window Frame	Blue	Metal	Intact
6/6/2022	22	Lead Paint	PASS	Negative	0	Office Manager's Office	Wall	White	Drywall	Intact
6/6/2022	23	Lead Paint	PASS	Negative	0	Office Manager's Restroom	Ceramic Tile	Multiple	Ceramic	Intact
6/6/2022	24	Lead Paint	PASS	Negative	0	Office Manager's Restroom	Door	Varnish	Wood	Intact
6/6/2022	25	Lead Paint	PASS	Negative	0.11	Main Entrance	Column	Gray	Metal	Intact
6/6/2022	26	Lead Paint	PASS	Negative	0	Main Entrance	Exterior Window Frame	Red	Metal	Intact
6/6/2022	27	Lead Paint	PASS	Negative	0	Main Entrance	Main Doors	Black	Metal	Intact
6/6/2022	28	Lead Paint	PASS	Negative	0	Portable 1520	Exterior Wall	Tan	Metal	Intact
6/6/2022	29	Lead Paint	PASS	Negative	0	Portable 1520	Skirt	Red	Wood	Intact
6/6/2022	30	Lead Paint	PASS	Negative	0	Portable 1520	Door	Brown	Metal	Intact
6/6/2022	31	Lead Paint	PASS	Negative	0	Portable 1529	Wall	White	Drywall	Intact
6/6/2022	32	Lead Paint	PASS	Negative	0	Portable 1529	Shelf	Mustard	Wood	Intact
6/6/2022	33	Lead Paint	PASS	Negative	0	Portable 1529	Stair Rail	Brown	Metal	Intact
6/6/2022	34	Lead Paint	PASS	Negative	0	Portable 1660	Exterior Window Frame	Brown	Metal	Intact
6/6/2022	35	Lead Paint	PASS	Negative	0.01	Portable Area	Sidewalk Rails	Black	Metal	Intact
6/6/2022	36	Lead Paint	PASS	Negative	0	Portable 1596	Shelf	Varnish	Wood	Intact
6/6/2022	37	Calibration	PASS	Positive	1.08			Red		

APPENDIX C

Licensing and Certifications

Texas Department of State Health Services

BE IT KNOWN THAT

LYNN CLARK ASSOCIATES, INC

is certified to perform as a

Lead Firm

in the State of Texas and is hereby governed by the rights, privileges and responsibilities set forth in Texas Occupations Code, Chapter 1955 and Title 25, Texas Administrative Code, Chapter 295 relating to Texas Environmental Lead Reduction, as long as this license is not suspended or revoked.

Certification Number: 2110555

Expiration Date: 06/12/2023

John Hellerstedt, M.D.,
Commissioner of Health

Control Number: 7262

(Void After Expiration Date)

VOID IF ALTERED NON-TRANSFERABLE

SEE BACK

Texas Department of State Health Services

BE IT KNOWN THAT

THOMAS A HALE

is certified to perform as a

Lead Risk Assessor

in the State of Texas and is hereby governed by the rights, privileges and responsibilities set forth in Texas Occupations Code, Chapter 1955 and Title 25, Texas Administrative Code, Chapter 295 relating to Texas Environmental Lead Reduction, as long as this license is not suspended or revoked.

Certification Number: 2070881

Expiration Date: 05/05/2023

John Hellerstedt, M.D.,
Commissioner of Health

Control Number: 7866

(Void After Expiration Date)

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DALLAS INDEPENDENT SCHOOL DISTRICT

ORG 274 - MARY MCLEOD BETHUNE ELEMENTARY SCHOOL

GEOTECHNICAL REPORT – ALPHA TESTING

GEOTECHNICAL EXPLORATION

NEW ENTRY AND MARQUEE SIGN
MARY MCLEOD BETHUNE ELEMENTARY SCHOOL

1665 Duncanville Road
Dallas, Texas
ALPHA Report No. G221466
June 15, 2022

Prepared for:

DALLAS ISD - BOND PROGRAM
9400 Central Expressway, 8th Floor
Dallas, Texas 75231
Attention: Mr. Aijaz Khan

Prepared By:

ALPHA TESTING
WHERE IT ALL BEGINS

ALPHA TESTING
A Universal Engineering Sciences Company

Geotechnical
Construction Materials
Environmental
TBPELS Firm No. 813

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June 15, 2022

Dallas ISD - Bond Program
9400 Central Expressway, 8th Floor
Dallas, Texas 75231

Attention: Mr. Aijaz Khan

Re: Geotechnical Exploration
New Entry and Marquee Sign
Mary McLeod Bethune Elementary School
1665 Duncanville Road
Dallas, Texas
ALPHA Report No. G221466

Attached is the report of the geotechnical exploration performed for the project referenced herein. This study was authorized by Purchase Order No. 874652 dated May 7, 2022 and performed in accordance with ALPHA Proposal No. 89861 dated March 11, 2022.

This report contains results of field explorations and laboratory testing and an engineering interpretation of these with respect to available project characteristics. The results and analyses were used to develop recommendations to aid design and construction of foundations.

ALPHA TESTING, LLC. appreciates the opportunity to be of service on this project. If we can be of further assistance, such as providing materials testing services during construction, please contact our office.

Sincerely,

ALPHA TESTING, LLC.

6/15/22
STATE OF TEXAS
SCOTT W. TAYLOR
129995
LICENSED
PROFESSIONAL ENGINEER

Scott W. Taylor, P.E.
Senior Geotechnical Engineer

Mark L. McKay, P.E.
Associate Principal

TABLE OF CONTENTS

ALPHA REPORT NO. G221466

1.0 PURPOSE AND SCOPE 1
2.0 PROJECT CHARACTERISTICS 1
3.0 FIELD EXPLORATION 1
4.0 LABORATORY TESTS 2
5.0 GENERAL SUBSURFACE CONDITIONS 2
6.0 DESIGN RECOMMENDATIONS 3
6.1 Existing Fill 3
6.2 Drilled Pier Foundation System 3
6.3 Sign Slab, Grade Beams and/or Pier Caps 4
6.4 Floor System for Pier-Supported Structure (Vestibule) 5
6.5 Potential Seasonal Movements and Flatwork/Pavement 5
6.6 Seismic Considerations 5
6.7 Drainage and Other Considerations 6
7.0 GENERAL CONSTRUCTION PROCEDURES AND RECOMMENDATIONS 6
7.1 Site Preparation and Grading 7
7.2 Foundation Excavations 8
7.3 Fill Compaction 9
7.4 Utilities 10
7.5 Groundwater 10
8.0 LIMITATIONS 11

APPENDIX

A-1 Methods of Field Exploration
Boring Location Plan – Figure 1

B-1 Methods of Laboratory Testing
Log of Boring Sheets
Key to Soil Symbols and Classifications

1.0 PURPOSE AND SCOPE

The purpose of this geotechnical exploration is for ALPHA TESTING, LLC. (ALPHA) to evaluate for Dallas ISD - Bond Program (Client) some of the physical and engineering properties of subsurface materials at selected locations on the subject site with respect to formulation of appropriate geotechnical design parameters for the proposed construction. The field exploration was accomplished by securing subsurface samples from widely spaced test borings performed across the expanse of the site. Engineering analyses were performed from results of the field exploration and results of laboratory tests performed on representative samples.

Also included are general comments pertaining to reasonably anticipated construction problems and recommendations concerning earthwork and quality control testing during construction. This information can be used to evaluate subsurface conditions and to aid in ascertaining construction meets project specifications.

Recommendations provided in this report were developed from information obtained in test borings depicting subsurface conditions only at the specific boring locations and at the particular time designated on the logs. Subsurface conditions at other locations may differ from those observed at the boring locations, and subsurface conditions at boring locations may vary at different times of the year. The scope of work may not fully define the variability of subsurface materials and conditions that are present on the site.

The nature and extent of variations between borings may not become evident until construction. If significant variations then appear evident, our office should be contacted to re-evaluate our recommendations after performing on-site observations and possibly other tests.

2.0 PROJECT CHARACTERISTICS

The project site is located within the Mary McLeod Bethune campus at 1665 Duncanville Road in Dallas, Texas. A site plan illustrating the general outline of the project site with ALPHA's boring locations noted on it is provided as Figure 1, the Boring Location Plan, in the Appendix. At the time of the field exploration, the area of the proposed vestibule renovation consisted of existing concrete and a canopy at the south side of the existing building. The area of the proposed marquee sign consisted of an open area covered in grass near the existing marquee sign. Cursory visual observations indicate the site is relatively level.

It is proposed to replace a marquee sign and renovate an existing vestibule at the entry of the existing school building. The proposed marquee sign and vestibule renovation are expected to be supported using drilled pier foundation systems. Grading plans were not available at the time of this study. For the purposes of this investigation, we have assumed cuts and fills of 1 ft or less will be required to establish the final grades for grade supported flatwork.

3.0 FIELD EXPLORATION

Subsurface conditions on the subject lot were explored by drilling two (2) test borings to a depth of 30 ft each in general accordance with ASTM Standard D 420 using standard rotary drilling equipment. Boring 1 was drilled in the vicinity of the vestibule while Boring 2 was drilled in the vicinity of the proposed marquee sign. The approximate location of each test boring is shown on

the Boring Location Plan, Figure 1, enclosed in the Appendix. Details of drilling and sampling operations are briefly summarized in Methods of Field Exploration, Section A-1 of the Appendix.

Subsurface types encountered during the field exploration are presented on Log of Boring sheets included in the Appendix. The boring logs contain our Field Technician's and Engineer's interpretation of conditions believed to exist between actual samples retrieved. Therefore, these boring logs contain both factual and interpretive information. Lines delineating subsurface strata on the boring logs are approximate and the actual transition between strata may be gradual.

4.0 LABORATORY TESTS

Selected samples of the subsurface materials were tested in the laboratory to evaluate their engineering properties as a basis in providing recommendations for foundation design and earthwork construction. A brief description of testing procedures used in the laboratory can be found in Methods of Laboratory Testing, Section B-1 of the Appendix. Individual test results are presented on Log of Boring sheets or on summary data sheets also enclosed in the Appendix.

5.0 GENERAL SUBSURFACE CONDITIONS

Based on the Geologic Atlas of Texas from the Texas Bureau of Economic Geology, published by the University of Texas at Austin, the project site is mapped in the Austin Chalk formation. The Austin Chalk generally consists of massive gray unweathered limestone, overlain by tan weathered limestone. Residual overburden soils associated with Austin Chalk formation generally consist of clays with very high shrink/swell potential.

Subsurface materials in Boring 1 consist of about 5 inches of concrete overlying a thin layer of clay soils to a depth of about 1 ft below existing grade, followed by shaly limestone to the boring termination depth of 30 ft. Subsurface materials in Boring 2 consist of clay soils (CL) to a depth of about 12 ft below existing grade, followed by shaly limestone to the boring termination depth of 30 ft. Based on visual inspection of the samples obtained, the upper 4 ft of material encountered in Boring 2 is considered to be possible fill. The letters in parenthesis represent the soils' classification according to the Unified Soil Classification System (ASTM D 2488). More detailed stratigraphic information is presented on the Log of Boring Sheets in the Appendix.

Groundwater was not encountered in the borings during the field exploration. However, it is common to detect seasonal groundwater within fill material, the clayey matrix, near the soil/rock (shaly limestone) interface, and from seams or fractures in the rock, particularly during or after periods of precipitation. The groundwater level at the site is anticipated to fluctuate seasonally depending on the amount of rainfall, prevailing weather conditions and subsurface drainage characteristics. The clayey soils and shaly limestone are considered relatively impermeable and are anticipated to have a slower response to water movement. Therefore, several days of observation will be required to evaluate actual groundwater levels within the depths explored. If more detailed groundwater information is required, monitoring wells or piezometers can be installed. Further details concerning subsurface materials and conditions encountered can be obtained from the Log of Boring sheets provided in the Appendix

6.0 DESIGN RECOMMENDATIONS

The following design recommendations were developed on the basis of the previously described Project Characteristics (Section 2.0) and General Subsurface Conditions (Section 5.0). If project criteria should change, including the sign location on the site, our office should conduct a review to determine if modifications to the recommendations are required. Further, it is recommended our office be provided with a copy of the final plans and specifications for review prior to construction.

Differential movements can occur between the existing structure and the proposed vestibule addition. Methods should be implemented to allow for possible differential performance between the foundation systems of the existing structure and the addition. Preventative measures should also be taken in order not to damage the integrity of the existing foundation system and pavement during construction of the addition.

6.1 Existing Fill

As stated in Section 5.0, possible fill was encountered in Boring 2 to a depth of about 4 ft below the existing ground surface. If records of density testing are unavailable, the existing fill should be considered uncontrolled fill. Uncontrolled fill is generally not suitable for direct support of floor slabs. However, no at-grade slabs are planned for this project. If any grade-supported slabs are planned at this project site, all uncontrolled existing fill underneath the slab and 5 ft beyond its perimeter should be removed and replaced per the recommendations in Section 7.3. Pavement areas should be properly prepared and tested as discussed in Section 7.1.

Although not encountered at the borings, fill materials can contain organics, boulders, rubble, and other debris which could be encountered during site grading and general excavation. The earthwork and excavation contracts should contain provision for removal of unsuitable materials in the existing fill. Test pits could be performed prior to construction to assess the depth, extent, and nature of the existing fill. ALPHA would be pleased to assist with a test pit program if desired.

6.2 Drilled Pier Foundation System

Our findings indicate the vestibule and proposed marquee sign could each be supported using a system of drilled, straight-shaft piers bearing in tan and/or gray shaly limestone. These piers should bear at least 3 ft into the underlying tan and/or gray shaly limestone. Deeper penetrations will be required to develop skin friction and/or uplift resistance. Tan shaly limestone was encountered at depths of about 1 and 12 ft below existing grade in Borings 1 and 2, respectively. Gray shaly limestone was encountered at depths of about 19 and 21 ft below existing grade in Borings 1 and 2, respectively.

Drilled piers bearing at least 3 ft into tan and/or gray shaly limestone can be dimensioned using a net allowable end-bearing pressure of 30.0 ksf and skin friction (in compression) of 5.0 ksf. The skin friction component should be applied only to the portion of the shaft located below the minimum 3 ft of penetration in the shaly limestone and below any temporary casing, if used. Further, the minimum clear spacing between piers should be at least two pier shaft diameters (based on the larger pier) to develop the full load carrying capacity from skin friction. Closer spacing will result in a reduction in the skin friction capacity. The skin friction will vary linearly

from the full value at a clear spacing of 2 diameters to 50 percent of the design value with no clear spacing.

The bearing capacity provided contains a factor of safety of at least 3 considering a general bearing capacity failure and the skin friction value has a factor of safety of at least 2. Normal elastic settlement of piers under loading is estimated at less than about ½ inch.

Each pier should be designed with sufficient full-length reinforcing steel and a sufficient embedment into the shaly limestone to resist the uplift pressure (soil-to-pier adhesion) due to potential soil swell along the shaft from post construction heave and other uplift forces applied by structural loadings. The magnitude of uplift adhesion due to soil swell along the pier shaft cannot be defined accurately and can vary according to the actual in-place moisture content of the soils during construction. It is estimated this uplift adhesion will not exceed about 1.4 ksf. This soil adhesion is approximated to act uniformly over the upper portion of the drilled pier in contact with clayey soils within 10 ft of finish exterior grades.

The uplift resistance of each pier can be computed using an allowable skin friction value of 4.0 ksf acting uniformly over the portion of the shaft bearing in the tan and/or gray shaly limestone. The top 3 ft of shaly limestone should be neglected in computing the uplift resistance of each pier. Also, uplift resistance should only be considered for the portion of the shaft in shaly limestone below the bottom of temporary casing. This uplift resistance value has a factor of safety of at least 2.

Lateral analysis for drilled piers can be performed using the following design parameters (LPILE) provided for the site subsurface materials in Table A. The lateral resistance of the upper 6 ft of the pier shafts in contact with the clay overburden soil should be neglected.

TABLE A
DESIGN PARAMETERS FOR LPILE

Material	Clay Soils[1]	Tan and Gray Shaly Limestone
L-Pile p-y Model	Stiff clay w/o free water	Weak rock
Effective Unit Weight (γ), pci	0.069	0.079
Undrained Cohesion (c), psi	5.2	-
Rock Uniaxial Compressive Strength (q_u), psi	-	250
Rock Mass Modulus (E_r), psi	-	25,000
Rock Quality Designation (RQD), %	-	50-70
Rock Strain Factor (k_{rm})	-	0.0001

[1] Resistance of clay soils situated within 6 ft of final exterior grades should be neglected due to potential soil shrinkage and disturbance.

6.3 Sign Slab, Grade Beams and/or Pier Caps

All grade beams connecting piers and pier caps should be formed and not cast in earthen trenches. The sign slab, grade beams and/or pier caps should be suspended completely above the ground

surface with a nominal 6-inch void at the bottom. Commercially available cardboard box forms (cartons) are made for this purpose. The cardboard cartons should extend the full length and width of the grade beams and pier caps. Prior to concrete placement, cartons should be inspected to verify they are firm, properly placed, and capable of supporting wet concrete. Some type of permanent soil retainer, such as pre-cast concrete panels, must be provided to prevent soils adjacent to grade beams and pier caps from sloughing into the void space. Additionally, backfill soils placed adjacent to grade beams and pier caps must be compacted as outlined in Section 7.3.

6.4 Floor System for Pier-Supported Structure (Vestibule)

A floor system suspended completely above the existing clayey soils is the most positive floor system for the structure. A minimum 6-inch void space should be provided between the bottom of the floor system (and lowest suspended fixture/utility) and top surface of the underlying expansive clays. Cardboard carton forms or a deeper crawl space can be used to create the minimum void space. A ventilated crawl space is recommended. Provisions should be made for (a) adequate drainage of the under-floor space and (b) differential movement of utility lines, including areas where the utility penetrates through the grade beam and/or where the utility penetrates below grade areas.

6.5 Potential Seasonal Movements and Flatwork/Pavement

The proposed flatwork, pavement, and any other soil-supported structural elements in the vicinity of the borings could experience soil-related movements of about 2 inches if constructed within 1 ft of existing grade. If this level of movement is not acceptable, flatwork could be supported on pier foundations as discussed in Section 6.2. As an alternative, subgrade improvements consisting of moisture conditioning could be considered for reduction in soil movements in any areas where post-construction movements would be critical. Our office may be contacted if subgrade improvement recommendations are desired.

These potential movements were estimated using results of absorption swell tests, in general accordance with methods outlined by Texas Department of Transportation (TxDOT) Test Method Tex-124-E and engineering judgment and experience. Estimated movements were calculated assuming the moisture content of the in-situ soil within the normal zone of seasonal moisture content change varies between a "dry" condition and a "wet" condition as defined by Tex-124-E. Movements exceeding those predicted could occur if positive drainage of surface water is not maintained or if soils are subject to an outside water source, such as leakage from a utility line or subsurface moisture migration from off-site locations.

6.6 Seismic Considerations

The Site Class for seismic design is based on several factors that include soil profile (soil or rock), shear wave velocity, and strength, averaged over a depth of 100 ft. Since our borings did not extend to 100-foot depths, we based our determinations on the assumption that the subsurface materials below the bottom of the borings were similar to those encountered at the termination depth of the borings. Based on Section 1613.2.2 of the 2018 International Building Code and Table 20.3-1 in the 2010 ASCE-7, we recommend using Site Class C (very dense soil and soft rock) for seismic design at this site.

6.7 Drainage and Other Considerations

Adequate drainage should be provided to reduce seasonal variations in the moisture content of foundation soils. All pavement and sidewalks within 10 ft of the structures should be sloped away from the structures to prevent ponding of water around the foundations. Final grades within 10 ft of the structure should be adjusted to slope away from the structure at a minimum slope of 2 percent. Maintaining positive surface drainage throughout the life of the structure is essential.

In areas with pavement or sidewalks adjacent to the structure, a positive seal must be maintained between the structure and the pavement or sidewalk to minimize seepage of water into the underlying supporting soils. Post-construction movement of pavement and flatwork is common. Normal maintenance should include examination of all joints in paving and sidewalks, etc. as well as re-sealing where necessary.

Several factors relate to civil and architectural design and/or maintenance, which can significantly affect future movements of the foundation and floor slab system:

- Large trees and shrubs should not be allowed closer to the foundations than a horizontal distance equal to roughly their mature height due to their significant moisture demand upon maturing.

- Moisture conditions should be maintained "constant" around the edge of the foundation. Ponding of water in planters, in unpaved areas, and around joints in paving and sidewalks can cause movements beyond those predicted in this report.

- Planter box structures placed adjacent to the structure should be provided with a means to assure concentrations of water are not available to the subsoil stratigraphy.

- The root systems from any existing trees at this site will have dried and desiccated the surrounding clay soils, resulting in soil with near-maximum swell potential. Clay soils surrounding tree root mats within the structure areas or areas to be covered with grade slabs (including, but not limited to, pavement, sidewalks, patios and equipment pads) should be removed to a depth of at least 3 ft or 1 ft below the root ball, whichever occurs first. The resulting excavation should be backfilled with engineered fill as described in Section 7.3.

Trench backfill for utilities should be properly placed and compacted as outlined in Sections 7.3 and 7.4 and in accordance with requirements of local City standards. Since granular bedding backfill is used for most utility lines, the backfilled trench should not become a conduit and allow access for surface or subsurface water to travel toward the structure. Concrete cut-off collars or clay plugs should be provided where utility lines cross structure lines to prevent water from traveling in the trench backfill and entering beneath the structure.

7.0 GENERAL CONSTRUCTION PROCEDURES AND RECOMMENDATIONS

Variations in subsurface conditions could be encountered during construction. To permit correlation between test boring data and actual subsurface conditions encountered during construction, it is recommended a registered Professional Engineering firm be retained to observe construction procedures and materials.

Some construction problems, particularly degree or magnitude, cannot be anticipated until the course of construction. The recommendations offered in the following paragraphs are intended not to limit or preclude other conceivable solutions, but rather to provide our observations based on our experience and understanding of the project characteristics and subsurface conditions encountered in the borings.

7.1 Site Preparation and Grading

All areas supporting pavement, flatwork, or areas to receive fill should be properly prepared.

- After completion of the necessary stripping, clearing, and excavating and prior to placing any required fill, the exposed subgrade should be carefully evaluated by probing and testing. Any undesirable material (organic material, wet, soft, or loose soil) still in place should be removed.

- The exposed subgrade should be further evaluated by proof-rolling with a heavy pneumatic tired roller, loaded dump truck or similar equipment weighing approximately 20 tons to check for pockets of soft or loose material hidden beneath a thin crust of possibly better soil.

- Proof-rolling procedures should be observed routinely by a Professional Engineer, or his designated representative. Any undesirable material (organic material, wet, soft, or loose soil) exposed during the proofroll should be removed and replaced with well-compacted material as outlined in Section 7.3.

- Prior to placement of any fill, the exposed subgrade should then be scarified to a minimum depth of 6 inches and recompacted as outlined in Section 7.3.

If fill is to be placed on existing slopes (natural or constructed) steeper than six horizontal to one vertical (6:1), the fill materials should be benched into the existing slopes in such a manner as to provide a minimum bench-key width of five (5) ft. This should provide a good contact between the existing soils and fill materials, reduce potential sliding planes, and allow relatively horizontal lift placements.

Slope stability analysis of embankments (natural or constructed) was not within the scope of this study.

The contractor is responsible for designing any excavation slopes, temporary sheeting or shoring. Design of these structures should include any imposed surface surcharges. Construction site safety is the sole responsibility of the contractor, who shall also be solely responsible for the means, methods and sequencing of construction operations. The contractor should also be aware that slope height, slope inclination or excavation depths (including utility trench excavations) should in no case exceed those specified in local, state and/or federal safety regulations, such as OSHA Health and Safety Standard for Excavations, 29 CFR Part 1926, or successor regulations. Stockpiles should be placed well away from the edge of the excavation and their heights should be controlled so they do not surcharge the sides of the excavation. Surface drainage should be carefully controlled to prevent flow of water over the slopes and/or into the excavations. Construction slopes should be closely observed for signs of mass movement, including tension

cracks near the crest or bulging at the toe. If potential stability problems are observed, a geotechnical engineer should be contacted immediately. Shoring, bracing or underpinning required for the project (if any) should be designed by a professional engineer registered in the State of Texas.

Due to the nature of the clayey soils found near the surface at the borings, traffic of heavy equipment (including heavy compaction equipment) may create pumping and general deterioration of shallow soils. Therefore, some construction difficulties should be anticipated during periods when these soils are saturated.

7.2 Foundation Excavations

All foundation excavations should be properly monitored to verify loose, soft, or otherwise undesirable materials are removed and foundations will bear on satisfactory material. Surface runoff should be drained away from excavations and not allowed to pond in the bottom of the excavation. Concrete for foundations should be placed as soon as practical after the excavation is made. That is, the exposed foundation soils should not be allowed to become excessively dry or wet before placement of concrete. Drilled piers should be excavated and concrete placed the same day.

Prolonged exposure of the bearing surface to air or water will result in changes in strength and compressibility of the bearing stratum. Therefore, if delays occur, straight shaft drilled piers should be slightly widened and deepened to provide a fresh penetration surface, or a new (deeper) full penetration should be provided.

All pier shafts should have a diameter of at least 1/30th of the shaft length, with a minimum 1.5 ft diameter, to facilitate clean-out of the base and proper monitoring. Concrete placed in pier holes should be directed through a tremie, hopper, or equivalent. Placement of concrete should be vertical through the center of the shaft without hitting the sides of the pier or reinforcement to reduce the possibility of segregation of aggregates. Concrete placed in piers should have a minimum slump of 5 inches (but not greater than 7 inches) to avoid potential honey-combing.

Observations during pier drilling should include, but not necessarily be limited to, the following items:

- Verification of proper bearing strata and consistency of subsurface stratification with regard to boring logs,
- Confirmation the minimum required penetration into the bearing strata is achieved,
- Complete removal of cuttings from bottom of pier holes,
- Proper handling of any observed water seepage and sloughing of subsurface materials,
- No more than 2 inches of standing water should be permitted in the bottom of pier holes prior to placing concrete, and
- Verification of pier diameter and steel reinforcement.

Free groundwater was not encountered during the field exploration. However, groundwater could be encountered during pier installation. The risk of encountering seepage is increased during or after periods of precipitation. Temporary casing may be necessary to control groundwater seepage that could occur in the clayey matrix or near the interface of the overburden soil and rock (shaly limestone), or from fractures in the soil and rock. Casing should be seated in the clays or shaly limestone below the depth of seepage, and all water and loosened material should be removed from the cased excavation before starting the design penetration. As casing is extracted, care should be taken to maintain a positive head of plastic concrete and minimize the potential for intrusion of water seepage. It is recommended a separate bid item be provided for casing on the contractors' bid schedule.

Groundwater can also occur within fractures in the bearing stratum for drilled, straight-shaft piers and this may require extending the casing and deepening the piers. From our experience with similar soil and rock conditions, sometimes groundwater cannot be controlled by the use of casing, and underwater placement of pier concrete may be required. Special mix designs are usually required for tremied or pumped concrete. Proper concreting procedures should include placement of concrete from the bottom to the top of the pier using a sealed tremie or pumped concrete. The tremie should be maintained at least 5 ft into the wet concrete during placement. It is recommended a separate bid item be provided for casing and underwater concrete placement on the contractor's bid schedule. Pier drilling contractors experienced in similar soil and groundwater conditions should be utilized for this project.

7.3 Fill Compaction

Clay soils used for general fill with a plasticity index equal to or greater than 25 should be compacted to a dry density between 93 and 98 percent of standard Proctor maximum dry density (ASTM D 698). The compacted moisture content of the clays during placement should be within the range of +2 to +6 percentage points of the material's optimum moisture.

Clay soils used for general fill with a plasticity index less than 25 should be compacted to a dry density of at least 95 percent of standard Proctor maximum dry density (ASTM D 698). The compacted moisture content of the clays during placement should be within the range of -1 to +3 percentage points of the material's optimum moisture.

In cases where mass fills are more than 10 ft deep, the fill/backfill below 10 ft should be compacted to at least 100 percent of standard Proctor maximum dry density (ASTM D 698) and within –2 to +2 percentage points of the material's optimum moisture content. The portion of the fill/backfill shallower than 10 ft should be compacted as outlined herein.

Clay fill should be processed and the largest particle or clod should be less than 6 inches prior to compaction.

Compaction should be accomplished by placing fill in about 8-inch thick loose lifts and compacting each lift to at least the specified minimum dry density. Field density and moisture content tests should be performed on each lift.

In cases where either mass fills or utility lines are more than 10 ft deep, the fill/backfill below 10 ft should be compacted to at least 100 percent of standard Proctor maximum dry density (ASTM D 698) and within –2 to +2 percentage points of the material's optimum moisture content. The portion of the fill/backfill shallower than 10 ft should be compacted as outlined herein. See Section 7.4 for additional comments and recommendations regarding deep fills.

7.4 Utilities

In cases where utility lines, retaining walls, and mass fills are more than 10 ft deep, the fill/backfill below 10 ft should be compacted to at least 100 percent of standard Proctor maximum dry density (ASTM D 698) and within –2 to +2 percentage points of the material's optimum moisture content. The portion of the fill/backfill shallower than 10 ft should be compacted as previously outlined. Density tests should be performed on each lift (maximum 12-inch thick) and should be performed as the trench is being backfilled.

Even if fill is properly compacted, fills in excess of about 10 ft are still subject to settlements over time of up to about 1 to 2 percent of the total fill thickness, due to compression from self-weight. This should be considered when designing pavements, flatwork, and other at-grade structures over utility lines, retaining wall backfill, and/or other areas with deep fill. Compaction as described above can reduce, but not eliminate, this risk. If the risk of this settlement is not acceptable, portions of the deeper fill can consist of flexible base material, flowable fill, cement-stabilized sand, or other material with reduced compression characteristics. ALPHA would be please to further discuss settlements of deep fills with the project team if desired.

If utility trenches or other excavations extend to or beyond a depth of 5 ft below construction grade, the contractor or others shall be required to develop an excavation safety plan to protect personnel entering the excavation or excavation vicinity. The collection of specific geotechnical data and the development of such a plan, which could include designs for sloping and benching or various types of temporary shoring, is beyond the scope of this study. Any such designs and safety plans shall be developed in accordance with current OSHA guidelines and other applicable industry standards.

7.5 Groundwater

Free groundwater was not encountered during the field exploration. From our experience, shallow groundwater seepage may be encountered during excavation at this site for utilities, foundations, and other general excavations. The risk of groundwater seepage increases with depth of excavation and during or after periods of precipitation. Standard sump pits and pumping may be adequate to control groundwater seepage on a local basis. Where sump pits and pumping are not capable of controlling groundwater seepage, supplemental dewatering measures (such as, but not limited to, submersible pump in slotted casings and wellpoints) may be required.

In any areas where cuts are made to establish final grades, attention should be given to possible seasonal water seepage that could occur through natural cracks and fissures in the newly exposed stratigraphy. In this case, subsurface drains may be required to intercept seasonal groundwater seepage. The need for these or other de-watering devices should be carefully addressed during construction. Our office could be contacted to visually observe the final grades to evaluate the need for such drains.

8.0 LIMITATIONS

Professional services provided in this geotechnical exploration were performed, findings obtained, and recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. The scope of services provided herein does not include an environmental assessment of the site or investigation for the presence or absence of hazardous materials in the soil, surface water or groundwater. ALPHA, upon written request, can be retained to provide these services.

ALPHA is not responsible for conclusions, opinions or recommendations made by others based on this data. Information contained in this report is intended for the exclusive use of the Client (and their designated design representatives), and is related solely to design of the specific structures outlined in Section 2.0. No party other than the Client (and their designated design representatives) shall use or rely upon this report in any manner whatsoever unless such party shall have obtained ALPHA's written acceptance of such intended use. Any such third party using this report after obtaining ALPHA's written acceptance shall be bound by the limitations and limitations of liability contained herein, including ALPHA's liability being limited to the fee paid to it for this report. Recommendations presented in this report should not be used for design of any other structures except those specifically described in this report. In all areas of this report in which ALPHA may provide additional services if requested to do so in writing, it is presumed that such requests have not been made if not evidenced by a written document accepted by ALPHA. Further, subsurface conditions can change with passage of time. Recommendations contained herein are not considered applicable for an extended period of time after the completion date of this report. It is recommended our office be contacted for a review of the contents of this report for construction commencing more than one (1) year after completion of this report. Non-compliance with any of these requirements by the Client or anyone else shall release ALPHA from any liability resulting from the use of, or reliance upon, this report.

Recommendations provided in this report are based on our understanding of information provided by the Client about characteristics of the project. If the Client notes any deviation from the facts about project characteristics, our office should be contacted immediately since this may materially alter the recommendations. Further, ALPHA is not responsible for damages resulting from workmanship of designers or contractors. It is recommended the Owner retain qualified personnel, such as a Geotechnical Engineering firm, to verify construction is performed in accordance with plans and specifications.

APPENDIX

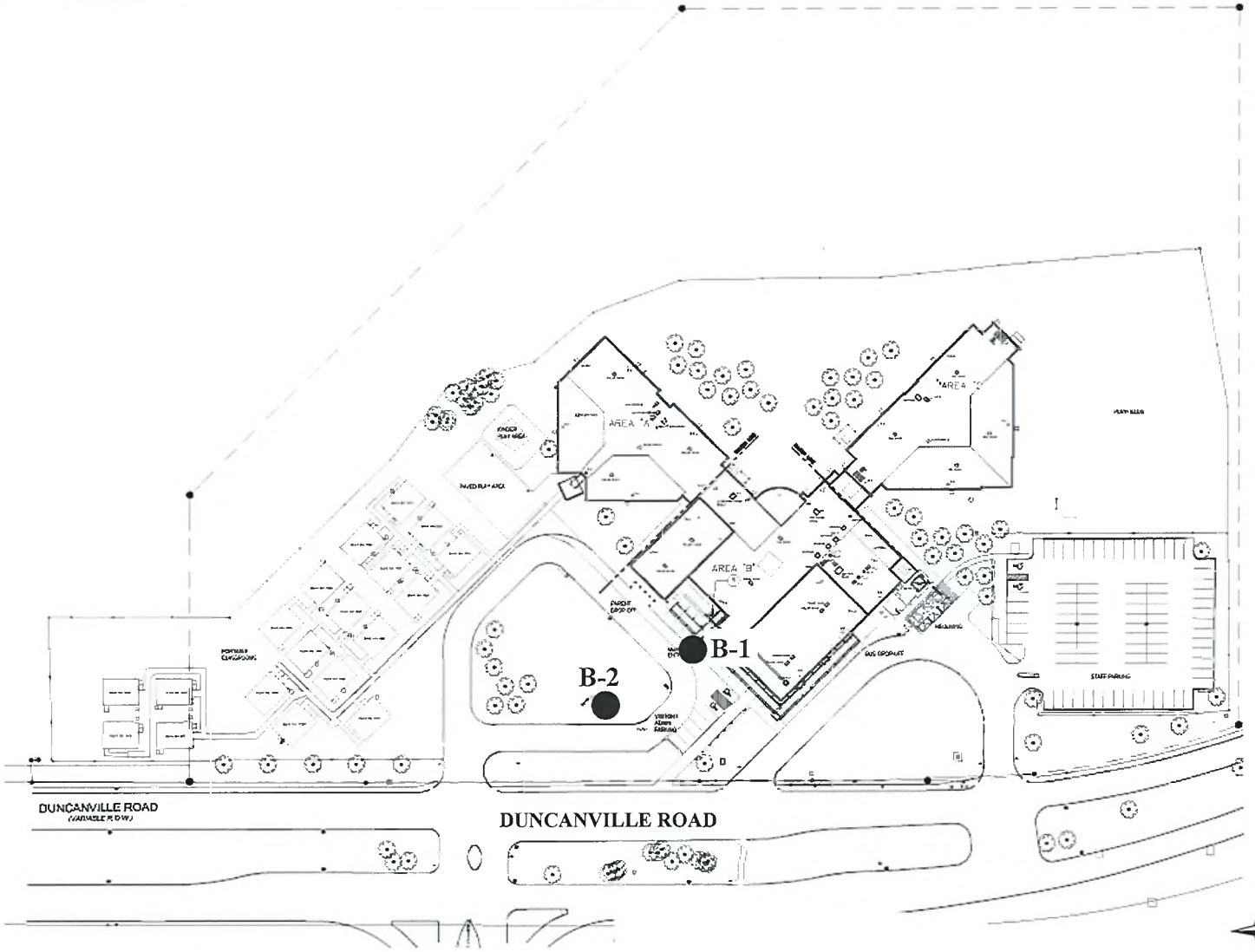
A-1 METHODS OF FIELD EXPLORATION

Using standard rotary drilling equipment, two (2) test borings were performed for this geotechnical exploration at the approximate locations shown on the Boring Location Plan, Figure 1. The test borings were located in the field by using a handheld GPS device or by pacing or taping and estimating right angles from landmarks which could be identified in the field and as shown on the site plan provided during this study. The locations of the test borings shown on the Boring Location Plan are considered accurate only to the degree implied by the methods used to define them.

Relatively undisturbed samples of the cohesive subsurface materials were obtained by hydraulically pressing 3-inch O.D. thin-wall sampling tubes into the underlying soils at selected depths (ASTM D 1587). These samples were removed from the sampling tubes in the field and examined visually. One representative portion of each sample was sealed in a plastic bag for use in future visual examinations and possible testing in the laboratory.

The Texas Cone Penetration (TCP) test was used to assess the apparent in-place strength characteristics of the rock type materials. The TCP test consists of a 3-inch diameter steel cone driven by a 170-pound hammer dropped 24 inches (340 ft-pounds of energy) and is the basis for TxDOT strength correlations. Depending on the resistance (strength) of the materials, either the number of blows of the hammer required to provide 12 inches of penetration, or the inches of penetration of the cone due to 100 blows of the hammer are recorded on the field logs and are shown on the Log of Boring sheets as “TX Cone” (reference: TxDOT Test Method TEX 132-E).

Log of Boring sheets are included in the Appendix. The Log of Boring sheets show visual descriptions of subsurface strata encountered using the Unified Soil Classification System. Sampling information, pertinent field data, and field observations are also included. Samples not consumed by testing will be retained in our laboratory for at least 14 days and then discarded unless the Client requests otherwise.



● **Approximate Boring Locations**

Geotechnical Exploration
New Entry and Marquee Sign
Mary Mcleod Bethune Elementary School
1665 Duncanville Road
Dallas, Texas
ALPHA Report No. G221466

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Boring Location Plan
Figure 1

B-1 METHODS OF LABORATORY TESTING

Representative samples were examined and classified by a qualified member of the Geotechnical Division and the boring logs were edited as necessary. To aid in classifying the subsurface materials and to determine the general engineering characteristics, natural moisture content tests (ASTM D 2216), Atterberg-limit tests (ASTM D 4318) and dry unit weight determinations were performed on selected samples. In addition, pocket-penetrometer tests were conducted on selected soil samples to evaluate soil shear strength. Results of all laboratory tests described herein are provided on the accompanying Log of Boring sheets.

In addition to the Atterberg-limit tests, the expansive properties of the clay soils were further analyzed by an absorption swell test (ASTM D 4546). The swell test is performed by placing a selected sample in a consolidation machine and applying either the approximate current or expected overburden pressure and then allowing the sample to absorb water. When the sample exhibits very little tendency for further expansion, the height increase is recorded and the percent swell and total moisture gain calculated. Results of the absorption swell tests are provided on the Log of Borings, attached in this Appendix.

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2209 Wisconsin St.
Dallas, Texas 75229
Phone: 972-620-8911
Fax: 972-620-1302
www.alphatesting.com

BORING NO.: 1 (Sheet 1 of 1)
PROJECT NO.: G221466

Client: Dallas ISD
Project: New Entry and Marquee Sign - Mary McLeod Bethune Elementary School
Start Date: 5/31/2022 **End Date:** 5/31/2022
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Dallas, Texas
Surface Elevation:
West:
North:
Hammer Drop (lbs / in): 170 / 24

GROUND WATER OBSERVATIONS
▽ On Rods (ft): NONE
▼ After Drilling (ft): DRY
▼ After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION		Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft, in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Swell, %
		5" CONCRETE	0.4												
		Tan CLAY	1.0												
		Tan SHALY LIMESTONE with clay seams and layers													
5						100/ 0.75"									
10						100/ 0.25"									
15						100/ 0.75"									
			19.0												
20		Gray SHALY LIMESTONE with shale seams				100/ 0.5"									
25						100/ 0.5"									
30			30.0			100/ 0.5"									
		TEST BORING TERMINATED AT 30 FT													

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Dallas, Texas 75229
Phone: 972-620-8911
Fax: 972-620-1302
www.alphatesting.com

BORING NO.: 2
Sheet 1 of 1
PROJECT NO.: G221466

Client: Dallas ISD
Project: New Entry and Marquee Sign - Mary McLeod Bethune Elementary School
Start Date: 5/31/2022 **End Date:** 5/31/2022
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Dallas, Texas
Surface Elevation:
West:
North:
Hammer Drop (lbs / in): 170 / 24

GROUND WATER OBSERVATIONS
▽ On Rods (ft): NONE
▼ After Drilling (ft): DRY
▼ After ____ Hours (ft):

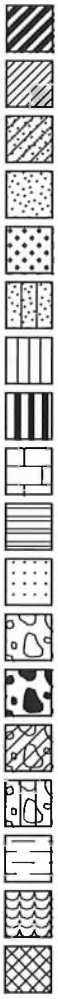
Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft, in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Swell, %
		Brown CLAY with some sand calcareous nodules -possible fill				4.5+				34				
						4.5+				13	47	20	27	0.1
		4.0												
5		Tan SILTY CLAY with calcareous nodules				3.5				24				
						4.0				20				
10						4.5				19	30	14	16	
		12.0												
		Tan SHALY LIMESTONE with clay seams and layers												
15					100/ 2"									
20					100/ 2"									
		21.0												
		Gray SHALY LIMESTONE												
25					100/ 0.5"									
30					100/ 0.5"									
		30.0												
		TEST BORING TERMINATED AT 30 FT												

ALPHA TESTING

WHERE IT ALL BEGINS

KEY TO SOIL SYMBOLS AND CLASSIFICATIONS

SOIL & ROCK SYMBOLS



(CH), High Plasticity CLAY

(CL), Low Plasticity CLAY

(SC), CLAYEY SAND

(SP), Poorly Graded SAND

(SW), Well Graded SAND

(SM), SILTY SAND

(ML), SILT

(MH), Elastic SILT

LIMESTONE

SHALE / MARL

SANDSTONE

(GP), Poorly Graded GRAVEL

(GW), Well Graded GRAVEL

(GC), CLAYEY GRAVEL

(GM), SILTY GRAVEL

(OL), ORGANIC SILT

(OH), ORGANIC CLAY

FILL

SAMPLING SYMBOLS

SHELBY TUBE (3" OD except where noted otherwise)

SPLIT SPOON (2" OD except where noted otherwise)

AUGER SAMPLE

TEXAS CONE PENETRATION

ROCK CORE (2" ID except where noted otherwise)

RELATIVE DENSITY OF COHESIONLESS SOILS (blows/ft)

VERY LOOSE	0 TO 4
LOOSE	5 TO 10
MEDIUM	11 TO 30
DENSE	31 TO 50
VERY DENSE	OVER 50

SHEAR STRENGTH OF COHESIVE SOILS (tsf)

VERY SOFT	LESS THAN 0.25
SOFT	0.25 TO 0.50
FIRM	0.50 TO 1.00
STIFF	1.00 TO 2.00
VERY STIFF	2.00 TO 4.00
HARD	OVER 4.00

RELATIVE DEGREE OF PLASTICITY (PI)

LOW	4 TO 15
MEDIUM	16 TO 25
HIGH	26 TO 35
VERY HIGH	OVER 35

RELATIVE PROPORTIONS (%)

TRACE	1 TO 10
LITTLE	11 TO 20
SOME	21 TO 35
AND	36 TO 50

PARTICLE SIZE IDENTIFICATION (DIAMETER)

BOULDERS	8.0" OR LARGER
COBBLES	3.0" TO 8.0"
COARSE GRAVEL	0.75" TO 3.0"
FINE GRAVEL	5.0 mm TO 3.0"
COURSE SAND	2.0 mm TO 5.0 mm
MEDIUM SAND	0.4 mm TO 5.0 mm
FINE SAND	0.07 mm TO 0.4 mm
SILT	0.002 mm TO 0.07 mm
CLAY	LESS THAN 0.002 mm

SECTION 02 41 16 - STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Structure Demolition:
1. Demolition of designated building structures.
2. Demolition of designated site improvements including paving, curbing, site walls, and utility structures.
3. Demolition of below-grade foundations and site improvements to depth to avoid conflict with new construction or site work.
4. Removal of hollow items or items which could collapse.
5. Salvage of designated items.
6. Protection of site work and adjacent structures.
7. Disconnection, capping, and removal of utilities.
8. Pollution control during building demolition, including noise control.
9. Removal and legal disposal of materials.
10. Protection of designated site improvements and adjacent construction,
11. Interruption, capping or removal of utilities as applicable.

B. Hazardous Materials:
1. Not present.
2. Removed under separate prior contract.

1.2 SUBMITTALS

A. Submit under provisions of Section 01 31 00 - Project Management and Coordination.

B. Schedule: Submit for approval demolition schedule, including schedule and methods for capping utilities to be abandoned and maintaining existing utility service.

1.3 QUALITY ASSURANCE

A. Codes and Regulations: Comply with governing codes and regulations. Use experienced workers.

1.4 PRE-INSTALLATION MEETINGS

A. Convene minimum two weeks prior to starting work of this section.

1.5 SEQUENCING

A. Immediate areas of work will not be occupied during demolition. The public, including children, may occupy adjacent areas.

B. No responsibility for buildings and structures to be demolished will be assumed by the Owner.

C. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 STRUCTURE DEMOLITION

A. Demolition Operations: Do not damage building elements and improvements indicated to remain. Items of salvage value, not included on schedule of salvage items to be returned to Owner, shall be removed from structure. Storage or sale of items at project site is prohibited.

B. Utilities: Locate, identify, disconnect, and seal or cap off utilities in buildings to be demolished.

C. Shoring and Bracing: Provide and maintain interior and exterior shoring and bracing.

D. Occupied Spaces: Do not close or obstruct streets, walks, drives or other occupied or used spaces or facilities without the written permission of the Owner and the authorities having jurisdiction. Do not interrupt utilities serving occupied or used facilities without the written permission of the Owner and authorities having jurisdiction. If necessary, provide temporary utilities.

E. Operations: Cease operations if public safety or remaining structures are endangered. Perform temporary corrective measures until operations can be continued properly.

F. Security: Provide adequate protection against accidental trespassing. Secure project after work hours.

3.2 SCHEDULE

A. Items for Protection During Demolition:
1. Designated site improvements, trees, and plantings.
2. Adjacent construction.

B. Items to be Salvaged for Reinstallation:
1. Light fixtures.

C. Items to be Salvaged for Delivery to Owner:
1. Light fixtures.
2. Plumbing fixtures.

D. Utilities Requiring Interruption, Capping, or Removal:
1. Electric.
2. Heat.
3. Water.
4. Gas.
5. Sewerage.

END OF SECTION 02 41 16

SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Selective Site Demolition:
1. Demolition of designated site improvements including paving, curbing, site walls, and utility structures.
2. Demolition of below-grade foundations and site improvements to depth to avoid conflict with new construction or site work.
3. Removal of hollow items or items which could collapse.
4. Salvage of designated items.
5. Protection of site work and adjacent structures.
6. Disconnection, capping, and removal of utilities.
7. Pollution control during building demolition, including noise control.
8. Removal and legal disposal of materials.
9. Designated site improvements and adjacent construction.
10. Interruption, capping or removal of utilities as applicable.

B. Selective Building Demolition:
1. Selective demolition of interior partitions, systems, and building components designated to be removed.
2. Selective demolition of exterior facade, structures, and components designated to be removed.
3. Protection of portions of building adjacent to or affected by selective demolition.
4. Removal of abandoned utilities and wiring systems.
5. Notification to Owner of schedule of shut-off of utilities which serve occupied spaces.
6. Pollution control during selective demolition, including noise control.
7. Removal and legal disposal of materials.
8. Protection of designated site improvements and adjacent construction.
9. Salvage of designated items.
10. Interruption, capping or removal of utilities as applicable.

C. Hazardous Materials:
1. Not present.
2. Removed under separate prior contract.
3. Removed as a part of this contract.

1.2 SUBMITTALS

A. Submit under provisions of Section 01 31 00 – Project Management and Coordination.

B. Schedule: Submit for approval selective demolition schedule, including schedule and methods for capping utilities to be abandoned and maintaining existing utility service.

1.3 QUALITY ASSURANCE

A. Codes and Regulations: Comply with governing codes and regulations. Use experienced workers.

1.4 PRE-INSTALLATION MEETINGS

A. Convene minimum two weeks prior to starting work of this section.

1.5 SEQUENCING

A. Immediate areas of work will not be occupied during selective demolition. The public, including children, may occupy adjacent areas.

B. No responsibility for buildings and structures to be demolished will be assumed by the Owner.

C. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 SELECTIVE DEMOLITION

A. Demolition Operations: Do not damage building elements and improvements indicated to remain. Items of salvage value, not included on schedule of salvage items to be returned to Owner, shall be removed from structure. Storage or sale of items at project site is prohibited.

B. Utilities: Locate, identify, disconnect, and seal or cap off utilities in buildings to be demolished.

C. Shoring and Bracing: Provide and maintain interior and exterior shoring and bracing.

D. Occupied Spaces: Do not close or obstruct streets, walks, drives or other occupied or used spaces or facilities without the written permission of the Owner and the authorities having jurisdiction. Do not interrupt utilities serving occupied or used facilities without the written permission of the Owner and authorities having jurisdiction. If necessary, provide temporary utilities.

E. Operations: Cease operations if public safety or remaining structures are endangered. Perform temporary corrective measures until operations can be continued properly.

F. Security: Provide adequate protection against accidental trespassing. Secure project after work hours.

G. Restoration: Restore finishes of patched areas.

3.2 SCHEDULE

A. Items for Protection During Demolition and Construction
   1. Designated site improvements, trees, and plantings
   2. Adjacent construction.

B. Items to be Salvaged for Reinstallation:
   1. Light fixtures

C. Items to be Salvaged for Delivery to Owner:
   1. None

D. Utilities Requiring Interruption, Capping, or Removal:
   1. Electric
   2. Heat.
   3. Water
   4. Gas.
   5. Sewerage
   6. Cable television.

END OF SECTION 02 41 19

SECTION 03 20 00 - CONCRETE REINFORCING

PART 1 - GENERAL

1.1 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site or location or method as mutually agreed upon.
   1. Review the following:
      a. Special inspection and testing and inspecting agency procedures for field quality control.
      b. Steel-reinforcement installation
      .

1.2 ACTION SUBMITTALS

A. Product Data: For the following:
   1. Each type of steel reinforcement.
   2. Epoxy repair coating.
   3. Zinc repair material.
   4. Bar supports.
   5. Mechanical splice couplers.
   6. Structural thermal break insulated connection system.

B. Shop Drawings: Comply with ACI 315R-18:
   1. Include placing drawings that detail fabrication, bending, and placement.
   2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.
   3. For structural thermal break insulated connection system, indicate general configuration, insulation dimensions, tension bars, compression pads, shear bars, and dimensions.
   4. Do not reproduce structural drawings for use as shop drawings.
   5. Submit in writing any requests for modifications to Drawings and Specifications. Submitting shop drawings for review does not constitute “in writing”.

C. Construction Joint Layout: Indicate proposed construction joints required to build the structure. Location of construction joints is subject to approval of the Architect.

D. Delegated-Design Submittal: For structural thermal break insulated connection system, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Statements: For testing and inspection agency.

B. Delegated-Design Engineer Qualifications: Include the following:
   1. Experience providing delegated-design engineering services of the type indicated.
   2. Documentation that delegated-design engineer is licensed in the state in which Project is located.

C. Welding certificates.
   1. Reinforcement To Be Welded: Welding procedure specification in accordance with AWS D1.4/D1.4M

D. Material Certificates: For each of the following, signed by manufacturers:
1. Epoxy-Coated Reinforcement: CRSI's "Epoxy Coating Plant Certification."
2. Dual-Coated Reinforcement: CRSI's "Epoxy Coating Plant Certification."

E. Material Test Reports: For the following, from a qualified testing agency:
1. Steel Reinforcement:
a. For reinforcement to be welded, mill test analysis for chemical composition and carbon equivalent of the steel in accordance with ASTM A706/A706M.
2. Mechanical splice couplers.

F. Minutes of preinstallation conference.

1.4 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.4/D 1.4M.

B. Mockups: Reinforcing for cast-concrete formed surfaces, to demonstrate tolerances and standard of workmanship.
1 Build panel approximately 100 sq. ft. for formed surface in the location indicated on Drawings or, if not indicated, as directed by Architect.
2 Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage and to avoid damaging coatings on steel reinforcement.
1. Store reinforcement to avoid contact with earth.
2. Prevent buildup of rust and dirt on reinforcing.
3. Protect reinforcing from contamination that would prevent bonding of concrete.
4. Do not allow epoxy-coated reinforcement to be stored outdoors for more than 60 days without being stored under an opaque covering.
5. Do not allow dual-coated reinforcement to be stored outdoors for more than 60 days without being stored under an opaque covering.
6. Do not allow stainless steel reinforcement to come into contact with uncoated reinforcement.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design structural thermal break insulated connection system, including attachment to building construction.

B. Structural Performance of Structural Thermal Break Insulating Connection System: Structural thermal break insulated connection system shall withstand the following loads and stresses:
1. Dead Loads: As indicated on Structural Drawings.
a Shear Load: As indicated on Structural Drawings.
b Bending Moment: As indicated on Structural Drawings.
2. Live Loads: As indicated on Structural Drawings.
a Shear Load: As indicated on Structural Drawings.

b Bending Moment: As indicated on Structural Drawings.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A615, as indicated on Structural Drawings, deformed.

B. Low-Alloy Steel Reinforcing Bars: ASTM A706, deformed.

C. Headed-Steel Reinforcing Bars: ASTM A970.

D. Galvanized Reinforcing Bars:
1. Steel Bars: ASTM A615, as indicated on Structural Drawings, deformed bars.

E. Epoxy-Coated Reinforcing Bars:
1. Steel Bars: ASTM A615**,** as indicated on Structural Drawings, deformed bars.

F. Dual-Coated Reinforcing Bars: ASTM A1055.
1. Steel Bars: ASTM A615, as indicated on Structural Drawings, deformed bars.
2. Epoxy Coating: ASTM A775 or ASTM A934 with less than 2 percent damaged coating in each 12-inch bar length.

G. Steel Bar Mats: ASTM A184, fabricated from ASTM A615**,** as indicated on Structural Drawings, deformed bars, assembled with clips.

H. Plain-Steel Welded-Wire Reinforcement: ASTM A1064, plain, fabricated from as-drawn steel wire into flat sheets.

I. Deformed-Steel Welded-Wire Reinforcement: ASTM A1064, flat sheet.

J. Reinforcing bars to be welded: ASTM A706 as indicated on Structural Drawings.

K. Galvanized-Steel Welded-Wire Reinforcement: ASTM A1064, plain, fabricated from galvanized steel wire into flat sheets.

2.3 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A615, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.

B. Epoxy-Coated Joint Dowel Bars: ASTM A615, Grade 60, plain-steel bars, ASTM A775 epoxy coated.

C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.
1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
a For concrete surfaces exposed to view, where legs of wire bar support contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.
b For supports in contact with soil or vapor retarded, provide precast concrete blocks or chairs with bearing plates.
c For epoxy-coated reinforcement, use CRSI Class 1A epoxy-coated or other dielectric-polymer-coated wire bar supports.

d For dual-coated reinforcement, use CRSI Class 1A epoxy-coated or other dielectric polymer-coated wire bar supports.
e For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.
f For stainless steel reinforcement, use CRSI Class 1 plastic-protected steel wire, all plastic bar supports, or CRSI Class 2 stainless steel bar supports.

D. Mechanical Splice Couplers: ACI 318 Type 1 Type 2 or as indicated on Structural Drawings, same material of reinforcing bar being spliced.

E. Steel Tie Wire: ASTM A1064, annealed steel, not less than 0.0508 inch in diameter.
1. Finish: Galvanized ASTM A884/A884M, Class A, Type 1, epoxy coated, with less than 2 percent damaged coating in each 12-inch wire length.

F. Stainless Steel Tie Wire: ASTM A1022/A1022M, not less than 0.0508 inch in diameter.

G. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A775/A775M.

H. Zinc Repair Material: ASTM A780/A780M.

2.4 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection of In-Place Conditions:
1 Do not cut or puncture vapor retarder.
2 Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, oil, grease, and other foreign materials that reduce bond to concrete.

C. Repair or damaged epoxy coating: Conform to ASTM D3963

D. Repair of damaged galvanizing: Conform to ASTM A780.

3.2 INSTALLATION OF STEEL REINFORCEMENT

A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.

B. Accurately position, support, and secure reinforcement against displacement.
1 Locate and support reinforcement with bar supports to maintain minimum concrete cover.
2 Do not tack weld crossing reinforcing bars.
3 Maintain position of reinforcing mats in walls with metal spacers between mats.

C. Preserve clearance between bars of not less than 1 inch, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.

D. Provide concrete coverage in accordance with ACI 318 and Structural Drawings.

E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

F. Splices: Lap splices as indicated on Structural Drawings.
   1 Mechanical Splice Couplers: Install in accordance with manufacturer's instructions.
   2 Weld reinforcing bars in accordance with AWS D1.4, where indicated on Structural Drawings.

G. Install structural thermal break insulated connection system in accordance with manufacturer's instructions.

H. Install welded-wire reinforcement in longest practicable lengths.
   1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."
      a. For reinforcement less than W4.0 or D4.0, continuous support spacing shall not exceed 12 inches.

I. Support reinforcing in slabs-on-grade and slabs-on-deck on bolsters or blocks. Do not lift reinforcing during concrete placement.

J. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating in accordance with ASTM D3963/D3963M.

K. Dual-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating in accordance with ASTM D3963/D3963M.

L. Zinc-Coated Reinforcement: Repair cut and damaged zinc coatings with zinc repair material in accordance with ASTM A780/A780M.

3.3 JOINTS

A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
   1 Place joints perpendicular to main reinforcement.
   2 Continue reinforcement across construction joints unless otherwise indicated.
   3 Do not continue reinforcement through sides of strip placements of floors and slabs.

B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length, to prevent concrete bonding to one side of joint.

3.4 INSTALLATION TOLERANCES

A. Comply with ACI 117.

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Inspections: Provide inspections indicated in Structural Drawings.

C. Manufacturer's Inspections: Engage manufacturer of structural thermal break insulated connection system to inspect completed installations prior to placement of concrete, and to provide written report that installation complies with manufacturer's written instructions.

END OF SECTION 03 20 00

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.
B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site or location or method as mutually agreed upon.
    1. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
        a. Contractor's superintendent.
        b. Independent testing agency responsible for concrete design mixtures.
        c. Ready-mix concrete manufacturer.
        d. Concrete Subcontractor.
        e. Special concrete finish Subcontractor.
    2. Review the following:
        a. Special inspection and testing and inspecting agency procedures for field quality control.
        b. Construction joints, control joints, isolation joints, and joint-filler strips.
        c. Semirigid joint fillers.
        d. Vapor-retarder installation.
        e. Anchor rod and anchorage device installation tolerances.
        f. Cold and hot weather concreting procedures.
        g. Concrete finishes and finishing.
        h. Curing procedures.
        i. Methods for achieving specified floor and slab flatness and levelness.
        j. Floor and slab flatness and levelness measurements.
        k. Concrete repair procedures.
        l. Concrete protection.
        m. Initial curing and field curing of field test cylinders (ASTM C31.)
        n. Protection of field cured field test cylinders.

1.3 ACTION SUBMITTALS

A. Product Data: For each of the following.
    1. Portland cement.
    2. Fly ash.
    3. Slag cement.
    4. Blended hydraulic cement.
    5. Silica fume.
    6. Performance-based hydraulic cement
    7. Aggregates.
    8. Admixtures:
        a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.

9. Color pigments.
10. Fiber reinforcement.
11. Vapor retarders.
12. Floor and slab treatments.
13. Liquid floor treatments.
14. Curing materials.
    a. Include documentation from color pigment manufacturer, indicating that proposed methods of curing are recommended by color pigment manufacturer.
15. Joint fillers.
16. Repair materials.

B. Design Mixtures: For each concrete mixture, include the following:
1. Mixture identification.
2. Minimum 28-day compressive strength.
3. Durability exposure class.
4. Maximum w/cm.
5. Calculated equilibrium unit weight, for lightweight concrete.
6. Air content.
7. Nominal maximum aggregate size.
8. Steel-fiber reinforcement content.
9. Synthetic micro-fiber content.
10. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
11. Intended placement method.
12. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Shop Drawings:
1. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
    a. Location of construction joints is subject to approval of the Architect.

D. Samples: As indicated on structural drawings.

E. Concrete Schedule: For each location of each Class of concrete indicated in "Concrete Mixtures" Article, including the following:
1. Concrete Class designation.
2. Location within Project.
3. Exposure Class designation.
4. Formed Surface Finish designation and final finish.
5. Final finish for floors.
6. Curing process.
7. Floor treatment if any.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For the following:
1. Installer: Include copies of applicable ACI certificates.
2. Ready-mixed concrete manufacturer.

B. Material Certificates: For each of the following, signed by manufacturers:
1. Cementitious materials.
2. Admixtures.
3. Fiber reinforcement.

4. Curing compounds.
5. Floor and slab treatments.
6. Bonding agents.
7. Adhesives.
8. Vapor retarders.
9. Semirigid joint filler.
10. Joint-filler strips.
11. Repair materials.

C. Material Test Reports: For the following, from a qualified testing agency:
1. Portland cement.
2. Fly ash.
3. Slag cement.
4. Blended hydraulic cement.
5. Silica fume.
6. Performance-based hydraulic cement.
7. Aggregates.
8. Admixtures:

D. Floor surface flatness and levelness measurements report, indicating compliance with specified tolerances.

E. Research Reports:
1. For concrete admixtures in accordance with ICC's Acceptance Criteria AC198.
2. For sheet vapor retarder/termite barrier, showing compliance with ICC AC380.

F. Preconstruction Test Reports: For each mix design.

G. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs Project personnel qualified as an ACI-certified Flatwork Technician and Finisher and a supervisor who is a certified ACI Flatwork Concrete Finisher/Technician or an ACI Concrete Flatwork Technician.
1. Post-Installed Concrete Anchors Installers: ACI-certified Adhesive Anchor Installer.

B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready- mixed concrete products and that complies with ASTM C94 requirements for production facilities and equipment.
1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Laboratory Testing Agency Qualifications: A testing agency qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated and employing an ACI-certified Concrete Quality Control Technical Manager.

D. Mockups: Cast concrete slab-on-ground and formed-surface panels to demonstrate typical joints, surface finish, texture, tolerances, floor treatments, and standard of workmanship as required by and directed by Architect.
1. Build panel approximately 200 square feet for slab-on-ground and 100 square feet for formed surface in the location indicated by Architect.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on each concrete mixture.
   1. Include the following information in each test report:
      a. Admixture dosage rates.
      b. Slump.
      c. Air content.
      d. Seven-day compressive strength.
      e. 28-day compressive strength.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with ASTM C94 and ACI 301.

1.8 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 301 and ACI 306.1 and as follows.
   1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
   2. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
   3. Do not use frozen materials or materials containing ice or snow.
   4. Do not place concrete in contact with surfaces less than 35 deg F, other than reinforcing steel.
   5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:
   1. Maintain concrete temperature at time of discharge to not exceed 95 deg F. If ice is used to control temperature, use water equivalent of ice to calculate total amount of mixing water.
   2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

A. Cementitious Materials:
   1. Portland Cement: ASTM C150, as indicated on Structural Drawings.
   2. Fly Ash: ASTM C618, Class C or F. Carbon content shall not exceed 3 percent.
   3. Slag Cement: ASTM C989, Grade 100 or 120.
   4. Blended Hydraulic Cement: ASTM C595, as indicated on Structural Drawings.
   5. Silica Fume: ASTM C1240 amorphous silica.

B. Normal-Weight Aggregates: ASTM C33, coarse aggregate or better, graded as indicated on Structural Drawings.
   1. Alkali-Silica Reaction: Comply with one of the following:

      a. Expansion Result of Aggregate: Not more than 0.04 percent at one-year when

tested in accordance with ASTM C1293.

b. Expansion Results of Aggregate and Cementitious Materials in Combination: Not more than 0.10 percent at an age of 16 days when tested in accordance with ASTM C1567.

c. Alkali Content in Concrete: Not more than 4 lb./cu. yd. for moderately reactive aggregate or 3 lb./cu. yd. for highly reactive aggregate, when tested in accordance with ASTM C1293 and categorized in accordance with ASTM C1778, based on alkali content being calculated in accordance with ACI 301.

2. Maximum Coarse-Aggregate Size: As indicated on Structural Drawings.

3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Lightweight Aggregate: ASTM C330, As indicated on Structural Drawings.

D. Air-Entraining Admixture: ASTM C260.

E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C494, Type A.
2. Retarding Admixture: ASTM C494, Type B.
3. Water-Reducing and -Retarding Admixture: ASTM C494, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C494, Type F.
5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494, Type G.
6. Plasticizing and Retarding Admixture: ASTM C1017, Type II.

F. Color Pigment: ASTM C979, synthetic mineral-oxide pigments, color stable, nonfading, and resistant to lime and other alkalis.

1. Color: As selected by Architect from manufacturer's full range.

G. Water and Water Used to Make Ice: ASTM C94, potable.

2.3 FIBER REINFORCEMENT

A. Synthetic Monofilament Micro-Fiber: Monofilament polypropylene micro-fibers engineered and designed for use in concrete, complying with ASTM C1116/C1116M, Type III, 1/2 to 1-1/2 inches long.

B. Synthetic Fibrillated Micro-Fiber: Fibrillated polypropylene micro-fibers engineered and designed for use in concrete, complying with ASTM C1116/C1116M, Type III, 1 to 2-1/4 inches long.

2.4 VAPOR RETARDERS

A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A, except with maximum water-vapor permeance of less than 0.1 perms; not less than 15 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.

2.5 FLOOR AND SLAB TREATMENTS

A. Slip-Resistive Emery Aggregate Finish: Factory-graded, packaged, rustproof, non-glazing, abrasive, crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than
20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials with 100 percent passing No. 8 sieve.

2.6 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
   1. Color:
      a. Ambient Temperature Below 50 deg F: Black.
      b. Ambient Temperature between 50 deg F and 85 deg F: Any color.
      c. Ambient Temperature Above 85 deg F: White.

D. Water: Potable or complying with ASTM C1602.

E. Clear, Waterborne, Membrane-Forming, Dissipating Curing Compound: ASTM C309, Type 1, Class B with a VOC content of 200g/L or less.

2.7 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber or ASTM D1752, cork or self-expanding cork.

B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 in accordance with ASTM D2240.

C. Bonding Agent: ASTM C1059, Type II, non-re-dispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade and class to suit requirements, and as follows:
   1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

E. Floor Slab Protective Covering: 8-feet- wide cellulose fabric.

2.8 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
   1. Cement Binder: ASTM C150/C150M Portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
   2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
   3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand, as recommended by underlayment manufacturer.
   4. Compressive Strength: Not less than 4100 psi at 28 days when tested in accordance with ASTM C109.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.

1. Cement Binder: ASTM C150 Portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested in accordance with ASTM C109.

2.9 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.
   1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as indicated in Structural Drawings.

C. Admixtures: Use admixtures in accordance with manufacturer's written instructions. Water soluble chloride ions exceeding 0.01 percent by weight of cement are not permitted.

D. Color Pigment: Add color pigment to concrete mixture in accordance with manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

E. Limit water-soluble chloride ion content in hardened concrete to 0.15 percent by weight of cement.

2.10 CONCRETE MIXTURES

A. Proportion concrete mixture as indicated in Structural Drawings.

2.11 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94 and ASTM C1116 and furnish batch ticket information.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
   1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
   2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:
   1. Daily access to the Work.
   2. Incidental labor and facilities necessary to facilitate tests and inspections.
   3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.
   4. Security and protection for test samples and for testing and inspection equipment at

Project site.

3.3 INSTALLATION OF EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.
   1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI.
   3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is indicated at lintels, shelf angles, and other conditions.

3.4 INSTALLATION OF VAPOR RETARDER

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.
   1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
   2. Face laps away from exposed direction of concrete pour.
   3. Lap vapor retarder over footings and grade beams not less than 6 inches, sealing vapor retarder to concrete.
   4. Lap joints 6 inches and seal with manufacturer's recommended tape.
   5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
   6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
   7. Protect vapor retarder during placement of reinforcement and concrete.
      a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches on all sides, and sealing to vapor retarder.

3.5 JOINTS

A. Construct joints true to line, with faces perpendicular to surface plane of concrete.

B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.
   1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
   2. Place joints perpendicular to main reinforcement.
      a. Continue reinforcement across construction joints unless otherwise indicated.
   3. Space vertical joints in walls as indicated on Drawings.
   4. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
   5. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth indicated on Structural Drawings as follows:
   1. Grooved Joints: Form control joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of control joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
   2. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints as indicated on Structural Drawings into concrete when cutting action does not tear, abrade, or otherwise damage surface and before

concrete develops random cracks.

D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
   1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
   2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface, where joint sealants are specified or indicated.
   3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints:
   1. Install dowel bars and support assemblies at joints where indicated on Drawings.
   2. Lubricate or asphalt coat one-half of dowel bar length to prevent concrete bonding to one side of joint.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.
   1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
   2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.

B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301, but not to exceed the amount indicated on the concrete delivery ticket.
   1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.
   1. If a section cannot be placed continuously, provide construction joints as indicated.
   2. Deposit concrete to avoid segregation.
   3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
   4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301.
      a. Do not use vibrators to transport concrete inside forms.
      b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
      c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
      d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
   1. Do not place concrete floors and slabs in a checkerboard sequence.

2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
3. Maintain reinforcement in position on chairs during concrete placement.
4. Screed slab surfaces with a straightedge and strike off to correct elevations.
5. Level concrete, cut high areas, and fill low areas.
6. Slope surfaces uniformly to drains where required.
7. Begin initial floating using bull floats or derbies to form a uniform and open-textured surface plane before excess bleed water appears on the surface.
8. Do not further disturb slab surfaces before starting finishing operations.

3.7 FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:
   1. ACI 301 Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.
      a. Patch voids larger than 1-1/2 inches wide or 1/2 inch deep.
      b. Remove projections larger than 1 inch.
      c. Tie holes do not require patching.
      d. Surface Tolerance: ACI 117 Class D.
      e. Apply to concrete surfaces not exposed to public view.

   2. ACI 301Surface Finish SF-2.0: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams.
      a. Patch voids larger than 3/4 inch wide or 1/2 inch deep.
      b. Remove projections larger than 1/4 inch.
      c. Patch tie holes.
      d. Surface Tolerance: ACI 117 Class B.
      e. Locations: Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.

   3. ACI 301 Surface Finish SF-3.0:
      a. Patch voids larger than 3/4 inch wide or 1/2 inch deep.
      b. Remove projections larger than 1/8 inch.
      c. Patch tie holes.
      d. Surface Tolerance: ACI 117 Class A.
      e. Locations: Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.

B. Rubbed Finish: Apply the following to as cast surface finishes where indicated on Drawings:
   1. Smooth-Rubbed Finish:
      a. Perform no later than one day after form removal.
      b. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture.
      c. If sufficient cement paste cannot be drawn from the concrete by the rubbing process, use a grout made from the same cementitious materials used in the in-place concrete.
      d. Maintain required patterns or variances as indicated on Drawings or to match design reference sample.

C. Related Unformed Surfaces:
   1. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a color and texture matching adjacent formed surfaces.

2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

A. Comply with ACI 302.1R recommendations for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish:
1. While still plastic, texture concrete surface that has been screeded and bull-floated or darbied.
2. Use stiff brushes, brooms, or rakes to produce a profile depth of 1/4 inch in one direction.
3. Apply scratch finish to surfaces to receive concrete floor toppings or to receive mortar setting beds for bonded cementitious floor finishes.

C. Float Finish:
1. When bleed water sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power- driven floats or by hand floating if area is small or inaccessible to power-driven floats.
2. Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 tolerances for conventional concrete.
3. Apply float finish to surfaces indicated on Drawings and/or to receive trowel finish or to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand- bed terrazzo.

D. Trowel Finish:
1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
4. Do not add water to concrete surface.
5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
6. Apply a trowel finish to surfaces indicated on Drawings and/or exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
7. Finish surfaces to the following tolerances, in accordance with ASTM E1155, for a randomly trafficked floor surface:
    a. Slabs on Ground:
        1) Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.-long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch in 2 feet.
        2) Specified overall values of flatness, FF 25; and of levelness, FL 20; with minimum local values of flatness, FF 17; and of levelness, FL 15.
        3) Specified Overall Value (SOV): FF 50 and FL 25 with minimum local value (MLV): FF 40 and FL 17.

    b. Suspended Slabs:
        1) Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.-long straightedge resting on two high

spots and placed anywhere on the surface does not exceed 1/4 inch in 2 feet.

2) Specified overall values of flatness, FF 25; and of levelness, FL 20; with minimum local values of flatness, FF 17; and of levelness, FL 15.
3) Specified overall values of flatness, FF 35; and of levelness, FL 20; with minimum local values of flatness, FF 24; and of levelness, FL 15.
4) Specified overall values of flatness, FF 45; and of levelness, FL 35; with minimum local values of flatness, FF 30; and of levelness, FL 24.

E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated on Drawings, or where ceramic or quarry tile is to be installed by either thickset or thin set method. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.
1. Coordinate required final finish with Architect before application.
2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber- bristle broom perpendicular to main traffic route.
2. Coordinate required final finish with Architect before application.

G. Slip-Resistive Finish: Before final floating, apply slip-resistive granule finish to concrete stair treads, platforms, ramps as indicated on Drawings.
1. Apply in accordance with manufacturer's written instructions and as follows:
a. Uniformly spread 25 lb/100 sq. ft. of dampened slip-resistive granules over surface in one or two applications.
b. Tamp aggregate flush with surface, but do not force below surface.
c. After broadcasting and tamping, apply float finish.
d. After curing, lightly work surface with a steel wire brush or an abrasive stone and water to expose slip-resistive aggregate.

H. Dry-Shake Floor Hardener Finish: After initial floating, apply dry-shake floor hardener to surfaces in accordance with manufacturer's written instructions where indicated on Drawings and as follows:
1. Uniformly apply dry-shake floor hardener at a rate of 100 lb/100 sq. ft. unless greater amount is recommended by manufacturer.
2. Uniformly distribute approximately two-thirds of dry-shake floor hardener over surface by hand or with mechanical spreader and embed by power floating.
3. Follow power floating with a second dry-shake floor hardener application, uniformly distributing remainder of material, and embed by power floating.
4. After final floating, apply a trowel finish.
5. Cure concrete with curing compound recommended by dry-shake floor hardener manufacturer and apply immediately after final finishing.

3.9 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

A. Filling In:
1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
3. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and

terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as indicated on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items.
1. Cast-in inserts and accessories, as indicated on Drawings.
2. Screed, tamp, and trowel finish concrete surfaces.

3.10 CONCRETE CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
1. Comply with ACI 301 and ACI 306.1 for cold weather protection during curing.
2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.
3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h, calculated in accordance with ACI 305.1,) before and during finishing operations.
4. Duration of curing: Curing shall continue until cumulative number of days or fraction, not necessarily consecutive, during which temperature of air in contact with concrete is above 55 degrees F has totaled 7 days.

B. Curing Formed Surfaces: Comply with ACI 308.1 as follows:
1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.
3. If forms remain during curing period, moist cure after loosening forms.
4. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:
    a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
    b. Continuous Sprinkling: Maintain concrete surface continuously wet.
    c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
    d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
    e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
        1) Recoat areas subject to heavy rainfall within three hours after initial application.
        2) Maintain continuity of coating and repair damage during curing period.
        3) Do not use on surfaces against which additional concrete or other cementitious finishing materials are to be bonded, over surfaces to receive waterproofing, or on surfaces on which curing compound is prohibited by Specifications.

C. Curing Unformed Surfaces: Comply with ACI 308.1 as follows:
1. Begin curing immediately after finishing concrete.
2. Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
    a. Lap edges and ends of absorptive cover not less than 12-inches.
    b. Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
3. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining

cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
   a. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
   b. Cure for not less than seven days.
4. Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
   a. Water.
   b. Continuous water-fog spray.
5. Curing Compound:
   a. Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
   b. Recoat areas subjected to heavy rainfall within three hours after initial application.
   c. Maintain continuity of coating, and repair damage during curing period.
   d. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer, unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.
6. Floors to Receive Curing and Sealing Compound:
   a. Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.
   b. Recoat areas subjected to heavy rainfall within three hours after initial application.
   c. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.11 TOLERANCES

A. Conform to ACI 117.

3.12 APPLICATION OF LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment in accordance with manufacturer's written instructions.
   1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
   2. Do not apply to concrete that is less than 28 days' old.
   3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing.
   4. Rinse with water; remove excess material until surface is dry.
   5. Apply a second coat in a similar manner if surface is rough or porous.

B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller in accordance with manufacturer's written instructions.

3.13 JOINT FILLING

A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.
   1. Defer joint filling until concrete has aged at least six month(s).
   2. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint, and trim joint filler flush with top of joint after hardening.

3.14 CONCRETE SURFACE REPAIRS

A. Defective Concrete:
   1. Repair and patch defective areas when approved by Architect.
   2. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry pack patching mortar, consisting of 1 part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
   1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete.
      a. Limit cut depth to 3/4 inch.
      b. Make edges of cuts perpendicular to concrete surface.
      c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
      d. Fill and compact with patching mortar before bonding agent has dried.
      e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
   2. Repair defects on surfaces exposed to view by blending white Portland cement and standard Portland cement, so that, when dry, patching mortar matches surrounding color.
      a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
      b. Compact mortar in place and strike off slightly higher than surrounding surface.
   3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces:
   1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
   2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
   3. After concrete has cured at least 14 days, correct high areas by grinding.
   4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
   5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.
      a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
      b. Feather edges to match adjacent floor elevations.
   6. Correct other low areas scheduled to remain exposed with repair topping.
      a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations.
      b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level

surface.

7. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete.
   a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch clearance all around.
   b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
   c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
   d. Place, compact, and finish to blend with adjacent finished concrete.
   e. Cure in same manner as adjacent concrete.
8. Repair random cracks and single holes 1 inch or less in diameter with patching mortar.
   a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
   b. Dampen cleaned concrete surfaces and apply bonding agent.
   c. Place patching mortar before bonding agent has dried.
   d. Compact patching mortar and finish to match adjacent concrete.
   e. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.15 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.

B. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
1. The testing agency shall be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31.
2. Testing agency shall immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
3. Testing agency shall report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.
   a. Test reports shall include reporting requirements of ASTM C31, ASTM C39, and ACI 301, including the following as applicable to each test and inspection:
      1) Project name.
      2) Name of testing agency.
      3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
      4) Name of concrete manufacturer.
      5) Date and time of inspection, sampling, and field testing.
      6) Date and time of concrete placement.
      7) Location in Work of concrete represented by samples.
      8) Date and time sample was obtained.
      9) Truck and batch ticket numbers.
      10) Design compressive strength at 28 days.
      11) Concrete mixture designation, proportions, and materials.
      12) Field test results.

13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
14) Type of fracture and compressive break strengths at seven days and 28 days.

C. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, and amount of water that can be added at Project site.

D. Inspections: As indicated on Structural Drawings.

E. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172 shall be performed in accordance with the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 100 cu. yd. or fraction thereof.
   a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
2. Air Content: ASTM C231 pressure method, for normal-weight concrete; ASTM C173 volumetric method, for structural lightweight concrete.
   a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
3. Concrete Temperature: ASTM C1064:
   a. One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
4. Unit Weight: ASTM C567 fresh unit weight of structural lightweight concrete.
   a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
5. Compression Test Specimens: ASTM C31:
   a. Cast and laboratory cure two sets of two 6-inch by 12-inch cylinder specimens for each composite sample.
   b. Cast, initial cure, and field cure additional standard cylinder specimens as required for determination of concrete strength for form removal, stressing of post-tension tendons, etc.
6. Compressive-Strength Tests: ASTM C39.
   a. Test one set of two laboratory-cured specimens at seven days and one set of two specimens at 28 days.
   b. Test one set of field-cured specimens at age required for form removal and/or stressing of post-tension tendons.
   c. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi if specified compressive strength is 5000 psi less, or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi.
9. Nondestructive Testing: Impact hammer, sono-scope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection

of concrete.

10. Additional Tests:
    a. Testing and inspecting agency shall make additional tests of concrete when test results indicate that, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
    b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42 or by other methods as directed by Architect.
        1) Acceptance criteria for concrete strength shall be in accordance with ACI 301.
11. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
12. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

F. Measure floor and slab flatness and levelness in accordance with ASTM E1155 within 48 hours of completion of floor finishing and promptly report test results to Architect.

3.16 PROTECTION

A. Protect concrete surfaces as follows:
1. Protect from petroleum stains.
2. Diaper hydraulic equipment used over concrete surfaces.
3. Prohibit vehicles from interior concrete slabs.
4. Prohibit use of pipe-cutting machinery over concrete surfaces.
5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.
7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.
8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using Floor Slab Protective Covering.

END OF SECTION 03 30 00

SECTION 04 20 00 - UNIT MASONRY

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Requirements of this Section apply to masonry Work specified in Division 4 Section "Engineered Unit Masonry".

1.2 SUMMARY

A. Section Includes:
1. Concrete masonry units.
2. Clay face brick.
3. Mortar and grout.
4. Steel reinforcing bars.
5. Masonry-joint reinforcement.
6. Ties and anchors.
7. Embedded flashing.
8. Miscellaneous masonry accessories.

B. Products Installed but not Furnished under This Section:
1. Steel lintels in unit masonry.
2. Steel shelf angles for supporting unit masonry.
3. Cavity wall insulation.

C. Related Requirements:
1. Division 5 Section “Metals” for loose steel lintels.
2. Section 07 21 00 "Thermal Building Insulation" for cavity wall insulation.
3. Section 07 62 00 "Sheet Metal Flashing, Trim, and Accessories" for exposed sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.

1.3 DEFINITIONS

A. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.
1. Percent voids (ASTM C 216) for solid brick indicated to be used in fire rated wall assemblies.

B. Shop Drawings: For the following:
1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Stone Trim Units: Show sizes, profiles, and locations of each stone trim unit required.
3. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.
4. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
5. Ledge Flashing Plans, Elevations, and Details: Indicate locations of vertical offsets and end dams, changes in flashing materials, and built-up or prefabricated assemblies.

6. Provide building elevation drawings showing Masonry Expansion Joint and Control Joint locations.
7. Marking of Fire Rated and Smoke Rated Walls: Submit a plan based on rated walls indicated on the Code Review. Submit as a part of the masonry submittal, and at the same time as other masonry related submittals.

C. Samples for Initial Selection:
1. Acoustical CMUs.
2. Clay face brick, and Hollow brick.
3. Weep holes/cavity vents.

D. Samples for Verification: For each type and color of the following:
1. Clay face brick and Hollow brick.
2. Special brick shapes.
3. Weep holes and cavity vents.
4. Accessories embedded in masonry.

1.6 INFORMATIONAL SUBMITTALS

A. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
1. Submittal is for information only. Receipt of list does not constitute approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.

B. Qualification Data: For testing agency.

C. Material Certificates: For each type and size of the following:
1. Masonry units.
a. Include material test reports substantiating compliance with requirements.
b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
c. For exposed brick, include test report for efflorescence according to ASTM C 67.
d. For surface-coated brick, include test report for durability of surface appearance after 50 cycles of freezing and thawing according to ASTM C 67.
e. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
2. Cementitious materials. Include name of manufacturer, brand name, and type.
3. Mortar admixtures.
4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
5. Grout mixes. Include description of type and proportions of ingredients.
6. Reinforcing bars.
7. Joint reinforcement.
8. Anchors, ties, and metal accessories.

D. Mix Designs: For each type of mortar. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91/C 91M for air content.
2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

E. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.

F. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

G. Cleaning Procedures: Detailed description of methods, materials, equipment and site cleanup procedures to be used. Provide with letters of approval from brick and cleaning material manufacturers regarding the compatibility of proposed use of products and methods used together for cleaning purposes.

1.7 QUALITY ASSURANCE

A. Sample Panels: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects. Comply with requirements in Section 01 40 00 "Quality Requirements" for mockups.
   1. Build sample panels for each type of exterior wall, interior wall which do not get painted in sizes approximately 60 inches long by 48 inches high by full thickness.
   2. Build sample panels facing south.
   3. Where masonry is to match existing, build panels adjacent and parallel to existing surface.
   4. Clean one-half of exposed faces of panels with masonry cleaner indicated.
   5. Protect approved sample panels from the elements with weather-resistant membrane.
   6. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
      a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless Architect specifically approves such deviations in writing.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
   1. Build mockup as shown on Drawings, or if not indicated, build mockup of typical exterior walls and provide a minimum of 4-feet of wall for each type of wall. Size of mockup shall be a minimum of 20 linear feet and shall include a door, brick bump-out (refer to plans for bump-out), a window, inside corner, outside corner and a brick ledge. Height of mockup shall be 12-feet provide adequate structure for mockup to withstand wind and other elements – rebuild if elements knock wall down. Cover top of wall. Preferably adjacent to the job trailer – confirm with Architect in the field.
      a. Include a sealant-filled joint at least 16 inches long in each mockup.
      b. Include lower corner of window opening, framed with masonry trim required for the project, at upper corner of exterior wall mockup. Provide mockup openings for each type of required masonry trim which is not smooth faced. Make opening approximately 12 inches wide by 16 inches high.
      c. Include through-wall flashing installed for a 24-inch length in corner of exterior wall mockup approximately 16 inches down from top of mockup, with a 12-inch length of flashing left exposed to view (omit masonry above half of flashing).
      d. Include studs of kind required on project (both metal and wood if required), sheathing, water-resistive air barrier sheathing joint-and-penetration treatment, veneer anchors, flashing, cavity drainage material, and weep and vent holes in exterior masonry-veneer wall mockup. The materials used in the mockups shall be the products accepted for use on the project.

2. Where masonry is to match existing, erect mockups adjacent and parallel to existing surface.
3. Clean one-half of exposed faces of mockups with masonry cleaner as indicated.
4. Protect and maintain (keep clean) accepted mockups from the elements with a weather resistant membrane. The mockup will act as a standard for judging the completed Work
5. Review of mockups is not limited to color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
    a. Approval of mockups is also for other material and construction qualities.
    b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
    c. Mockups will in all cases represent the level of workmanship to be provided, including the extent of excess mortar to be cleaned from completed masonry assemblies, inside and outside.
6. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion if allowed by and coordinated with the Architect in the field.

C. Construction Water Leak Testing by the Contractor:
1. Water Leak Testing at Windows: Test masonry veneer assembly construction, including mockups, per ASTM C1715 – 09 Standard Test Method for Evaluation of Water Leakage Performance of Masonry Wall Drainage Systems. This testing shall be done in the presence of the Architect. A report of the testing activity shall be provided to the Architect. The report shall contain photos and narrative description of all the test locations and photos. The photos shall document conditions before testing begins and during testing conditions showing that the flashing successfully sheds all water. Provide three hard copies (color printed on paper – 8.5 inches x 11 inches and bound) of the report to the Architect. Provide an electronic copy in a single document, in the portable document format (PDF).
    a. Exterior Perimeter Walls: Plan on performing water leak testing at 25% of the windows as directed by Architect. Testing shall be performed during installation of through-wall flashing and masonry veneer. Testing shall extend up to a minimum of 24 inches above the adjacent openings
    b. Retesting: In the event of water leak testing failure, veneer masonry shall be removed, and appropriate repairs shall be made to ensure a watertight system. The masonry veneer assembly shall be rebuilt to a minimum of 24 inches above the through-wall flashing. The wall assembly shall be retested at no additional cost to the Owner.

1.8 DELIVERY, STORAGE AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store in a manner to prevent leaching of naturally occurring earth salts or other undesirable materials.

C. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.

D. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.9 FIELD CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
   1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.
   2. Where one wythe of multi-wythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
   1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
   2. Protect sills, ledges, and projections from mortar droppings.
   3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
   4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
   1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work and will be within 20 feet vertically and horizontally of a walking surface.

C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
   1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

2.3 CONCRETE MASONRY UNITS

A. Indigenous Materials: CMUs shall be manufactured within 500 miles of Project site from aggregates and cement that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.

B. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
   1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
   2. Provide bullnose units for outside corners unless otherwise indicated.
   3. Where ceramic tile is indicated as the finish material, use square edged units for outside corners and jamb conditions.

C. CMUs: ASTM C 90 (load bearing) or ASTM C129 (non-load bearing).
   1. Unit Compressive Strength: Provide units of compressive strength as indicated in Division 4 Section “Reinforced Masonry” but not less than a minimum average net-area compressive strength of 2150 psi.
   2. Density Classification: Normal weight unless otherwise indicated.
   3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions. Concrete building bricks are often used to adjust dimensions in CMU construction.

D. Sound-Absorbing Concrete Masonry Units: Hollow Loadbearing units, ASTM C 90, Grade N. Acoustical Masonry Units each with two concealed slots, and two skewed (angled), and sloped impressed surfaces to provide sound absorption and diffusion. Fillers shall be provided and shall be of specially fabricated incombustible fibrous material. Grout insert shall be provided where CMUs are to be reinforced. All accessories used in the work will be acceptable to and approved by the block Manufacturer.
   1. Products: Subject to compliance with requirements, products which may be incorporated in the Work include the following:
      a. Sound cell, as designed by Sound Seal. Contact The Proudfoot Company, Inc. 800445-0034 www.theproudfootcompany.com

2.4 BRICK

A. Indigenous Materials: Brick shall be manufactured within 500 miles of Project site from aggregates and clay materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site. If materials are transported by rail or water, the distance transported by rail or water shall be multiplied by 0.25 to determine the distance to Project site.

B. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:

1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
3. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

C. Clay Face Brick: Facing brick complying with ASTM C 216 or hollow brick complying with ASTM C 652, Class H40V (void areas between 25 and 40 percent of gross cross-sectional area).
1. Grade: SW.
2. Type: FBX, FBS or HBX, HBS.
3. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested according to ASTM C 67.
4. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
5. Size (Actual Dimensions): 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long.
6. Application: Use where brick is exposed unless otherwise indicated.
7. Where shown to "match existing", provide face brick matching color range, texture, and size of existing adjacent brickwork.
8. Color and Texture: Match Architect's samples.

D. Clay Brick Mix: Brick designation “BK 1” shall be factory mixed and pre-blended.

2.5 MORTAR AND GROUT MATERIALS

A. Portland Cement-Lime Mix: Packaged blend of Portland cement and hydrated lime containing no other ingredients.

B. Colored Cement Mortar Products: Packaged blend made from Portland cement, hydrated lime, sand aggregate and mortar pigments, all complying with specified requirements, and containing no other ingredients.
1. Colored / Un-Colored Portland Cement-Lime / Sand Mix: Comply with ASTM C 1714. Subject to compliance with requirements, products which may be incorporated in the Work include the following. Provide custom colors where the proposed manufacturer does not have colors matching the Basis-of-Design colors.
   a. Portland Cement/Lime and Sand Mortar, Spec Mix, Inc. 888-773-2649 www.specmix.com/
   b. AMX 400, Portland Cement/Lime and Sand Mortar, Ameri-mix, an Oldcastle company 888-313-0755 www.amerimix.com/
2. Formulate blend as required to produce custom color indicated or, if not indicated, as selected from manufacturer's standard colors.
3. Pigments shall not exceed 10 percent of Portland cement by weight. Carbon black content shall be less than 2 percent by weight.

C. Aggregate for Mortar: ASTM C 144.
1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
3. White-Mortar Aggregates: Natural white sand or crushed white stone.
4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

D. Aggregate for Grout: ASTM C 404.

E. Water: Potable.

2.6 REINFORCEMENT

A. Uncoated-Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.

B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated. Basis of Design:
   1. RB Rebar Positioners and RB-Twin Rebar Positioners by Hohmann & Barnard company 800645-0616 www.h-b.com, or comparable product by another manufacturer.

C. Masonry-Joint Reinforcement, General: ASTM A 951/A 951M.
   1. Interior Walls: Mill- galvanized carbon steel.
   2. Exterior Walls: Hot-dip galvanized carbon or Stainless steel.
   3. Wire Size for Side Rods: 0.148-inch diameter.
   4. Wire Size for Cross Rods: 0.148-inch diameter.
   5. Wire Size for Veneer Ties: 0.148-inch diameter.
   6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
   7. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

D. Masonry-Joint Reinforcement for Vertically Unreinforced Single-Wythe Masonry (CMU) and for Vertically Unreinforced Collar-Jointed, Multi-wythe Masonry (CMUs and/or Brick, or combination), All wall without Air Spaces: Truss type with side rods at each wall face.

E. Masonry-Joint Reinforcement for Vertically Unreinforced Multi-wythe Masonry with an Air Space Between Wythes: Truss or Ladder designs as follow. Where horizontal joints do not align between the different wall wythes, use the truss design:
   1. Adjustable (two-piece) type, truss design in the backing wythe, with one side rod at each face shell of backing wythe and with separate adjustable ties with pintle-and-eye connections having a maximum horizontal play of 1/16 inch and maximum vertical adjustment of 1-1/4 inches. Size ties to extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face. Ties have hooks or clips to engage a continuous horizontal wire in the facing wythe.
   2. Ladder type with one side rod at each face shell of hollow masonry units more than 4 inches wide, plus one side rod at each wythe of masonry 4 inches wide or less.

F. Masonry-Joint Reinforcement for Vertically Reinforced (steel bars) Multi-wythe Masonry with an Air Space Between Wythes: Ladder design with perpendicular cross rods spaced not more than 16 inches O.C. and number of side rods as follows. Where horizontal joints do not align between the different wall wythes, use the pintle-and-eye Ladder design.
   1. Adjustable (two-piece) type, ladder design in the backing wythe, with one side rod at each face shell of backing wythe and with separate adjustable ties with pintle-and-eye connections having a maximum horizontal play of 1/16 inch and maximum vertical adjustment of 1-1/4 inches. Size ties to extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face. At CMU face masonry, ties have hooks or clips to engage a continuous horizontal wire in the facing wythe.
   2. Ladder type with one side rod at each face shell of hollow masonry units more than 4 inches wide, plus one side rod at each wythe of masonry 4 inches wide or less.

2.7 TIES AND ANCHORS

A. General: Ties and anchors shall extend into veneer to within 1 inch of exterior masonry face but with at least a 5/8-inch cover on outside face.

B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated Stainless Steel may be substituted for any metal material listed.
   1. Mill-Galvanized, Carbon-Steel Wire (for Interior only): ASTM A 82/A 82M, with ASTM A 641/A 641M, Class 1 coating.
   2. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M, with ASTM A 153/A 153M, Class B-2 coating.
   3. Stainless-Steel Wire: ASTM A 580/A 580M, Type 304.
   4. Galvanized-Steel Sheet (for Interior only): ASTM A 653/A 653M, Commercial Steel, G60 (Z180) zinc coating.
   5. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
   6. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304.
   7. Steel Plates, Shapes, and Bars (for Rigid Anchors): ASTM A 36/A 36M.
   8. Stainless-Steel Bars (for Stone Trim): ASTM A 276 or ASTM A 666, Type 304.

C. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches wide.
   1. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches long may be used for masonry constructed from solid units.
   2. Where wythes do not vertically align or are of different materials, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches.
   3. Wire: Fabricate from 3/16-inch- diameter, hot-dip galvanized steel wire. Mill galvanized wire ties may be used in interior walls unless otherwise indicated.

D. Where “flexible anchors” are indicated for connecting masonry to structural framework, provide 2-piece anchors as described below that permit vertical or horizontal differential movement between wall and framework parallel to, but resist tension and compression forces perpendicular to, plane of wall.

E. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
   1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch-diameter, wire. Mill-galvanized wire may be used at interior walls unless otherwise indicated.
   2. Tie Section: Triangular-shaped wire tie made from 0.187-inch-diameter, hot-dip galvanized steel wire. Mill-galvanized wire may be used at interior walls unless otherwise indicated.

F. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall. For anchorage to concrete framework, provide anchors with triangular shaped wire tie section sized to extend within 1 inch of masonry face.
   1. Surface Applied Anchors for masonry veneer over concrete walls: Zinc-alloy barrel section with flanged head with eye and corrosion-resistant, self-drilling screw. Eye designed to receive tie section and to serve as head for drilling fastener into concrete. Where insulation is indicated, provide barrel length to suit insulation thickness, allowing screw to seat directly against the concrete wall with flanged head covering hole in insulation.
      a. Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
         1) Pos-i-Tie, Heckmann Building Products, Inc. 800-621-4140 www.heckmannbuildingprods.com

G. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins unless otherwise indicated. This anchor is used

where walls span horizontally, and it is not the intention that they will be needed on this job but are included in case they are needed.

1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.

H. Adjustable Masonry-Veneer Anchors:

1. General: Provide anchors that allow vertical adjustment but resist a 100-lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.
2. Fabricate sheet metal anchor sections and other sheet metal parts from 0.075-inch-thick steel sheet, galvanized after fabrication.
3. Fabricate wire ties from 0.187-inch-diameter, hot-dip galvanized-steel wire unless otherwise indicated.
4. Two-piece assemblies that permit vertical or horizontal differential movement between wall and framework parallel to, but resist tension and compression forces perpendicular to, plane of wall, consisting of wire tie section and metal anchor section for attachment over sheathing to metal studs and complying with the following requirements.
5. Wire Ties for Cold-Formed Metal Frame Stud Assemblies:
   a. Wire Size: 0.1875-inch diameter.
   b. Wire Tie Shape: Triangular.
   c. Wire Tie Length: As required to extend within 1 inch of masonry veneer face.
6. Wire Ties for Cold-Formed Metal Frame Furring Channel Assemblies:
   a. Wire Size: 0.1875-inch diameter.
   b. Wire Tie Shape: J shaped with vertical loop-back leg.
   c. Wire Tie Length: As required to extend within 1 inch of masonry veneer face.
   d. Products: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include the following:
      1) Heckmann Building Products, Inc. 800-621-4140 www.heckmannbuildingprods.com
7. Anchor Sections for Cold-Formed Metal Frame Stud Assemblies:
   a. Anchor Section: Use this anchor where there is rigid insulation applied over sheathing. Gasketed, Rib-stiffened, sheet metal plate with screw holes top and bottom, approximately 2-3/4 inches wide by 1.5 inches high; with projecting tabs having slotted holes for inserting vertical legs of wire tie specially formed to fit anchor section.
      1) Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
         a) HB 200-X, with X-Seal Tape (used as a gasket) Hohmann & Barnard company
            800-645-0616 www.h-b.com
   b. Anchor Section (For Cold-Formed Metal Framing Furring Channel Assemblies): Self-drilling steel fastener with 3/8-inch x 3/4-inch galvanized steel washer with a perma-seal backing for 1/2 inch gypsum sheathing. Fastener section shall be coated twice with Stalgard, by Elco Industries, Inc. 815-397-5151, after initial galvanizing. The barrel casting shall be of Zamak-2 (92% zinc) with an eye at the outer end that fits over the end of the self-drilling steel fastener.
      1) Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
         a) Pos-i-Tie, Heckmann Building Products, Inc. 800-621-4140 www.heckmannbuildingprods.com
8. Polymer-Coated, Steel Drill Screws for Steel Studs: ASTM C 954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 diameter by length required to penetrate steel stud flange with not less than three exposed threads, and with organic polymer coating with salt-spray resistance to red rust of more than 800 hours according to ASTM B 117.

I. Miscellaneous Anchors:

1. Rigid Anchors: Provide straps of form and length indicated, fabricated from sheet metal strips of following width and thickness, unless otherwise indicated.
   a. Width: 1 inch.
   b. Thickness: 1/8 inch.

3. Anchor Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers; hot - dip galvanized to comply with ASTM A 153, Class C; of diameter and length indicated and in the following configurations.

2.8 EMBEDDED FLASHING MATERIALS

A. Flexible Flashing: Use one of the following unless otherwise indicated:

1. Asphalt-Coated Copper Flashing: 5-oz./sq. ft. copper sheet coated with flexible asphalt. Use only where flashing is fully concealed in masonry at locations such as the tops of walls constructed with masonry and no metal coping.
   a. Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
      1) Type ACC-Asphalt Bituminous Coated, Phoenix Building Products 800-8252878
      2) Coated Copper Flashing, Sandell Manufacturing 800-283-3888 www.sandellmfg.com
      3) Multi-Flash 500 Series, York Manufacturing, Inc. 800-551-2828 www.yorkmfg.com

2. Elastomeric Thermoplastic Flashing: Composite flashing product consisting of a polyester reinforced ethylene interpolymer alloy.
   a. Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
      1) Elvaloy Flashing: Thru-wall flashing made with DuPont Elvaloy and premium adhesive backing:
         a) DuPont Thru-Wall Flashing, E. I. du Pont de Nemours and Company
         b) Flex-Flash, Hohmann and Barnard, Inc. Hohmann & Barnard, Inc. 800-645-0616 www.h-b.com
         c) Cloaked Flashing System (ELVALOY 40 mil SHEET), Hyload, Inc. 800-4574056 www.hyloadflashing.com
   b. Monolithic Sheet: Elastomeric thermoplastic flashing, 0.040 inch thick. For use as an accessory to the adhesive backed product. Do not apply with Rubberized-Asphalt adhesive if adjacent to or in contact with flexible vinyl products and wall components (PVC).
   c. Self-Adhesive Sheet: Elastomeric thermoplastic flashing, 0.025 inch thick, with a 0.015-inch- thick coating of adhesive. For use at bottoms of walls and as additionally indicated. If Rubberized-Asphalt adhesive is used, it shall not be used adjacent to or in contact with flexible vinyl products and wall components (PVC).
   d. Self-Adhesive Sheet with Drip Edge: Elastomeric thermoplastic flashing, 0.025 inch thick, with a 0.015-inch- thick coating of rubberized-asphalt adhesive. Where flashing extends to face of masonry, rubberized-asphalt coating is held back approximately 1-1/2 inches) from edge. Do not use where sealant will be applied to the flashing (where it daylights), at the face of the wall. Do not apply flashing adjacent to or in contact with flexible vinyl products and wall components (PVC).
      1) Color: Gray.
   e. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.

3. EPDM Flashing (Elastomeric flashing): Sheet flashing product made from ethylenepropylene-diene terpolymer, complying with ASTM D 4637/D 4637M, 0.040 inch

thick. This product is only to be used for bridging vertical wall joints B. Application: Unless otherwise indicated, use the following:

a. Where flashing is partly exposed and is indicated to terminate at the wall face, use metal flashing or elastomeric thermoplastic flashing with a drip edge.
b. Where flashing is fully concealed, use flexible flashing.
c. Elastomeric Thermoplastic Flashing as embedded flashing at bottoms of walls, at bottom of elevated walls, and as additionally indicated.
d. Asphalt coated copper as embedded flashing where flashing will be required to conform to irregular shapes like at the top of walls under masonry coping or under a cast stone bench surface.

C. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

D. Termination Bars for Flexible Flashing: Aluminum sheet 0.064 inch by 1-1/2 inches with a 3/8-inch sealant flange at top.

2.9 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Pre-molded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D 226/D 226M, Type I (No. 15 asphalt felt).

D. Weep/Cavity Vent Products: Use the following unless otherwise indicated:

1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in grey color where uncolored mortar is used. Color as selected by Architect from manufacturer's full line of colors where colored mortar is used.
   a. Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
      1) Quadro-Vent, Hohmann & Barnard, Inc. 800-645-0616 www.h-b.com
      2) York Weep Vents, by York Manufacturing, Inc. 800-551-2828 www.yorkmfg.com

E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

1. Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
   a. Mortar Break, Advanced Building Products, Inc. 800-252-2306. www.advancedflashing.com
   b. Mortar Net, Mortar Net USA Ltd. 800-664-6638 www.mortarnet.com
   c. CavClear Masonry Mat, CavClear Products, a Division of Archovations, Inc. 715-381-5773 www.cavclear.com
2. Configuration: Provide one of the following:
   a. Strips, full depth of cavity and 10 inches (250 mm) high, with dovetail-shaped notches 7 inches (175 mm) deep that prevent clogging with mortar droppings.

Other comparable products providing similar performance, in the opinion of the Architect, will be accepted.

2.10 MASONRY CLEANERS

A. General: Subcontractors option is to use the least damaging method of cleaning. Preference is to use the first option below (Detergent Cleaner), but with care to not abrade the masonry surfaces with brushes used for the cleaning. If the method yields unacceptable results, the second method will be required (Acidic Cleaner).

B. Job-Mixed Detergent Solution: Solution of 1/2 cup dry measure tetrasodium polyphosphate and 1/2 cup dry measure laundry detergent dissolved in 1 gal. of water.

C. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned. Do not use products which will damage mortar or grout.
   1. Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include the following:
      a. Diedrich Technologies, Inc. 800-323-3565 www.diedrichtechnologies.com
      b. EaCo Chem, Inc. 800-313-8505 www.eacochem.com
      c. PROSOCO Incorporated 800-255-4255 www.prosoco.com

2.11 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
   1. Do not use calcium chloride in mortar or grout.
   2. Use Portland cement-lime mortar unless otherwise indicated.
   3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
   1. For masonry below grade or in contact with earth, use Type M.
   2. For reinforced masonry, use Type N. CMU lintels, door jambs and window jambs are to be reinforced with Type S mortar.
   3. For exterior, above-grade, load-bearing and non-load-bearing walls, and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
   4. For interior non-load-bearing partitions, Type O may be used instead of Type N.

D. Pigmented Mortar: Use colored cement product. Do not add pigments to colored cement products. Pigments shall not exceed 10 percent of Portland cement by weight.
   1. Mix mortar to match Architect's sample.
   2. Application: Use pigmented mortar for exposed mortar joints with the following units as indicated:
      a. Clay face brick.

E. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
   1. Mix to match Architect's sample.
   2. Application: Use colored-aggregate mortar for exposed mortar joints with the following units:
      a. Clay face brick.

F. Grout for Unit Masonry: Comply with ASTM C 476.
   1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
   2. Proportion grout in accordance with ASTM C 476, paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
   3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
   1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
   2. Verify that foundations are within tolerances specified.
   3. Verify that reinforcing dowels are properly placed.
   4. Verify that substrates are free of substances that impair mortar bond.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.

D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

G. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested according to ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:
   1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4-inch.
   2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2-inch.
   3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4-inch in a story height or 1/2-inch total.

B. Lines and Levels:
   1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
   2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
   3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
   4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
   5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
   6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
   7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.
   8. For lines and surfaces (surface planes) do not vary from a straight line by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond (stack bond at Sound cell CMUs); do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2 inches. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs. Existing bond patter appears to be one-half running bond – match the existing.

D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.

H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

I. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
   1. Install compressible filler in joint between top of partition and underside of structure above.
   2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors 48 inches o.c. unless otherwise indicated.
   3. Wedge non-load-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
   4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 07 84 13 "Penetration Fire stopping."

3.5 MORTAR BEDDING AND JOINTING

A. Lay hollow brick as follows:
   1. Bed face shells in mortar and make head joints of depth equal to bed joints.
   2. Bed webs in mortar in all courses of piers, columns, and pilasters.
   3. Bed webs in mortar in grouted masonry, including starting course on footings.
   4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
   5. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.
   6. Fully bed (horizontal) and head (vertical) joints between units completely filled with mortar.

B. Lay solid masonry units and hollow brick with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Maintain joint widths shown, except for minor variations required to maintain bond alignment. Unless otherwise indicated, lay walls with 3/8-inch joints.

D. Where weep holes are indicated or required, provide weep vents in head joints, unless use of open head joints or different venting devices is otherwise indicated.

E. Where vent holes at tops of walls are indicated, or required, provide weep vents in head joints, unless use of open head joints or different venting devices is otherwise indicated. Align vents at tops of walls with vents at bottoms of walls.

F. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

1. For glazed masonry units, use a nonmetallic jointer 3/4 inch or more in width.

G. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

H. Cut joints flush where indicated to receive waterproofing, cavity wall insulation, air barriers unless otherwise indicated.

I. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners or jambs to shift adjacent stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.

J. Provide rake joint at mortar bed joint to extend VCT under the face of the walls.

3.6 CAVITY WALLS

A. Bond wythes of cavity walls together as follows:
   1. Masonry-Joint Reinforcement: Installed in horizontal mortar joints.
      a. Where indicated and bed joints of both wythes align, use truss-type reinforcement extending across both wythes.
   2. Masonry-Veneer Anchors: Comply with requirements for anchoring masonry veneers.

B. Bond wythes of cavity walls together using bonding system indicated on Drawings.

C. Keep cavities clean of mortar droppings and other materials during construction. Do not allow the formation of mortar bridges. Do not allow mortar or other materials to block drainage paths or weepholes. Do not allow mortar or other materials to accumulate on flashings, ties, or other cavity elements. Follow recommendations of BIA Technical Note 21C and other workmanship standards indicated or required. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Strike joints facing cavities flush. Remove mortar which has dropped to the bottom of the cavity during construction activities.

D. Installing Cavity Wall Insulation: Where damp proofing is not utilized as an adhesive surface for application of board cavity- wall insulation, place small dabs of adhesive, spaced approximately 12 inches o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
   1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

E. Tie exterior wythe to back-up with continuous horizontal joint reinforcing, installed in mortar joints at not more than 16 inches O.C. vertically and in the joint below the top-most veneer masonry unit.

F. Provide weep holes in exterior wythe of cavity wall located immediately above ledges and flashing, spaced 2 feet O.C., unless otherwise indicated.

3.7 ANCHORED MASONRY VENEERS

A. Anchor masonry veneers to wall framing with masonry-veneer anchors to comply with the following requirements:
   1. Fasten screw-attached anchors through sheathing to wall framing with metal fasteners of type indicated. Fasten the anchors with the maximum number of fasteners that the anchors were designed to use.

2. Embed tie sections in masonry joints. Provide not less than 2-inch air space between back of masonry veneer wythe and face of sheathing.
3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
4. Space anchors as indicated, but not more than 16 inches O.C. vertically and 16 inches O.C. horizontally, with not less than one anchor for each 1.33 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 16 inches, around perimeter.

B. Provide not less than 2 inches of airspace between back of masonry veneer and face of closest sheathing or insulation.
1. Keep airspace clean of mortar droppings and other materials during construction. Bevel beds away from airspace, to minimize mortar protrusions into airspace. Do not attempt to trowel or remove mortar fins protruding into airspace.

3.8 MASONRY-JOINT REINFORCEMENT (Horizontal)

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches. Reinforce walls with continuous horizontal joint reinforcing.
1. Space reinforcement not more than 16 inches o.c unless otherwise indicated.
2. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.
3. For parapets, space reinforcement at 8 inches o.c. vertically, unless otherwise indicated. Start the reinforcement below any anchor support point so that the anchor has reinforcement in the joints immediately above and below the location where the anchor attaches to structure.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

3.9 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:
1. Provide an open space not less than 1 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 16 inches o.c. vertically and 16 inches o.c. horizontally.

3.10 CONTROL AND EXPANSION JOINTS

A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement. Build in related items as the masonry Work progresses. Provide vertical and horizontal expansion, control and isolation joints in masonry where shown; and if not shown, provide control and isolation joints as recommended by BIA and NCMA and as follows:
1. Interior Partitions: Provide vertical expansion joints 25 feet o.c. horizontally (maximum).

2. Exterior Cavity Walls: Provide vertical expansion joints 20 feet o.c. horizontally (maximum).
3. Steel Lintels: Provide horizontal bond breaks at the end bearing to allow for thermal expansion and contraction.
4. Openings in Exterior and Interior Walls: At masonry with steel lintels, provide expansion joints on each side of the opening continuing to the top and bottom of the brick wythe and as specified above. At concrete masonry unit lintels, provide control joints in alignment with the outside ends of the lintel continuing to the bed joint and then with horizontal bond breaks at the end bearing.
5. At exterior windows only, at concrete masonry unit sills and lintels, provide control joints in alignment with the outside ends of the sill/lintel continuous vertically.
6. Veneer Construction: Provide horizontal pressure relieving joints at each story as recommended by BIA Technical Note 28B current edition. Verify locations of steel shelf angles with Architect/Engineer.

B. Form control joints in concrete masonry using one of the following methods:
1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
2. Install preformed control-joint gaskets designed to fit standard sash block.
3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.
4. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

C. Form expansion joints in brick as follows:
1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.
2. Build flanges of factory-fabricated, expansion-joint units into masonry. Lap each joint 4 inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints, if any.
3. Build in compressible joint fillers where indicated.
4. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8-inch for installation of sealant and backer rod specified in Section 07 92 00 "Joint Sealants."

D. Provide horizontal, pressure-relieving joints by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 07 92 00 "Joint Sealants," but not less than 3/8-inch.
1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.11 LINTELS

A. Install steel lintels where indicated.

B. Provide masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.
1. For hollow concrete masonry unit walls, use specially formed U-shaped lintel units with reinforcement bars placed as shown filled with coarse grout.

C. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.12 FLASHING, WEEP HOLES, AND CAVITY VENTS

A. General: Install embedded flashing and weep holes where indicated and in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, so as to divert water to the exterior. Install cavity vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.

B. Install flashing as follows unless otherwise indicated:
   1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, as recommended by flashing manufacturer. Extend flashings through exterior face of masonry and turn down to form drip 1/4 inch in length when finished.
   2. At multi-wythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 4 inches, and through inner wythe to within 1/2 inch of the interior face of wall in exposed masonry. Where interior face of wall is to receive furring or framing, carry flashing completely through inner wythe and turn flashing up approximately 2 inches on interior face. At heads and sills turn up ends not less than 2 inches to form an end dam as recommended by BIA and illustrated in BIA Technical Note 7, Figure 21, current edition.
   3. At junction between flashing, and air and water barrier, lap flashing over air and water barrier, and apply termination bar over top of flashing. Apply compatible silicone sealant at joint between air and water barrier and flashing.
   4. At masonry-veneer walls, extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under water-resistive barrier / air barrier, lapping at least 4 inches. Fasten upper edge of flexible flashing to sheathing through termination bar.
   5. At masonry walls intersecting with roofs, provide elastic sheet flashing as indicated on the drawings and herein specified with steps, lapped joints set in compatible adhesive, and end dams. Before proceeding with the masonry Work, notify the Architect. Only after the Architect has witnessed the flashing Work in place shall the Contractor continue the masonry Work.
   6. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
   7. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
   8. Install flashing to comply with manufacturer’s installation requirements.

C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.

D. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

E. Install weep holes in exterior wythes and veneers in head joints of first course of masonry immediately above embedded flashing.
   1. Use specified weep/cavity vent products installed per manufacturer’s instructions, to form weep holes.
   2. Space weep holes 24 inches O.C. maximum and closer where indicated.

F. Place cavity drainage material in cavities / airspace behind veneers to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

G. Install cavity vents in head joints in exterior wythes at spacing indicated. Use specified weep/cavity vent products to form cavity vents.

H. If installing Rubberized-Asphalt Materials, do not install them adjacent to or in contact with flexible vinyl products (PVC). Maintain separation between these two dissimilar materials.

3.13 REINFORCED UNIT MASONRY INSTALLATION

A. General: For nonstructural applications such as wall openings, doors, and windows.

B. Refer to Division 4 Section “Unit Masonry" for installation requirements applicable to reinforced unit masonry other than opening, door and window jambs, heads, and sills.

C. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
   1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
   2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.

D. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.

E. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
   1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
   2. Limit height of vertical grout pours to not more than 60 inches.

3.14 INSTALLATION OF EMBEDDED (THROUGH-WALL) FLASHING IN EXISTING MASONRY VENEER OR CAVITY WALLS

A. General: To install continuous flashing in existing masonry walls, remove alternate sections of outer wythe (exterior and exposed to view) in 2 feet to 5 feet lengths, in accordance with BIA and NCMA recommendations. Support and protect remaining masonry that surrounds removal area - maintain any flashing, reinforcement, lintels, and adjoining construction in an undamaged condition. Flashing and drainage material shall be installed in these sections of walls, and the masonry placed back into its original position to match the original pattern of the masonry, if any, unless otherwise indicated on the drawings. Alternately, temporary braces may be installed to allow for longer sections of masonry walls to be accessed. At joints, the flashing shall be lapped a minimum of 6 inches and shall be completely sealed to function properly. Provide end dams at step-ups in substrates, ledges, and other steps. Replace masonry as described for new construction in other paragraphs of this specification and as described below.

B. Brick Removal:

   1. Support and protect remaining masonry that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.
   2. Remove in an undamaged condition as many whole bricks as possible for reuse.

a. Remove mortar, loose particles, and soil from brick by cleaning with hand chisels, brushes, and water.
b. Store brick for reuse, as indicated or securely if not indicated.
c. Deliver cleaned brick not required for reuse to Owner's Agent, unless otherwise directed.

3. Notify Architect of unforeseen detrimental conditions including voids, cracks, bulges, and loose masonry units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items.

C. Installation of Wall Drainage System:

1. Wall drainage device shall be placed vertically on top of the flashing inside the wall cavity where it shall catch and permanently suspend mortar droppings above the level of the weep holes and flashing.

D. Brick Replacement:

1. Clean bricks surrounding removal areas by removing mortar, dust, and loos particles in preparation for replacement.
2. Install replacement brick into bonding and coursing pattern of existing brick. If cutting is required, use a motor-driven saw designed to cut masonry with clean, sharp, unchipped edges.
3. Lay replacement brick with completely filled bed, head, and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet both replacement and surrounding bricks that have ASTM C 67 initial rates of absorption (suction) of more than 30 g/30 sq. in. per min. Use wetting methods that ensure that units are nearly saturated, but surface is dry when laid. Maintain joint width for replacement units to match existing joints.
   a. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork.
4. Replaced masonry shall be properly cured (5 to 7 days) before the intermediate masonry sections or supports are removed.

3.15 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Payment for these services will be made from the Inspection and Testing Allowance, as authorized by Change Orders. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense. Comply with requirements for qualification and acceptance of testing laboratory specified in Part 1 for preconstruction testing service.

B. Inspections: Special inspections according to Level B in TMS 402/ACI 530/ASCE 5.

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
3. Place grout only after inspectors have verified proportions of site-prepared grout.

C. Testing Prior to Construction: One set of tests.

D. Testing Sand: During progress of mixing and placing mortar on job, take one sand specimen per 25 cubic yards of mortar and test in accordance with ASTM C117 and ASTM C136.

E. Clay Masonry Unit Test: For each type of unit provided, according to ASTM C 67 for compressive strength.

F. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.

G. Mortar Test (Property Specification) for Job Site Mortar: For each mix provided, according to ASTM C 780. Test mortar for compressive strength.

H. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019 with minimum compressive strength of 2,500 psi.

I. Prism Test: For each type of construction provided, according to ASTM C 1314 at 7 days and at 28 days.
   1. Prism Test: For each type of wall construction indicated, per ASTM C 1314.
   2. Fabricate brick prisms with height to thickness ratio of 5, unless otherwise indicated.
   3. Fabricate concrete masonry prisms with height to thickness ratio of not less than 1.33 and not more than 3.0.

J. The Contractor shall conduct Water Leak Testing of the wall drainage system per the “Quality Assurance” Article. The Contractor shall submit the required report, to the Owner, indicating a successful Water Leak Test was achieved.

3.16 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses daily, by dry brushing to remove mortar fins and smears before tooling joints. Do not allow excess mortar lumps or smears to harden on the finished surfaces of masonry. Remove green mortar with burlap or dry cloth. Harsh cleaning methods after walls have been erected may mar the surface of the Work. Pressure washing is not allowed for in-progress cleaning.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
   1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
   2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape. For Acidic Cleaners use protection for adjacent materials which is appropriate and recommended by the cleaner manufacturer.
   3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
   4. If the Detergent Cleaning method is used on the clay brick, clean the brick by bucket and brush hand-cleaning method described in BIA Technical Notes 20.
   5. If the Detergent Cleaning method is used on the CMU, clean the concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.
   6. If a proprietary acidic cleaner is used, apply the cleaner according to manufacturer's written instructions. Prior to using an Acidic Cleaner, verify local air and water pollution prevention requirements and coordinate requirements with work to be performed.

7. Clean stone trim to comply with stone supplier's written instructions.
8. Clean limestone units to comply with recommendations in ILI's "Indiana Limestone Handbook."
9. Do not use high-pressure washing methods (greater than 700 psi as described in BIA Technical Notes No. 20) on single wythe construction, or on concrete masonry incorporating integral or applied water repellents.

E. MARKING OF FIRE RATED AND SMOKE RATED WALLS: All rated walls including, but not limited to corridor partitions, smoke partitions, horizontal exit enclosures, and fire walls must be permanently marked above ceilings as follows: "RATED "FIRE BARRIER" WALL – 1 HR - PROTECT ALL OPENINGS" and RATED "SHAFT ENCLOSURE" WALL– 1 HR - PROTECT ALL OPENINGS AGAINST SMOKE AND FIRE". Refer to code review sheet for wall locations and hourly ratings. Letters shall be minimum 2 1/2" in height and painted red. Provide one time per structural bay, or for walls that do not extend for a full bay, at least once.

3.17 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
1. Crush masonry waste to less than 4 inches in each dimension.
2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste.
3. Do not dispose of masonry waste as fill within 18 inches of finished grade.

C. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.

D. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 04 20 00

SECTION 04 72 00 - CAST STONE MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Cast-stone trim. including the following:
a. Wall caps.

B. Related Sections:
1. Section 04 20 00 "Unit Masonry" for installing cast-stone units in unit masonry.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
1. For cast-stone units, include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Basis-of-Design products with known Environmental Product Declarations (EPD or EPDs) and Material Ingredient Reports (i.e., Health Product Declarations (HPD or HPDs) or other reports) are indicated in the project's "Interior Finish Schedule", or other interior finishes list for the job. For this project, the materials and products require the reports indicated - if none are indicated, none are required. Where reports are available for materials and products not required to have reports, provide reports for these materials and products, for the benefit of the Owner, so that the Owner may have the most complete picture possible of the materials and products installed in their project.
3. Environmental Product Declarations (EPD or EPDs): For products specified in this section where reports are available, provide reports that comply with below. Any proposed substitute product, in lieu of a Basis-of-Design (BOD) product which has a report, shall also have a report available, or the proposed alternate product will be considered to not be comparable and to not be in compliance with the specifications. The substitute request will be rejected. Reports may not be available for some specified materials, products and systems. Acceptable reports shall meet one of the disclosure criteria below (below requirements are based on LEED v4.1 BD + C, Getting started guide for beta participants, November 2020 – pages 173):
a. *"…Life-cycle assessment and environmental product declarations.*
1) *Products with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that have at least a cradle to gate scope...*
2) *Product-specific Type III EPD -- Internally Reviewed. Products with an internally critically reviewed LCA in accordance with ISO 14071. Products with product specific internal EPDs which conform to ISO 14025, and EN 15804 or ISO 21930 and have at least a cradle to gate scope...*
3) *Industry-wide Type III EPD -- Products with third-party certification (Type III), including external verification, in which the manufacturer is explicitly recognized as a participant by the program operator. Products with industry wide EPDs, which conform to ISO 14025, and EN 15804 or ISO 21930 and have at least a cradle to gate scope...*
b. *Environmental Product Declarations which conform to ISO 14025 and EN 15804 or ISO 21930 and have at least a cradle to gate scope.*
1) *Product-specific Type III EPD -- Products with third-party certification (Type III), including external verification and external critical review…"*
4. Material Ingredient Reporting: This requirement is for products and materials which are used as interior finishes and within the building envelope. For products specified in this section where ingredient reports are available, provide reports that comply with below.

Any proposed substitute product, in lieu of a Basis-of-Design (BOD) product which has a report, shall also have a report available, or the proposed alternate product will be considered to not be comparable and to not be in compliance with the specifications. The substitute request will be rejected. Reports may not be available for some specified materials, products, and systems. Use any of the following programs to demonstrate the chemical inventory of the product to at least 0.1% (1,000 parts per million (ppm)) (below programs and requirements are based on LEED v4.1 BD + C, Getting started guide for beta participants, November 2020 – page 187):

a. *"…Health Product Declaration. The end use product has a published and complete Health Product Declaration with full disclosure of known hazards in compliance with the Health Product Declaration open Standard…"*
b. *"…Cradle to Cradle. Product has Material Health Certificate or is Cradle to Cradle Certified™ under standard version 3 or later with a Material Health achievement level at the Bronze level or higher.*
c. *Declare. The Declare product label must meet the following requirements:*
    1) *Declare labels designated as Red List Free, LBC Red List Free, or Declared.*
    2) *Declare labels designated as LBC Red List Approved or LBC Compliant that demonstrate content inventory to 0.1% (1000 ppm)…"*

B. Shop Drawings: Show fabrication and installation details for cast-stone units. Include dimensions, details of reinforcement and anchorages if any, and indication of finished faces.
    1. Include building elevations showing layout of units and locations of joints and anchors.

C. Samples for Initial Selection: For colored mortar.

D. Samples for Verification:
    1. For each color and texture of cast stone required, 10 inches square in size.
    2. For each trim shape required, 10 inches in length.

E. Full-Size Samples: For each color, texture and shape of cast-stone unit required.
    1. Make available for Architect's review at Project site.
    2. Make Samples from materials to be used for units used on Project.
    3. Approved Samples may be installed in the Work.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and testing agency.
    1. Include copies of material test reports for completed projects, indicating compliance of cast stone with ASTM C 1364.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer of cast-stone units similar to those indicated for this Project, that has sufficient production capacity to manufacture required units, and is a plant certified by the Cast Stone Institute.

B. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

C. Mockups: Furnish cast stone for installation in mockups specified in Section 04 20 00 "Unit Masonry."
    1. Build mockup of typical wall area as shown on Drawings, as indicated, or as otherwise directed by the Architect in the field.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Coordinate delivery of cast stone with unit masonry work to avoid delaying the Work and to minimize the need for on-site storage.

B. Pack, handle, and ship cast-stone units in suitable packs or pallets.
   1. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move cast-stone units if required, using dollies with wood supports.
   2. Store cast-stone units on wood skids or pallets with non-staining, waterproof covers, securely tied. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.

C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

D. Store mortar aggregates where grading and other required characteristics can be maintained, and contamination can be avoided.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Cast Stone: Obtain cast-stone units from single source from single manufacturer.

B. Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include the following:
   1. Advanced Architectural Stone (formerly known as Advanced Cast Stone, Inc.) 817-572-18 www.advancedarchitecturalstone.com/
   2. RockCast by Reading Rock 800-482-6466 www.readingrock.com
   3. United Commercial Cast Stone, Inc. 940-668-8133 www.unitedcommercialcaststone.com

2.2 CAST-STONE MATERIALS

A. General: Comply with ASTM C 1364.

B. Portland Cement: ASTM C 150/C 150M, Type I or Type III, containing not more than 0.60 percent total alkali when tested according to ASTM C 114. Provide natural color or white cement as required to produce cast-stone color indicated.

C. Coarse Aggregates: Granite, quartz, or limestone complying with ASTM C 33/C 33M; gradation and colors as needed to produce required cast-stone textures and colors.

D. Fine Aggregates: Natural sand or crushed stone complying with ASTM C 33/C 33M, gradation and colors as needed to produce required cast-stone textures and colors.

E. Color Pigment: ASTM C 979/C 979M, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.

F. Admixtures: Use only admixtures specified or approved in writing by Architect.
   1. Do not use admixtures that contain more than 0.1 percent water-soluble chloride ions by mass of cementitious materials. Do not use admixtures containing calcium chloride.
   2. Use only admixtures that are certified by manufacturer to be compatible with cement and other admixtures used.

3. Air-Entraining Admixture: ASTM C 260/C 260M. Add to wet mixes for units exposed to the exterior at manufacturer's prescribed rate to result in an air content of 4 to 6 percent, except do not add to zero-slump concrete mixes.
4. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
5. Water-Reducing, Retarding Admixture: ASTM C 494/C 494M, Type D.
6. Water-Reducing, Accelerating Admixture: ASTM C 494/C 494M, Type E.

G. Reinforcement: Deformed steel bars complying with ASTM A 615/A 615M, Grade 60. Use galvanized or epoxy-coated reinforcement when covered with less than 1-1/2-inches of cast-stone material.
1. Epoxy Coating: ASTM A 775/A 775M.
2. Galvanized Coating: ASTM A 767/A 767M.

H. Embedded Anchors and Other Inserts: Fabricated from stainless steel complying with ASTM A 240/A 240M, ASTM A 276, or ASTM A 666, Type 304.

2.3 CAST-STONE UNITS

A. Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include the following:
1. Advanced Cast Stone, Inc. 817-572-1156 www.advancedcaststone.com
2. RockCast by Reading Rock 800-482-6466 www.readingrock.com
3. United Commercial Cast Stone, Inc. 940-668-8133 www.unitedcommercialcaststone.com

B. Cast-Stone Units: Comply with ASTM C 1364.
1. Units shall be manufactured using the vibrant dry tamp or the wet-cast method.

C. Fabricate units with sharp arris and accurately reproduced details, with indicated texture on all exposed surfaces unless otherwise indicated.
1. Slope exposed horizontal surfaces 1:12 to drain unless otherwise indicated.
2. Provide raised fillets at backs of sills and at ends indicated to be built into jambs.
3. Provide drips on projecting elements unless otherwise indicated.

D. Fabrication Tolerances:
1. Variation in Cross Section: Do not vary from indicated dimensions by more than 1/8 inch.
2. Variation in Length: Do not vary from indicated dimensions by more than 1/360 of the length of unit or 1/8 inch, whichever is greater, but in no case by more than 1/4 inch.
3. Warp, Bow, and Twist: Not to exceed 1/360 of the length of unit or 1/8 inch, whichever is greater.
4. Location of Grooves, False Joints, Holes, Anchorages, and Similar Features: Do not vary from indicated position by more than 1/8 inch on formed surfaces of units and 3/8 inch on unformed surfaces.

E. Cure Units as Follows:
1. Cure units in enclosed, moist curing room at 95 to 100 percent relative humidity and temperature of 100 deg F for 12 hours or 70 deg F for 16 hours.
2. Keep units damp and continue curing to comply with one of the following:
   a. No fewer than five days at mean daily temperature of 70 deg F or above.
   b. No fewer than six days at mean daily temperature of 60 deg F or above.
   c. No fewer than seven days at mean daily temperature of 50 deg F or above.
   d. No fewer than eight days at mean daily temperature of 45 deg F or above.

F. Acid etch units after curing to remove cement film from surfaces to be exposed to view.

G. Color, texture, and other finish characteristics: Refer to the project's "Color Schedule". If there are no color, texture or other finish characteristics indicated, provide the product with characteristics selected by the Architect from the manufacturer's full range of available standard and premium: colors, patterns, textures, and options. Provide products with variations from the manufacturer's standard and premium characteristics, where indicated.

2.4 MORTAR MATERIALS

A. Provide mortar materials that comply with Section 04 20 00 "Unit Masonry."

2.5 ACCESSORIES

A. Anchors: Type and size indicated, fabricated from Type 304 stainless steel complying with ASTM A 276/

B. Dowels: 1/2-inch diameter round bars, fabricated from Type 304 stainless steel complying with ASTM A 276.

2.6 MORTAR MIXES

A. Comply with requirements in Section 04 20 00 "Unit Masonry" for mortar mixes.
   1. Do not use calcium chloride in mortar or grout.
   2. Use Portland cement-lime mortar unless otherwise indicated.

B. Comply with ASTM C 270, Proportion Specification.
   1. For setting mortar, use Type N.
   2. For pointing mortar, use Type N.

C. Pigmented Mortar: Use colored cement product.
   1. Application: Use pigmented mortar for exposed mortar joints.

D. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
   1. Mix to match Architect's sample.
   2. Application: Use colored-aggregate mortar for exposed mortar joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SETTING CAST STONE IN MORTAR

A. Install cast-stone units to comply with requirements in Section 04 20 00 "Unit Masonry."

B. Set cast stone as indicated on Drawings. Set units accurately in locations indicated, with edges and faces aligned according to established relationships and indicated tolerances.
   1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
   2. Coordinate installation of cast stone with installation of flashing specified in other Sections.

C. Wet joint surfaces thoroughly before applying mortar or setting in mortar.

D. Set units in full bed of mortar with full head joints unless otherwise indicated.
   1. Set units with joints 1/4 to 3/8 inch wide unless otherwise indicated.
   2. Build anchors and ties into mortar joints as units are set.
   3. Fill dowel holes and anchor slots with mortar.
   4. Fill collar joints solid, if any, as units are set.
   5. Build concealed flashing into mortar joints as units are set.
   6. Keep head joints in copings and between other units with exposed horizontal surfaces open to receive sealant.
   7. Keep joints at shelf angles open to receive sealant.

E. Rake out joints for pointing with mortar to depths of not less than 3/4 inch. Rake joints to uniform depths with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.

F. Point mortar joints by placing and compacting mortar in layers not greater than 3/8 inch. Compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.

G. Tool exposed joints slightly concave when thumbprint hard. Use a smooth plastic jointer larger than joint thickness.

H. Where indicated rake out joints for pointing with sealant to depths of not less than 3/4 inch. Scrub faces of units to remove excess mortar as joints are raked.

I. Where indicated, point joints with sealant to comply with applicable requirements in Section 07 92 00 "Joint Sealants."
   1. Prime cast-stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant unless otherwise indicated.

J. Provide sealant joints at head joints of copings and other horizontal surfaces; at expansion, control, and pressure-relieving joints; and at locations indicated.
   1. Keep joints free of mortar and other rigid materials.
   2. Build in compressible foam-plastic joint fillers where indicated.
   3. Form joint of width indicated, but not less than 3/8 inch.
   4. Prime cast-stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant unless otherwise indicated.
   5. Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in Section 07 92 00 "Joint Sealants."

3.3 INSTALLATION TOLERANCES

A. Variation from Plumb: Do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.

B. Variation from Level: Do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.

C. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches or one-fourth of nominal joint width, whichever is less.

D. Variation in Plane between Adjacent Surfaces (Lipping): Do not vary from flush alignment with adjacent units or adjacent surfaces indicated to be flush with units by more than 1/16 inch, except where variation is due to warpage of units within tolerances specified.

3.4 ADJUSTING AND CLEANING

A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect.

B. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.

C. In-Progress Cleaning: Clean cast stone as work progresses.
   1. Remove mortar fins and smears before tooling joints.
   2. Remove excess sealant immediately, including spills, smears, and spatter.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:
   1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
   2. Test cleaning methods on sample; leave one sample uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of cast stone.
   3. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
   4. Wet surfaces with water before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
   5. Clean cast stone by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
   6. Clean cast stone with proprietary acidic cleaner applied according to manufacturer's written instructions.

END OF SECTION 04 72 00

SECTION 05 12 00 - STRUCTURAL STEEL FRAMING

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work: Furnish, fabricate, mark for erection identification, properly prepare for shipment, ship to site, and erect all structural steel indicated on the drawings, described in these specifications, or otherwise required for proper completion of work including the following:

1. Anchors, bolts, and miscellaneous fasteners.
2. Shop painting and field touch-up painting.
3. Furnishing to other trades anchorage portions and templates for items or work included in this Section.
4. Furnish and install all hangers, sleeves, rods, bars, plates, bolts, nuts, screws, anchors, brackets, welds, lugs, etc., as may be required to complete the work of the Section and to join the work of other trades.
5. Do all bracing, blocking, cutting, fitting, drilling, tapping, etc., as may be required to complete the work of this Section and to join the work of the trades.
6. Shop Drawings.
7. Grouting of base and bearing plates.
8. Laboratory and field inspection.

1.2 SECTION INCLUDES

A. Structural cast steel components including:

1. Universal Pin Connectors.
2. Diablo Bolted Splices.
3. High Strength Connectors.
4. Cast Bolted Brackets.

1.3 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 09 91 00 - Paints and Coatings

1.4 REFERENCES

A. American Institute of Steel Construction (AISC):

1. AISC 360 - Specification for Structural Steel Buildings.
2. AISC 341 - Seismic Provisions for Structural Steel Buildings.
3. AISC 358 - Prequalified Connections for Special and Intermediate Steel Moment Frames for Seismic Applications.

B. American Welding Society (AWS):

1. AWS D1.1 - Structural Welding Code - Steel.
2. AWS D1.8 - Structural Welding Code - Seismic Supplement.

C. ASTM International (ASTM):

1. ASTM A802 - Standard Practice for Steel Castings, Surface Acceptance Standards, Visual Examination.

1.5 SUBMITTALS

A. Manufacturer's Data:

1. Submit procedures' or manufacturers' specifications and installation instructions for the following products. Include Laboratory test reports and other data as required to show compliance with specified requirements:

a. Structural steel (each type), including certified copies of mill reports covering chemical and physical properties,
b. High-strength bolts including nuts and washers.
c. Non-shrink grout.

2. Submit shop drawings including complete details and schedules for fabrication, shop assembly of members and field erection. Shop Drawings shall include details of cuts, copes, connections, camber, holes, paint and other pertinent data. Indicate all welds, both shop and field, by AWS symbols, and show size, length, and type of weld. Indicate shop and field bolt lengths and type. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages. Identify details by reference to sheet and detail number on the drawings. Erection and Anchor bolt drawings should contain sufficient information such that steel erection and anchor bolt placement can be accomplished without referring to the design drawings.
3. Shop drawings may be split into smaller packages; however, each such package shall consist of a complete erection package including all associated columns, beams, bracing and equipment frames, anchor bolts, etc. In case of discrepancies between plans and specifications for buildings, the plans govern.
   Shop drawing submittal shall include:
   a. 2 Blueline sets
   b. 1 Reproducible set.
   c. One Blueline set will be retained by the architect, one blueline set will be retained by the structural engineer. One Reproducible set to be returned to the contractor.
4. Submit proof of AWS qualification of welders to architect prior to commencement of work.
5. Submit to the engineer the manufacturer's certification that the shop welding electrodes meet the requirements of the weld classification.
6. The fabricator shall be able to demonstrate by a written procedure and by actual practice a method of material application and identification, visible at least through the fit-up operation of the main structural elements of a shipping piece. The identification method shall be capable of verifying proper material application as it relates to material specification designation, heat number, and material test reports for special requirements.
7. Processing: Allow sufficient review time so that installation will not be delayed and to permit coordination with subsequent submittals. The contractor should allow a minimum of 10 working days in the engineer's office for initial shop drawing review. 10 working days should be allowed for each part of multiple submittals. Submittals larger than 100 sheets will be treated as a multiple submittal. Contractor should coordinate submittals with submittals of other trades in order to allow sufficient review time for each. Allow 10 working days to process each resubmittal.

B. Test Reports: Reports of all tests and inspections shall be forwarded to the Owner, the Architect, the Structural Engineer, and the Contractor. Reports of tests shall state whether tests and inspection conform with contract requirements.

1.6 QUALITY ASSURANCE

B. Casting Inspector Qualifications: in accordance with American Society for Nondestructive Testing, Inc. (ASNT), TC-1A, or equivalent independent qualified agency.

C. Engineer Qualifications: Professional engineer licensed in the jurisdiction of the project.

D. Manufacturer Qualifications: Specializing in structural cast steel components and having demonstrable experience in engineering, detailing, and supplying structural steel castings of a similar size as required for this project and for use in architecturally

exposed structural steel. Member of the following organizations:

1. Associate Member of the American Institute of Steel Construction.
2. Affiliate Member of the National Council of Structural Engineers Associations.
3. Associate Supplier Member of the Canadian Institute of Steel Construction.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle materials to avoid damage. Protect materials from corrosion, deterioration, and damage.

1.8 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.9 COORDINATION OF TOLERANCES BETWEEN CASTINGS AND STRUCTURAL FRAMING

A. The Steel Fabricator shall assume responsibility for the final coordination between cast steel product tolerances and the overall structural geometry, including allowances for fabrication and erection tolerances.

B. The Steel Fabricator shall notify the manufacturer of any discrepancies between the custom casting design and the overall structural geometry in a timely manner so that these discrepancies can be resolved prior to the creation of casting tooling.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Acceptable Manufacturer: CAST CONNEX, which is located at: 100 Consilium Place, Suite 311, Toronto, ON M1H 3E3; Tel: 416-806-3521; Email: info@castconnex.com; Web: www.castconnex.com

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 STRUCTURAL CAST STEEL COMPONENTS

A. Universal Pin Connectors (UPC): Provide as shown on the drawings, as manufactured by Cast Connex Corporation, including:

1. Materials shall comply with manufacturer's current published data for dimensions.
2. Connectors shall be supplied with hot-dip galvanized carbon steel pins, carbon steel spacers, and electropolished stainless steel cap plates, countersunk retaining screws, and washers.

B. Architectural Tapers (ART): Provide as shown on the drawings, as manufactured by Cast Connex Corporation, including:

1. Materials shall comply with manufacturer's current published data for dimensions.

C. Architectural Tapers (ART) and Universal Pin Connectors (UPC), where used together: Provide as shown on the drawings, as manufactured by Cast Connex Corporation, including:

1. Universal Pin Connector and Architectural Taper shall be welded by the Steel Fabricator to form the connection assembly. Strengths are governed by the Universal Pin Connector.
2. Materials shall comply with manufacturer's current published data for dimensions.
3. Universal Pin Connectors shall be supplied with hot-dip galvanized carbon steel pins, carbon steel spacers, and electropolished stainless steel cap plates, countersunk retaining screws, and washers.
4. Carbon steel spacers shall be tack welded to and coated with the gusset plate to which the connector is pin connected.

D. Diablo Bolted Splices (DBS): Provide as shown on the drawings, as manufactured by Cast Connex Corporation, including:
1. Materials shall comply with manufacturer's current published data for dimensions and connection strengths.
2. Unless otherwise noted, the Steel Fabricator shall supply cover plates to conceal the bolted portion of the splice.

E. High Strength Connectors (HSC): Provide as shown on the drawings, as manufactured by Cast Connex Corporation, including:
1. Materials shall comply with manufacturer's current published data for dimensions.
2. Meet requirements in ICC-ES ESR 3031 for Cast Connex High Strength Connectors.
3. The welded joint between the connectors and the round HSS or pipe member shall be a complete joint penetration (CJP) weld and shall comply with the requirements set forth for demand critical welds in AISC 341, AISC 360, AWS D1.1, and AWS D1.8 for welded connections in seismic-resistant applications.
4. Where High Strength Connectors are bolted to gusset plates, bolts must be pre-tensioned.

F. Cast Bolted Brackets (CBB): Provide as shown on the drawings, as manufactured by Cast Connex Corporation, including:
1. Materials shall comply with manufacturer's current published data for dimensions and shall meet the requirements set out in AISC 358 Chapter 9 for Cast Bolted Bracket Moment Connection.

G. Custom Designed Castings: Provide as shown on the drawings, as manufactured by Cast Connex Corporation, including:
1. Structural Requirements:
   a. The steel castings shall be engineered to resist the forces indicated on the structural drawings and shall have general out-and-out dimensions as shown on the structural drawings.
2. Architectural Requirements:
   a. The exterior shaping of the steel castings shall generally conform to that shown on the drawings. All edges shall be radiused and the Manufacturer may draft flat surfaces away from parting lines.
   b. Castings shall be furnished with visual inspection of exterior surfaces to confirm compliance with ASTM A802 Level 1.

H. Timber End Connectors (TEC): Provide as shown on the drawings, as manufactured by Cast Connex Corporation including:
1. Materials shall comply with manufacturer's current published data for dimensions.
2. Connection between the Timber End Connector and the timber/glulam element shall be coordinated between Cast Connex Corporation and the Timber Supplier.

PART 3 – EXECUTION

3.1 RELATED STEEL FABRICATION

A. Cast steel products are to be delivered to the shop of the Steel Fabricator and incorporated into the structural steelwork by the Steel Fabricator.

B. Base material joint preparation and cleaning:
   1. Prior to welding, steel casting surfaces for welding shall be prepared by the Steel Fabricator and shall be clean and free from paint, oil, rust, scale, slag, grease, and other foreign materials that are detrimental to welding.

C. Welds between the connectors and the attaching structural member shall be ground flush and smooth to the exterior of the connector or, if loading allows and the steel assembly incorporating the connectors will be within the building envelope, the welded joints may be prepared with a concave finish and an automotive body filler material that is compatible with the steel coating system may be used to mask the welded joint.

D. Unless otherwise noted on the drawings, cast steel products are to be coated along with and using the same coating system as applied to the attaching structural steel elements.
   1. Do not apply coatings to any stainless-steel pin accessories supplied by Cast Connex Corporation.

E. Carbon steel spacers for Universal Pin Connectors shall be tack welded to and coated with the gusset plate to which the connector is pin connected.

F. Cover plates for Diablos Bolted Splices shall be coated using the same coating system as applied to the attaching structural steel elements. Unless otherwise noted, seams shall be calked or filled with an automotive body filler material that is compatible with the steel coating system and touched up with paint.

END OF SECTION 05 12 00

SECTION 05 21 00 - STEEL JOIST FRAMING

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section specifies open web, steel joists and joist girders.

1.2 RELATED WORK

A. Structural Steel: Section 05 12 00 – Structural Steel Framing.

B. Finish Painting: Section 09 91 00 – Paints and Coatings.

1.3 DESIGN REQUIREMENTS

A. Design all elements with the latest published version of applicable Codes.

1.4 TOLERANCES

A. Deviation from a straight line between ends of any installed joist shall not exceed 10 mm in 3 m (3/8 inch in 10 feet).

1.5 REGULATORY REQUIREMENTS

A. Steel Joist Institute: Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders, (Latest Edition).

1.6 SUBMITTALS

A. Submit in accordance with Section 01 33 00, Submittal Procedures.

B. Shop and Erection Drawings: Complete.
   1. Fabrication drawings including details and schedules for the fabrication and assembly of each joist.
   2. Erection drawings showing the size and location of each joist, bridging, cross bracing, bearing details, connections, welds, bolts and bearing plates.

B. Certificates: Steel Joist Institute compliance.

C. Design Calculations: If requested by the Resident Engineer, submit complete calculations covering the design of all members and connections. Calculations must be specifically applicable to the joists supplied.

1.7 QUALITY ASSURANCE

A. Provide documentation that the joist manufacturer is a member of the Steel Joist Institute and has satisfactorily completed work of a similar scope and nature.

1.8 APPLICABLE PUBLICATIONS

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

B. American Institute of Steel Construction (AISC):
   1. Specification for Structural Steel Buildings – Allowable Stress Design and Plastic Design (Latest Edition).
   2. Load and Resistance Factor Design Specification for Structural Steel Buildings (Latest Edition).

C. American Society for Testing and Materials (ASTM):
   A307-07.....Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
   A325-09.....Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
   A490-08.....Heat-Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strengths

D. American Welding Society (AWS):
   D1.1-08.....Structural Welding Code – Steel

D. SSPC: The Society for Protective Coatings: Steel Structures Painting Manual, Volumes 1 and 2

F. Steel Joist Institute: Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders (Latest Edition).

PART 2 – PRODUCTS

2.1 OPEN WEB STEEL JOISTS

A. K-Series conforming to Steel Joist Institute standard specifications.

2.2 STEEL JOISTS AND DEEP LONGSPAN STEEL JOISTS

A. LH-Series and DLH-Series conforming to Steel Joist Institute standard specifications.

2.3 ACCESSORIES – FITTINGS

A. Accessories and fittings, including end supports and bridging, in accordance with standard Steel Joist Institute specification under which joists were designed.

B. Unfinished Threaded Fasteners: ASTM A307, Grade A, regular hexagon type, low carbon steel.

C. High-strength bolts, including nuts and washers: ASTM A325 or A490 heavy hexagon structural bolts.

2.4 BEDDING MORTAR

A. For joist ends bearing on concrete or masonry, provide bedding mortar as follows:
   1. Portland cement and sand, mixed at a ratio of 1 part cement to 3 parts sand, by volume, with enough water for placement and hydration.
   2. Non-metallic, shrinkage-resistant mortar; premixed, non-corrosive, non-staining product containing selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water reducing agents, complying with CRD-C-621.

PART 3 – EXECUTION

3.1 FABRICATION

A. Fabrication and assembly in accordance with applicable standard Steel Joist Institute specification:
   1. Make chord splices with full penetration welds capable of developing the ultimate strength in tension of the parent material. Make no allowance for the strength of back-up bars or other material incidental to welding.
   2. Provide shop-welded connection plates at panel points to receive supplemental framing.
   3. Holes in Chord Members: Provide holes in chord members where shown for securing other work to steel joists; however, deduct area of holes from the area of chord when calculating strength of member.
   4. Extended Ends: Provide extended ends on joists where shown, complying with manufacturer's standards and requirements of applicable Steel Joist Institute specifications.
   5. Ceiling Extensions: Provide ceiling extension in areas having ceilings attached directly to joist bottom chord. Provide either an extended bottom chord element or a separate unit, to suit manufacturer's standards, of sufficient strength to support ceiling construction. Extend ends to within 1/2 inch of finished wall surface unless otherwise indicated.
   6. Bridging: Provide horizontal or diagonal type bridging for joists and joist girders, complying with Steel Joist Institute specifications. Provide bridging anchors for ends of bridging lines terminating at walls or beams. Provide bridging adequate to resist the loads indicated on the Contract Documents.
   7. End Anchorage: Provide end anchorages, including bearing plates, to secure joists to adjacent construction, complying with Steel Joist Institute specifications, unless otherwise indicated. Design all end anchorages to resist a minimum net uplift of 35 pounds ps of supported area.
   8. Header Units: Provide header units to support all joists at openings in floor or roof system not framed with steel shapes.
   9. Provide supplemental steel support framing for metal deck where normal deck bearing is precluded by other framing members and minor openings.

3.2 SHOP PAINTING

A. Shop painting in accordance with applicable Steel Joist Institute standard specification.

B. Shop paint joists and accessories with a rust-inhibiting primer paint. For joists which will be finish painted, limit paint to a primer which is compatible with specified finish paint. In high humidity areas, shop paint joists with a zinc-rich primer to receive topcoats per the paint system manufacturer's recommendations.

3.3 ERECTION

A. Installation of joists in accordance with applicable Steel Joist Institute standard specification.

B. Handle joists in a manner to avoid damaging joists. Remove damaged joists from site, except when field repair is approved, and such repairs are satisfactorily made in accordance with manufacturer's recommendations.

C. Accurately set joists and end anchorage in accordance with the Steel Joist Institute standard specification. Secure joists resting on masonry or concrete bearing surfaces by welding or bolting to the steel bearing plates as indicated on the Contract Documents. Secure bridging and anchoring in place prior to application of any construction loads. Distribute any temporary loads so that carrying capacity of any joist is not exceeded. Loads shall not be applied to bridging where joist lengths are 40 feet and longer. Where joist lengths are 40 feet and longer, install a center row of bolted diagonal bridging to provide lateral stability before slackening of hoisting lines.

3.4 FIELD PAINTING

A. Clean abraded, corroded, and field welded areas and touch up with same type of paint used in shop painting.

B. Finish painting of steel surfaces is specified in Section 09 91 00 – Painting.

END OF SECTION 05 21 00

SECTION 05 31 00 - STEEL ROOF DECKING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Steel roof deck and accessories.

1.2 RELATED SECTIONS

A. Section 03 20 00 Concrete -Reinforcing.

B. Section 05 21 00 - Steel Joist Framing

C. Section 05 50 00 - Metal Fabrication

D. Section 09 91 00 - Paints and Coatings.

1.3 REFERENCES

A. ASTM A 924/A 924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

B. ASTM A 1008/A 1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

C. ISI – North America Specification for the Design of Cold-Formed Steel Structural Members.

D. AWS D1.3 – Structural Welding Code – Sheet Steel

E. SDI Code of Standard Practice - 2014

F. SDI RD - Standard for Steel Roof Deck

G. SDI RDDM - Roof Deck Design Manual

H. SDI COSP - Code of Standard Practice.

I. SDI MOC2 - Manual of Construction with Steel Deck

1.4 DESIGN / PERFORMANCE REQUIREMENTS

A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's North American Specification for the Design of Cold-Formed Steel Structural Members and SDI RDDM Roof Deck Design Manual.

B. Roof Decking:
   1. Deck shall meet the minimum design gage and yield strength specified on the drawings or meet minimum specified section properties at specified yield strength.
   2. Whenever possible, the deck shall be multi-span.

C. Factory Mutual Guide Listing: Provide steel roof deck evaluated by FM and listed in its "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.

D. Fire-Test-Response Characteristics: Where indicated, provide steel deck units that are

approved by UL, LLC and listed in the UL and ULC Fire Resistance Directories.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 31 00 – Project Management and Coordination.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Deck property information for the proposed deck units as outlined in section 5.6 of SDI COSP-2017.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Erection instructions.

C. Shop Drawings: Show location, connections, bearing on supports, methods of anchoring, attachment of accessories, adjusting plate details and the manufacturer's erection instructions and pertinent details.

D. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.

E. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Member in good standing of Steel Deck Institute (SDI).

B. Testing Agency Qualifications: An independent agency qualified according to ASTM E 329 for testing indicated.

C. Welding: Qualify procedures and personnel according to AWS D1.3, Structural Welding Code - Sheet Steel.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in compliance with SDI MOC2

B. Separate sheets and store on dry wood sleepers; slope for positive drainage. Cut plastic wrap to encourage ventilation. Protect with a waterproof covering and ventilate to avoid condensation.

1.8 SEQUENCING

A. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.

B. Coordinate installation of sound-absorbing insulation strips and non-corrosive spacers (lath when required) in the topside ribs of cellular acoustical deck as specified in Section 07 52 00 – Modified Bituminous Membrane Roofing to ensure protection of insulation strips against damage from effects of weather and other causes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: New Millennium Building Systems, which is located at: 7575 W. Jefferson Ave.; Fort Wayne, IN 46804 ; Tel: 260-969-3500; Fax: 260-868-6002; Email: request info (info@newmill.com); Web:http://www.newmill.com

B. Substitutions: Approved Equal permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 ROOF DECK

A. Steel Roof Deck - General: Fabricate deck to comply with SDI RD - Standard for Steel Roof Deck, with the minimum section properties indicated. Deck type and thickness shall be as indicated on the Drawings:
   1. Type BI Wide Rib deck is 1-1/2 inches deep and 36 inches wide with interlocking side laps.
      a. Provide with rolled-in hanger tabs.

B. Deck Materials
   1. Sheet steel for galvanized deck shall conform to ASTM A 653/A 653M Structural Steel, with a minimum yield strength of 33 ksi or other galvanized structural sheet steels or high strength low alloy steels in accordance with AISI S100, Section A2.

C. Deck Finish:
   1. Galvanized coating shall comply with A653/A653M with zinc coating as follows:

2.3 ACCESSORIES

A. Column closures, end closures, side closures and cover plates shall be the standard type provided by the deck manufacturer unless indicated otherwise on the Drawings.

B. Galvanizing Repair Paint for Roof Decks: High-zinc-dust content paint for re-galvanizing welds in galvanized steel conforming to ASTM A 780

C. Fasteners: As manufactured by Hilti, Buildex, Simpson Strong-Tie or approved equal.

D. Flexible Closure Strips.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not install roof deck until supporting construction is in place.

B. Examine support framing and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance of work of this section.

C. If supporting construction is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Locate deck bundles to prevent overloading of support members.

3.3 INSTALLATION – GENERAL

A. Install deck panels and accessories in accordance with the Contract Documents approved installation drawings and requirements of this Section.

B. Place deck panels on structural supports and adjust to final position with ends aligned. Attach firmly to the supports immediately after placement in order to form a safe working platform.

C. Cut and neatly fit deck units and accessories around openings and other work projecting through or adjacent to the decking.

D. Trades that subsequently cut unscheduled openings through the deck are responsible for reinforcing the openings.

3.4 INSTALLATION - ROOF DECK

A. Install and fasten deck and accessories in accordance with the Contract Documents, approved installation drawings and requirements of ANSI/SDI RD.

B. End Bearing: Install deck ends over supports with a minimum end bearing of 1-1/2 inches unless otherwise shown on approved installation drawings.

C. Side Closures: Fasten to supporting structure and deck in accordance with the Contract Documents, approved installation drawings and requirements of ANSI/SDI RD.

D. Ridge and valley plates, flat plates at changes of deck direction and sump pans, shall be fastened to the deck in accordance with the Contract Documents, approved installation drawings and requirements of ANSI/SDI RD.

3.5 INSPECTION AND REPAIR

A. Before roof insulation placement, the deck shall be inspected for tears, dents, or other damage that may prevent the deck from acting as a tight and substantial form. Replace decking which has been damaged or permanently deflected.

B. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint.

C. Repair Painting: Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.

3.6 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 05 31 00

SECTION 05 40 00 - COLD FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Cold-formed metal framing for the following applications:
   1. Load-bearing wall framing.
   2. Exterior non-load-bearing wall framing.
   3. Floor joist framing.
   4. Exterior soffit framing.

1.2 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrications: for masonry shelf angles and connections.

B. Section 09 22 16 - 'Non-Structural Metal Framing' for interior non-load bearing, metal-stud framing and ceiling-suspension assemblies.

C. Section 09 29 00 - Gypsum Board.

1.3 REFERENCES

A. American Concrete Institute (ACI) 318 - Building Code Requirements for Structural Concrete.

B. American Iron and Steel Institute (AISI) S200 - North American Standard for Cold-Formed Steel Framing - General Provisions.

C. ASTM International (ASTM):
   1. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
   2. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   3. ASTM A 1003/A 1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members.
   4. ASTM C 1513 - Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections.
   5. ASTM E 488 - Standard Test Methods for Strength of Anchors in Concrete Elements.
   6. ASTM E 1190 - Standard Test Methods for Strength of Power-Actuated Fasteners Installed in Structural Members.
   7. ASTM F 1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

D. ICC-ES AC70 - Acceptance Criteria for Fasteners Power-driven into Concrete, Steel and Masonry Elements.

E. SSPC - Structural Steel Painting Council.

1.4 ACTION SUBMITTALS

A. Submit under provisions of Section 01 31 00 – Project Management & Coordination

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings:

1. Include spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

D. Delegated-Design Submittal: For cold-formed steel framing structural design.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For third party manufacturing facility testing agency.

B. Welding Certificates: For each welder.

C. Manufacturing Facility Inspection Certification: For each stud and track framing product, submit current certification that manufacturing facility has been inspected by a 3rd party International Accreditation Service (IAS) accredited agency.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 5 year experience manufacturing similar products.

B. Installer Qualifications: Minimum 2 year experience installing similar products.

C. Manufacturing Facility Inspection Agency Qualifications: Qualified according to IAS Accreditation Criteria for Inspection Agencies (AC98) and has demonstrated compliance with ISO/IEC Standard 17020:2012, Conformity assessment - Requirements for the operation of various types of bodies performing inspection for testing indicated.

D. Product Tests: Mill certificates or data from a qualified independent testing agency, or in-house testing with calibrated test equipment, indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

E. Welding Qualifications: Qualify procedures and personnel according to the following:
1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

1.7 PRE-INSTALLATION MEETINGS

A. Convene minimum two weeks prior to starting work of this section.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Handling: Handle materials to avoid damage.

1.9 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.10 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Super Stud Building Products, which is located at: 2960 Woodbridge Ave,; Edison, NJ 08837; Tel: 732-662-6200; Fax: 732-548-6036; Email:request info (dallen@buysuperstud.com); Web:http://www.buysuperstud.com

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 - Quality Requirements "Quality Requirements," to design cold-formed steel framing.

B. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
   1. Design Loads: As indicated on Structural Drawings, and in accordance with Applicable Building Code.
   2. Deflection Limits: For deflection calculations, wind pressures may be reduced in accordance with International Building Code (IBC) table 1604.3, footnote f. Design framing systems to withstand design loads without deflections greater than the following:
      a. Exterior Load-Bearing and Exterior Non-Load-Bearing Wall Framing: Horizontal deflection depending upon type of cladding supported:
         1) Brick or Stone or Masonry Veneer: l/600 of wall height.
         2) Stucco or Portland Cement Plaster or Tile or Thin Brick: 1/360 of wall height.
         3) Exterior Insulation and Finish System (EIFS): 1/240 of the wall height.
         4) Aluminum composite metal (ACM) or similar metal panel systems: 1/180 of the wall height.
      b. Interior Load-Bearing Wall Framing: Horizontal deflection of 1/240 of the wall height under a horizontal load of 5 lbf/sf.
      c. Floor Joist Framing: Vertical deflection of 1/360 for live loads and l/240 for total loads of the span.
      d. Roof Rafter Framing: Vertical deflection of 1/240 of the horizontally projected span for live loads.
   3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120-degree F.
   4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live and snow load deflection of primary building structure as follows:
      a. Upward and downward movement of 1/2 inch.
   5. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

2.3 COLD-FORMED STEEL FRAMING, GENERAL

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.

B. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
   1. Grade: for 33 and 43 mil thickness: ST33H. For 54 mil and greater thickness:ST50H.
   2. Coating: ASTM A653 G60 standard. Heavier galvanizing is permitted.

C. Steel Sheet for Vertical Deflection Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:
   1. Grade: 50.
   2. Coating: G90.

2.4 LOAD-BEARING AND EXTERIOR NON-LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: 0.0329 inch (33 mil, structural 20 gauge).
   2. Flange Width: 1-5/8 inches.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and as follows:
   1. Minimum Base-Metal Thickness: 0.0329 inch.
   2. Flange Width: 1-5/8 inches.

C. Steel Box or Back-to-Back or L-Headers: Manufacturer's standard C-shapes or L-shapes used to form header beams, of web depths indicated, unpunched, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: 0.0329 inch.
   2. Flange Width: 1-5/8 inches minimum for C-shapes, and top flange width minimum 2 inches for L-shapes.
   3. Holes in header members greater than 1/4 inch are not permitted without an approved design.

D. Vertical Deflection Clips: Manufacturer's standard bypass and head-of-wall clips, capable of accommodating 1.5 inches upward and downward vertical displacement of primary structure (with total vertical movement of 3 inches) through positive mechanical attachment to stud web. Minimum deflection clip thickness: 97 mil (12 gauge).
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Super Stud Building Products, Inc.; or comparable product by one of the following:
      a. Super Stud Building Products, Inc.
      b. Simpson Strong-Tie, Inc.
      c. The Steel Network.

E. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
   1. Minimum Base-Metal Thickness: 0.0428 inch (43 mil, 18 gauge).
   2. Flange Width: 1 inch plus the design gap, or 1.5 inches, whichever is greater.

F. Drift Clips (where indicated on drawings): Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.5 FLOOR JOIST FRAMING

A. Steel Joists: Manufacturer's standard C-shaped steel joists, of web depths indicated, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: 0.0428 inch (43 mil, 18 gauge).
   2. Flange Width: 1-5/8 inches minimum.

B. Steel Joist Track: Manufacturer's standard U-shaped steel joist track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: Matching steel joists.
   2. Flange Width: 1-1/4 inches minimum.

2.6 EXTERIOR SOFFIT FRAMING

A. Exterior Soffit Framing: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: 0.0329 inch (33 mil, structural 20 gauge).
   2. Flange Width: 1-5/8 inches minimum.

2.7 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
   1. Supplementary framing.
   2. Bracing, bridging, and solid blocking.
   3. Web stiffeners.
   4. Anchor clips.
   5. End clips.
   6. Foundation clips.
   7. Gusset plates.
   8. Joist hangers and end closures.
   9. Hole reinforcing plates.
   10. Backer plates.

2.8 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.

B. Anchor Bolts: ASTM F 1554, Grade 36 minimum, threaded carbon-steel bolts, and carbon-steel nuts; and flat, hardened-steel washers; zinc coated.

C. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.

D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.

E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
   1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

F. Welding Electrodes: Comply with AWS standards.

2.9 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint must comply with one of the following: SSPC-Paint 20, MIL-P-21035B, or ASTM A 780.

B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

C. Nonmetallic, Non-shrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, Portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107/C 1107M, with fluid consistency and 30-minute working time.

D. Shims: Load bearing, high-density multi-monomer plastic, and non-leaching; or of cold-formed steel of same grade and coating as framing members supported by shims.

E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.10 FABRICATI0N

A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to code-referenced American Iron and Steel Institute (AISI) specifications and standards, manufacturer's written instructions, and requirements in this Section.
   1. Fabricate framing assemblies using jigs or templates.
   2. Cut framing members by sawing or shearing; do not torch cut.
   3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
      a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
      b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by no fewer than three exposed screw threads.
   4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
   1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
   2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Before sprayed fire-resistive materials are applied, attach continuous angles, Z-Furring, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-

resistive materials below that are required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

C. Install load bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch to ensure a uniform bearing surface on supporting concrete or masonry construction.

D. Install sealer gaskets at the underside of wall bottom track or rim track at the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed steel framing according to ASTM C1007 and to manufacturer's written instructions unless more stringent requirements are indicated.

C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.

D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
1. Cut framing members by sawing or shearing; do not torch cut.
2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.

E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.

H. Install insulation, specified in Section 07 21 00 - Building Insulation in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

I. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.4 JOIST INSTALLATION

A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to

supporting structure at corners, ends, and spacings indicated on Shop Drawings.

B. Install joists bearing on supporting frame, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track, or use end stiffeners for joist/track connection where attachment to one flange is not accessible.
   1. Install joists over supporting frame with a minimum end bearing of 1-1/2 inches.
   2. Reinforce ends and bearing points of joists with web stiffeners, end clips, joist hangers, steel clip angles, or steel-stud sections as indicated on Shop Drawings.

C. Space joists not more than 2 inches from abutting walls. Joist spacing shall be as indicated on approved shop drawings, but not more than 24 inches.

D. Frame openings with built-up joist headers consisting of joist and joist track, or another combination of connected joists if indicated.

E. At bearing walls and interior supports, provide web stiffeners and solid blocking as required or indicated on Shop Drawings, to transfer both vertical and lateral forces from walls above.

F. Install bridging at intervals indicated on Shop Drawings. Fasten bridging at each joist intersection as follows:
   1. Bridging: Joist-track or proprietary solid blocking of width and thickness indicated, secured to joist webs.
   2. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated, and joist-track or proprietary solid blocking of width and thickness indicated. Fasten flat straps to bottom flange of joists and secure solid blocking to joist webs. At bridging line, install solid blocking at each end of bridging straps, and at a maximum spacing of 120 inches on center.

G. Secure joists to load-bearing interior walls to prevent lateral movement of bottom flange.

H. Install miscellaneous joist framing anxd connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.

3.5 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 40 00

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Hidden countertop supports for knee and pony wall applications.

B. Hidden countertop supports for kitchen islands.

1.2 RELATED SECTIONS

A. Section 05 40 00 – Cold-Formed Metal Framing

1.3 REFERENCES

A. ASTM International (ASTM):
   1. ASTM A36 - Standard Specification for Carbon Structural Steel

1.4 SUBMITTALS

A. Submit under provisions of Section 01 31 00 – Project Management & Coordination.

B. Product Data:
   1. Manufacturer's data sheets on each product to be used.
   2. Preparation instructions and recommendations.
   3. Typical installation methods.

C. Verification Samples: Two representative units of each type, size, pattern, and color.

D. Shop Drawings: Include details of materials, construction, and finish. Include relationship with adjacent construction.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.

B. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store and handle in strict compliance with manufacturer's written instructions and recommendations.

B. Protect from damage due to weather, excessive temperature, and construction operations.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.8 WARRANTY

A. Manufacturer's standard limited warranty unless indicated otherwise.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Centerline Brackets, which is located at: 208 W Davis Industrial Dr.; St. Augustine, FL 32084; Toll Free Tel: 888-960-3854; Tel: 904-217-4186; Fax: 904-429-9450; Email: request info (kcromer@centerlinesteel.com); Web: https://www.countertopbracket.com/Default.asp

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 HIDDEN COUNTERTOP SUPPORTS FOR KNEE AND PONY WALL APPLICATIONS

A. Standard Granite Countertop Support Bracket: Designed to hold a great deal of weight. Mounts into a 1/2 inch deep by 2-1/2-inch-wide channel and affixed with No. 12 wood screws shipped with the product.
   1. Material: ASTM A36 Hot Rolled 1/2 x 2-1/2 inch steel.
   2. Professionally mill finished.
   3. Leading Edge: 35 degree beveled "Safe Edge."
   4. Mounting Points: 4 countersunk holes with No. 12 wood screws included with product
   5. Finish: Textured TGIC weather resistant powder coat suitable for interior or exterior applications.
      a. Color: Black.
      b. Color: White.
   6. Model CSP-0003-12. Length: 12.00.

B. Standard Plus Countertop Support Bracket: Hidden from view, creates a perfect floating countertop effect without large and unattractive corbels to knock your knees on
   1. Material: ASTM A36 Hot Rolled 1/2 x 2-1/2-inch steel.
      a. End Plate: ASTM A36 1/4 x 1-1/2 x 2-1/2-inch steel.
   2. Professionally mill finished, welded assembly.
   3. Leading Edge: 35 degree beveled "Safe Edge."
   4. Mounting Points: 5 countersunk holes with No. 12 wood screws included with product. Four holes in the bracket and one in the rear flange.
   5. Finish: Textured, TGIC weather resistant powder coat suitable for interior or exterior applications.
      a. Color: Black.
   6. Model CSA-0008-12. Length: 12.00.
   7. The Forward L Countertop Support is a versatile bracket. It is also used in countertop island support applications. Most commercial cabinetry is made of particle board and is not suitable for directly attaching a bracket, corbel or other load bearing support. This means the inside - top - back wall of the cabinet will need to be reinforced or "gusseted" with a 2 x 4. To attach the gusset we typically use Liquid Nail as an adhesive and clamp the 2 x 4 in place until the adhesive dries. For more detailed instruction please see our installation guide for this countertop support bracket. Delete if not required.

2.3 HIDDEN COUNTERTOP SUPPORTS FOR KITCHEN ISLANDS

A. A solid 1/2 inch by 2-1/2-inch steel bar that runs through the base cabinet and extends to the length of the overhang minus a couple of inches to keep the countertop support hidden from view. The countertop support has a 1/2 inch x 4 inch flange on the back that mounts via two screws (the screws are provided with the countertop support) to the inside of the cabinet face frame. The flange is short, hidden from view and does not interfere with the operation of the drawers. The countertop support then runs through the cabinet and rests in a 1/2 x 2 1/2-inch notch in the back side of the cabinet.

B. Before the countertop is mounted, we suggest that the installer apply a bead of "Liquid Nail" on the top of the countertop support.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly constructed and prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions approved submittals and in proper relationship with adjacent construction.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

B. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.

3.5 CLEANING AND PROTECTION

A. Clean products in accordance with the manufacturer’s recommendations.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 05 50 00

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Wood blocking, cants, wall backing and nailers.
   2. Plywood backing panels.

B. Related Requirements:
   1. Section 06 16 00 "Structural Sheathing Weather Barriers"
   2. Section 09 22 16 “Non Structural Metal Framing” for typical locations where wood blocking is required in steel frame construction.

1.3 DEFINITIONS

A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension. Plywood is laminated “board” lumber.

B. Dimension Lumber: Lumber of 2 inches nominal size or greater but less than 5 inches nominal size in least dimension.

C. Exposed Framing: Framing not concealed by other construction.

D. OSB: Oriented strand board.

E. ALSC: American Lumber Standard Committee

F. ICC-ES: International Code Council Evaluation Service

G. AWPA: American Wood Protection Association

H. NLGA: National Lumber Grades Authority

I. SPIB: Southern Pine Inspection Bureau

J. WCLIB: West Coast Lumber Inspection Bureau

K. NELMA: Northeastern Lumber Manufacturers Association

L. AF&PA: American Forest & Paper Association

M. Timber: Lumber of 5 inches nominal size or greater in least dimension.

N. TX-CHPS (CHPS for short, within the context of this project): TEXAS - COLLABORATIVE FOR HIGH PERFORMANCE SCHOOLS - 2015.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
   1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
   2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
   3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
   4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
   5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

B. CHPS Submittals (for plywood backing panels within the building envelope):
   1. Product Data for CHPS Credits EQ7.0 “Low Emitting Materials” for Composite Wood and Credit EQ7.1.3 “Additional Low Emitting Materials” for Composite Wood and Agrifiber Products showing compliance with CHPS. Submittals shall document compliance with requirements of the California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM) to Reduce Formaldehyde Emissions from Composite Wood Products (Sections 93120-93120.12, Title 17, California Code of Regulations). Conformance of no-added formaldehyde (NAF) under this option shall be demonstrated by formaldehyde emission test results and chain-of-custody documentation as required by the ATCM, or equivalent.
      a. For NAF plywood, submit printed statement of VOC content, data indicating no-added formaldehyde adhesives are exclusively used and chain-of-custody documentation.
   2. Product Data for CHPS Credit MW5.1 Single Attribute – Certified Wood showing compliance with CHPS. At least 50 percent of wood base materials shall be certified in accordance with the Forest Stewardship Council (FSC) or for floor products the NWFA Responsible Procurement Program (RPP) may be used in lieu of FSC certification.
   3. Refer to Division 1 section “CHPS REQUIREMENTS” for full requirements.

1.5 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

B. Evaluation Reports: For the following, from ICC-ES:
   1. Wood-preservative-treated wood.
   2. Fire-retardant-treated wood.
   3. Engineered wood products.
   4. Shear panels.
   5. Power-driven fasteners.
   6. Post-installed anchors.
   7. Metal framing anchors.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.7 DELIVERY, STORAGE AND HANDLING

A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

B. CHPS Requirements
   1. Mold Prevention (EQ5.2) - Building materials, especially gypsum wallboard, wood, porous insulation, paper, and fabric, should be kept dry to prevent the growth of mold and bacteria. Cover these materials to prevent rain damage, and if resting on the ground, use spacers to allow air to circulate between the ground and the materials. Water damaged materials shall be dried within 24 hours. Due to the possibility of mold and bacterial growth, materials susceptible to moisture that are damp or wet for more than 24 hours must be discarded. Immediately remove materials showing signs of mold and mildew, including any with moisture stains, from the site and properly dispose of them. Replace moldy materials with new, undamaged materials.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
   1. Factory mark each piece of lumber with grade stamp of grading agency.
   2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
   3. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 19 percent for 2-inch nominal thickness or less unless otherwise indicated.

C. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
   1. Allowable design stresses, as published by manufacturer, shall meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
   1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no

arsenic or chromium.

2. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece omit marking and provide certificates of treatment compliance issued by inspection agency.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, and similar concealed members in contact with masonry or concrete.
3. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
4. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Treatment shall not promote corrosion of metal fasteners.
2. Exterior Type: Treated materials shall comply with requirements specified above for fire- retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.

C. Kiln-dry lumber after treatment to maximum moisture content of 19 percent. Kiln-dry plywood after treatment to maximum moisture content of 15 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.

E. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not bleed through, contain colorants, or otherwise adversely affect finishes.

F. Application: Treat items indicated on Drawings, and the following:

1. Framing for raised platforms.
2. Framing for stages.

3. Roof construction.
4. Plywood backing panels.
5. Plywood Sheathing.
6. Everywhere except blocking, cants, and nailers.

2.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
   1. Blocking.
   2. Nailers.
   3. Cants.
   4. Interior wall backing, in sizes required to fit between studs:
      a. Basis-of-Design: Danback (fire treated wall backing) www.danback.com, distribut- ed by Dietrich Metal Framing 800-873-2604 www.dietrichindustries.com

B. Dimension Lumber Items: Standard, Stud, or No. 3 grade lumber of any of the following species:
   1. Hem-fir (north); NLGA.
   2. Mixed southern pine or southern pine; SPIB.
   3. Spruce-pine-fir; NLGA.
   4. Western woods; WCLIB or WWPA.
   5. Eastern softwoods; NeLMA.

C. Concealed Boards: 19 percent maximum moisture content and any of the following species and grades:
   1. Mixed southern pine or southern pine; No. 2 grade; SPIB.
   2. Hem-fir or hem-fir (north); Construction or No. 2 Common or No. 3 Common grade; NLGA, WCLIB, or WWPA.
   3. Spruce-pine-fir (south) or spruce-pine-fir; Construction or No. 2 Common or No. 3 Common grade; NeLMA, NLGA, WCLIB, or WWPA.

D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.5 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: Plywood, DOC PS 1, Exposure 1, B, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.6 FIBERBOARD SHEET FLOORING

A. Fiberboard Sheet: Masonite Corporation: “Industrial Board”; Thickness: not less than 1/4 inch.

2.7 FASTENERS

A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

D. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 and/or ICC-ES AC58 as appropriate for the substrate (masonry).
1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

E. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 and/or ICC-ES AC308 as appropriate for the substrate (concrete).
1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

F. Wood Screws: ASME B18.6.1.

G. Lag Bolts: ASME B18.2.1. (ASME B18.2.3.8M).

H. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

2.8 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1- inch nominal thickness, compressible to 1/32 inch; selected from manufacturer's standard widths to suit width of sill members indicated.

B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch for use as a separator between preservative-treated wood and metals.

C. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2- propynyl butyl carbamate, combined with an insecticide containing chlorpyrifos as its active ingredient. For use only at exposed ends of posts and beams.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate nailers, backers, blocking, and similar supports to comply with requirements for attaching other construction.

B. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.

C. Do not splice structural members between supports unless otherwise indicated.

D. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
   1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches O.C.

E. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

F. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
   1. Use inorganic boron for items that are continuously protected from liquid water.
   2. Use copper naphthenate for items not continuously protected from liquid water.

G. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

H. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
   1. Table 2304.10.1, "Fastening Schedule," in ICC's International Building Code (IBC).
   2. ICC-ES evaluation report for fastener.

I. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Predrill to avoid splitting. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 WOOD BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 FIBERBOARD SHEET FLOORING INSTALLATION

A. Install 4’-0” square panels. Do not install panels less than 2’-0” in dimension.
   1. Provide 2’-0” offset at adjacent panels. Space panels 1/8 inch apart at edges and ends.
   2. Offset fiberboard panel joints from underlayment joints.
   3. Secure to underlayment with flat head wood screws 16 inches maximum O.C.E.W. Recess screw heads slightly (1/32 inch) below face of fiberboard.
   4. Provide perimeter edge treatment and transitions as indicated.
   5. Paint finished floor surface with a minimum of two coats of Black Stage Paint, or more

coats until floor appearance is consistently black**.**

B. Prior to installation over existing flooring, correct deficiencies in existing flooring.
   1. Patch or fill holes and other surface irregularities. Replace finish flooring members where patching or repair does not provide a suitable substrate for new fiberboard panels.
   2. Correct separations of existing flooring from subflooring.
   3. Repair or replace supporting members evidencing excessive deflection or other structural integrity issues.
   4. Review condition of existing flooring with Architect prior to start of remedial activities and prior to installation of new fiberboard panels.

3.4 PROTECTION AND MOISTURE REMEDIATION

A. Protect installed wood from the elements (water, humidity, dust, wind) and construction activities. Replace wood which is damaged due to weather or other construction site activities. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06 10 00

SECTION 06 10 53 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Wood blocking and Nailers.
2. Plywood backing panels.

1.3 DEFINITIONS

A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.

B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
1. NeLMA: Northeastern Lumber Manufacturers' Association.
2. NHLA: National Hardwood Lumber Association.
3. NLGA: National Lumber Grades Authority.
4. SPIB: The Southern Pine Inspection Bureau.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

1.5 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For the following, from ICC-ES:
1. Preservative-treated wood.
2. Fire-retardant-treated wood.
3. Power-driven fasteners.
4. Powder-actuated fasteners.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
   1. Factory mark each piece of lumber with grade stamp of grading agency.
   2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
   3. Provide dressed lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.
   1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plate type applications.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:
   1. Wood cants, Nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
   2. Wood sills, sleepers, blocking, stripping, and similar concealed members in contact with masonry or concrete.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Treatment shall not promote corrosion of metal fasteners.
2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.

C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

E. Application: Treat items indicated on Drawings, and the following:
1. Concealed blocking.
2. Wood cants, Nailers, curbs, equipment support bases, blocking, and similar members in connection with roofing.
3. Plywood backing panels.

2.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
1. Blocking.
2. Nailers.

B. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:
1. Mixed southern pine, No. 3 grade; SPIB.
2. Hem-fir or hem-fir (north), Standard or No. 3 Common grade; NLGA, WCLIB, or WWPA.
3. Spruce-pine-fir (south) or spruce-pine-fir, Standard or No. 3 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
4. Eastern softwoods, No. 3 Common grade; NELMA.
5. Northern species, No. 3 Common grade; NLGA.
6. Western woods, Standard or No. 3 Common grade; WCLIB or WWPA.

C. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

D. For blocking and Nailers used for attachment of other construction, select, and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

2.5 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: DOC PS 1, Exterior, C-C Plugged, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
   1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or of Type 304 stainless steel. B. Nails, Brads, and Staples: ASTM F 1667.

B. Power-Driven Fasteners: NES NER-272.

C. Wood Screws: ASME B18.6.1.

D. Screws for Fastening to Metal Framing: ASTM C 1002 or ASTM C 954, length as recommended by screw manufacturer for material being fastened.

E. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M)

F. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
   1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
   2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or A4).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate Nailers, blocking, and similar supports to comply with requirements for attaching other construction.

B. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

C. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

D. Install plywood backing panels by fastening to masonry or studs; coordinate locations with utilities requiring backing panels.

E. Do not splice structural members between supports unless otherwise indicated.

F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

G. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches O.C. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.

H. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

I. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative treated lumber.
1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

J. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

K. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 WOOD

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.3 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06 10 53

SECTION 06 16 00 - STRUCTURAL SHEATHING WEATHER BARRIERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Structural sheathing draft stop water resistive barrier.

B. Structural weather barriers.

C. Sheathing tape.

1.2 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry

B. Section 07 11 13 – Bituminous Damp-Proofing

C. Section 07 25 00 - Weather Barriers

1.3 REFERENCES

A. American National Standards Institute (ANSI):
   1. ANSI/AWC Wind And Seismic - Special Design Provisions for Wind and Seismic (SDPWS).

B. American Society of Civil Engineers (ASCE):
   1. ASCE/SEI 7 - Minimum Design Loads for Buildings and Other Structures.

C. American Wood Council (AWC).

D. ASTM International (ASTM):
   1. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
   2. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
   3. ASTM E2126 - Standard Test Methods for Cyclic (Reversed) Load Test for Shear Resistance of Vertical Elements of the Lateral Force Resisting Systems for Buildings.
   4. ASTM E2178 - Standard Test Method for Air Permeance of Building Material.

E. International Building Code (IBC).

F. International Energy Conservation Code (IECC)

1.4 SUBMITTALS

A. Submit under provisions of Section 01 31 00 Project Management & Coordination

B. Product Data:
   1. Manufacturer's data sheets on each product to be used.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Typical installation methods.
   5. Design data.
   6. Test Reports: Provide manufacturer test reports indicating product compliance with

indicated requirements.

C. Verification Samples: Two representative units of each type, size, pattern and color.
   1. Weather Barrier Membrane: 8-1/2 x 11 inch.
   2. Each Type of Flashing Specified: 4 by 4 inches.

D. Shop Drawings: Include details of materials, construction, and finish. Include relationship with adjacent construction.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.

B. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.

C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

1.6 PRE-INSTALLATION CONFERENCE

A. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Store and handle in strict compliance with manufacturer's written instructions and recommendations.

C. Protect from damage due to weather, excessive temperature, and construction operations.

1.8 PROJECT CONDITIONS

A. Apply to surfaces free of dirt, oils, lubricants and other debris.

B. Install flexible flashing materials at temperatures above minus 10 degrees F. At temperatures below minus 10 degrees F, apply primer in accordance with flashing manufacturer recommendations, prior to installation of flashing.

1.9 WARRANTY

A. Description: Manufacturer's 10-year limited warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: National Shelter Products, Inc., which is located at: 10 W. Streetsboro St. Suite 207; Hudson, OH 44236; Toll Free Tel: 800-552-7775; Tel: 330-528-

0684; Fax: 330-528-0846; Email: request info (support@drylinewrap.com); Web: http://www.nationalshelter.com

B. Or Approved Equal.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 STRUCTURAL SHEATHING DRAFT STOP WATER RESISTIVE BARRIER

A. Basis of Design: Thermo-Sheath Green Label Structural Sheathing as manufactured and supplied by National Shelter Products.
   1. Standards Compliance:
      a. ASCE/SEI 7.
      b. ASTM E96.
      c. ASTM E330.
      d. ASTM E2126.
      e. ASTM E2178.
      f. International Building Code.
      g. International Energy Conservation Code (IECC
   2. Physical Properties:
      a. Composition: Multiple laminated plies consisting of highly water-resistant paperboard fibers adhered with a water-resistant adhesive.
      b. Water Vapor Transmission per ASTM 96: Less than 0.91 perms.
      c. Air Barrier Material Properties per ASTM E2178: Less than 0.03 perms.
      d. Nominal Thickness: 0.078 inch.
      e. Width: 48-inch.
      f. Width: 48-3/4-inch.
      g. Length: 96-inch.
      h. Length: 108-inch.
      i. Length: 120-inch.
      j. Facing: Polymer.
      k. Facing: Aluminum foil.
   3. Fastener Types:
      a. Galvanized Staples: Minimum 1 inch crown x 1-1/4-inch leg, 16 gauge galvanized staples installed with the underside of the crown flush with the surface of the sheathing.
      b. Minimum 0.120 x 1-1/4-inch galvanized roofing nail installed with the underside of the head flush with the surface of the sheathing.

2.3 STRUCTURAL WEATHER BARRIERS

A. Basis of Design: DRYline TSX Structural Weather Barriers Red Grade as manufactured and supplied by National Shelter Products.
   1. Standards Compliance:
      a. ANSI/AWC Wind and Seismic - Special Design Provisions.
      b. ASCE/SEI 7.
      c. ASTM E96.
      d. ASTM E330.
      e. ASTM E2126.
      f. ASTM E2178.
      g. Florida Building Code (FBC).
      h. International Building Code.
      i. International Energy Conservation Code (IECC).

2. Physical Properties:
    a. Composition: Proprietary wall sheathing consisting of a proprietary fibrous sheathing board laminated with a water-resistant adhesive to facers on one or both sides.
    b. Water Vapor Transmission per ASTM 96: Less than 0.455 perms.
    c. Air Barrier Material Properties per ASTM E2178: Less than 0.03 perms.
    d. Nominal Thickness: 0.108 inch.
    e. Width: 48-inch.
    f. Width: 48-3/4-inch.
    g. Length: 96-inch.
    h. Length: 108-inch.
    i. Length: 120-inch.
    j. Facing: Aluminum foil.
    k. Facing: Polyolefin film.
    l. Facing: Aluminized polyolefin.
    m. Facing: Kraft paper.
3. Fastener Types:
    a. Galvanized Staples: Minimum 15/16-inch crown x 1-1/4-inch leg, 16-gauge galvanized staples installed with the underside of the crown flush with the surface of the sheathing.
    b. Minimum 0.120 x 1-1/4-inch galvanized roofing nail installed with the underside of the head flush with the surface of the sheathing.

2.4 SHEATHING TAPE

A. Basis of Design: DRYline Sheathing Tape as manufactured and supplied by National Shelter Products.
    1. Aggressive joint sealing tape for reducing air infiltration through wall systems.
    2. Compatible with most house wraps and poly-faced sheathing materials.
    3. Roll Size: 1-7/8 inch x 55 yards.
    4. Rolls per Case: 24
    5. Cases Per Pallet: 36

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly constructed and prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions approved submittals and in proper relationship with adjacent construction.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

B. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01

3.5 CLEANING AND PROTECTION

A. Clean products in accordance with the manufacturer's recommendations.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 06 16 00

SECTION 06 40 23 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Wood cabinets.
   2. Shop finishing interior woodwork.
   3. Field refinishing of wood veneer doors.
   4. Cantilever countertop supports.

B. Related Sections include the following:
   1. Division 6 Section "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing woodwork and concealed within other construction before woodwork installation.

C. This Section does not include premanufactured casework. Refer to Division 12 Sections for premanufactured casework requirements. The Casework required to meet the Division 12 specification is distinguished from the custom millwork, specified in this section, by model numbers which correspond to predetermined cabinet designs. Refer to the plans for casework model numbers, if any. The cabinets specified in, and controlled by, this specification section are not designated by Manufacturer's model numbers, although they may be designated by the Architectural Woodwork Institute (AWI) cabinet unit design numbers. The Casework Manufacturers listed in the specification body, may bid the cabinets required in this section, subject to compliance with the indicated requirements.

D. The Casework Manufacturers listed in the specification body, may also bid the items required in this section other than the cabinets, subject to compliance with the indicated requirements.

1.3 DEFINITIONS

A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items, unless concealed within other construction before woodwork installation.

B. Balanced Construction: To achieve balanced construction panels should be absolutely symmetrical from the centerline, i.e., use materials on either side, which contract or expand, or are moisture permeable, at the same rate.

C. For the purposes of this specification and project:
   1. Thermoset Decorative Overlay (TDO): Melamine – will not be allowed on the project.
   2. High-Pressure Decorative Laminate (HPDL): Plastic Laminate other than Melamine.
   3. CLS: Thin Plastic Laminate used exclusively for cabinet liner or other "hidden from view" applications, unless otherwise indicated.

D. TX-CHPS (CHPS for short, within the context of this project): TEXAS - COLLABORATIVE FOR HIGH PERFORMANCE SCHOOLS - 2015.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated, including cabinet hardware and accessories, and finishing materials and processes.

B. Product Data: For plywood, high-pressure decorative laminate, cabinet hardware and accessories, and finishing materials and processes.

C. CHPS Submittals (for composite wood products: medium density fiberboard (MDF), particle board):
   1. Product Data for CHPS Credits EQ7.0 “Low Emitting Materials” for Composite Wood and Credit EQ7.1.3 “Additional Low Emitting Materials” for Composite Wood and Agrifiber Products showing compliance with CHPS. Submittals shall document compliance with requirements of the California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM) to Reduce Formaldehyde Emissions from Composite Wood Products (Sections 93120-93120.12, Title 17, California Code of Regulations). Conformance of no-added formaldehyde (NAF) under this option shall be demonstrated by formaldehyde emission test results and chain-of-custody documentation as required by the ATCM, or equivalent.
      a. For NAF plywood, submit printed statement of VOC content, data indicating no-added formaldehyde adhesives are exclusively used and chain-of-custody documentation.
   2. Product Data for CHPS Credit MW5.1 Single Attribute – Certified Wood showing compliance with CHPS. At least 50 percent of wood base materials shall be certified in accordance with the Forest Stewardship Council (FSC) or for floor products the NWFA Responsible Procurement Program (RPP) may be used in lieu of FSC certification.
   3. Refer to Division 1 section “CHPS REQUIREMENTS” for full requirements.

D. Shop Drawings: Comply with AWS Section 1 – Submittals, and, in addition, the following:
   1. Submit one copy of Shop Drawings to AWI Quality Certification Program for review.
   2. Shop Drawings to display AWS certified compliance label on first page.
   3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
   4. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, and other items installed in architectural woodwork.
   5. Show shelf to cabinet joint details of bottom, intermediate, and top fixed shelves.

E. Samples for Verification: Comply with AWS Section 1 – Submittals, and, in addition, the following:
   1. Lumber with or for transparent finish: 3 individual samples, each 12 by 12 inches, for each species and cut, finished on 1 side and 1 edge.
   2. Wood-veneer-faced panel products with or for transparent finish: 12 by 12 inches, for each species and cut. Include at least one face-veneer seam and finish as specified.
   3. Corner pieces as follows:
      a. Cabinet front frame joints between stiles and rail, as well as exposed end pieces, 18 inches high by 18 inches wide by 6 inches deep.
      b. Miter joints for standing trim.

F. Product Certificates: Signed by manufacturers of woodwork certifying that products furnished comply with requirements.

G. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names, and addresses of architects and owners, and other information specified.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed architectural woodwork similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Fabricator Qualifications: A firm experienced in producing architectural woodwork similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production and installation of interior architectural woodwork.

D. Quality Standard: Unless otherwise indicated, comply with Architectural Woodwork Institute, Architectural Woodwork Manufacturers Association of Canada, Woodwork Institute "Architectural Woodwork Standards" (AWS) for grades of interior architectural woodwork, construction, finishes, and other requirements.
   1. Provide letters indicating that woodwork, including installation, complies with requirements of AWS Quality Certification Program grades specified.

1.6 DELIVERY, STORAGE AND HANDLING

A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

B. CHPS Requirements
   1. Mold Prevention (EQ5.2) - Building materials, especially gypsum wallboard, wood, porous insulation, paper, and fabric, should be kept dry to prevent the growth of mold and bacteria. Cover these materials to prevent rain damage, and if resting on the ground, use spacers to allow air to circulate between the ground and the materials. Water damaged materials shall be dried within 24 hours. Due to the possibility of mold and bacterial growth, materials susceptible to moisture that are damp or wet for more than 24 hours must be discarded. Immediately remove materials showing signs of mold and mildew, including any with moisture stains, from the site and properly dispose of them. Replace moldy materials with new, undamaged materials.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
   1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed and indicate measurements on Shop Drawings.
   2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

B. Hardware Coordination: Distribute copies of approved hardware schedule specified in Division 8 Section "Door Hardware" to fabricator of architectural woodwork; coordinate Shop Drawings and fabrication with hardware requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide materials that comply with requirements of the AWS quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.

B. Wood Species and Cut for Transparent Finish: As indicated.

C. Wood Species for Opaque Finish: For standing and running trim: any closed-grain hardwood. For other woodwork: paint- grade birch.

D. Wood Products: Comply with the following:
   1. ANSI A208.2, Grade MD.
   2. ANSI A208.1, minimum 45 lb./cu. ft, Grade M-2.
   3. Hardwood Plywood and Face Veneers: HPVA HP-1, 7-ply, minimum Veneer Core.

E. General Cabinet: Construction Requirements:
   1. Cabinet bases shall be of dimensional lumber.
   2. Frames, side panels and structural parts of the cabinets shall be of plywood and/or dimension lumber.
   3. Doors, shelves, and drawer fronts may have their substrate of particleboard and veneer core plywood. All fixed shelves shall be full shelf thickness “stop dado” joined to their supports. The full depth of the stop dado joint shall, begin no more than 1-1/2 inch from the face of the shelf and, end at the back of the shelf. The joint shall be continuous.

F. Clear Tempered Float Glass for Doors: ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality q3; manufactured by horizontal (roller hearth) process, with exposed edges seamed before tempering, 6 mm thick, unless otherwise indicated.

G. Clear Tempered Float Glass for Shelves: ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality q3; with exposed edges seamed before tempering, 6 mm thick, unless otherwise indicated.

H. High-Pressure Decorative Laminate (Plastic Laminate): NEMA LD 3, grades as indicated, or if not indicated, as required by woodwork quality standard. Use at exteriors of cabinets and at interiors of cabinets where necessary to achieve balanced panel construction.
   1. Manufacturer: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:
      a. Formica Corporation 800-367-6422 www.formica.com
      b. Lamin-Art, Inc. 800-323-7624 www.laminart.com
      c. Pionite Decorative Surfaces 800-746-6483 www.pionite.com
      d. Wilsonart International, Inc., a Division of Illinois Tool Works Inc. 800-433-

3222 www.wilsonart.com

I. Formaldehyde Emission Levels: Adhesive materials and products used in the manufacture of wood products used in woodwork products for the section shall be urea-formaldehyde free.

2.2 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 8 Section "Door Hardware." The hardware indicated establishes a “Basis-of-Design” for appearance and performance. Comparable products by other manufacturers may be allowed where the design is, solely in the opinion of the Architect, equal or better than the “Basis-of-Design”. Caution, and attention to understanding the “Basis-of-Design”, should be exercised where substitutions away from use of the “Basis-of-Design” are planned.

B. Hardware Standard: Comply with BHMA A156.9, Grade1 for all items capable of being provided at Grade 1. All hardware shall be Heavy Duty and provided with a Satin finish.

C. Cabinet Hardware:
1. Shelf Standards: 255 Series, nickel-plated, Knape & Vogt Manufacturing Company 800-253-1561 www.knapeandvogt.com
2. Shelf Brackets: 256 Series, nickel-plated, Knape & Vogt Manufacturing Company 800-253-1561 www.knapeandvogt.com
3. Casework Hinges: Five knuckle pin type double wrap around design (overlay design) (0.088 inch steel) - Finish to match cabinet pulls.
   a. Five knuckle pin type double wrap around design (0.088” steel), ANSI-BHMA standard A156.9, Grade 1. Finish to match cabinet pulls where no color is indicated in the “Color Schedule” or to be the color indicated in the “Color Schedule”. Provide with Hospital tips.
   b. Three knuckle, nickel-plated cast zinc, institutional grade hinge. ANSI-BHMA standard A156.9, Grade 1. Provide with Hospital tips.
      1) Basis-of-Design: Aximat 300 Thin Panel Hinge or Aximat Glass Door Hinge, Hafele America Company 888-437-7477 www.hafele.com/us
      2) Provide the number of hinges per door leaf that is recommended by the hinge manufacturer for the given height of the door, except at doors 2’-0” and over in height or width, provide at least 3 hinges unless more are recommended by the manufacturer. Doors need no magnetic catches with the use of these hinges.
4. Hinges (use where indicated): #314, 2 inch wide Continuous Hinge, finish to cabinet pulls, Stanley Security Solutions, Inc. 317-849-2250 www.stanleysecuritysolutions.com
5. Pulls (Heavy Duty only): #DP57B 4-5/32” Wire Pulls, 3/8 inch diameter, Stainless steel with satin finish, Doug Mockett & Company 800-523-1269 www.mockett.com/
6. Catches: Provide for use with five-knuckle hinges (not needed at specified Hafele three-knuckle hinges). If three-knuckle hinges different from those specified are used, coordinate with the hinge manufacturer to determine if the substitute hinges are self-catching. If this is the case, catches are not required. If the substitute hinges are not self-catching, the specified catches shall be provided. Provide 2 catches when height or width of door exceeds 24 inches.
   a. 918 Magnetic Catch, aluminum satin finish, Knape & Vogt Manufacturing Company 800-253-1561 www.knapeandvogt.com
   b. #710300, clear coated aluminum, Stanley Security Solutions, Inc. 317-849-2250 www.stanleysecuritysolutions.com
7. Drawer Slides for Light and Medium Duty Drawers: Full extension all ball bearing 100 lbs. load rated with lever disconnect and positive out stop preventing inadvertent drawer removal.

a. 3832, Accuride International Inc. 562-903-0200 www.accuride.com

8. Drawer Slide for File Drawer and Wide Heavy Duty Drawers: Full extension all ball bearing 150 lbs. load rated with rail mount, hold-in detent, progressive movement and positive out stop preventing inadvertent drawer removal.
   a. 4032, Accuride International Inc. 562-903-0200 www.accuride.com
   b. 8500 Heavy-Duty Lateral File Slide, Knape & Vogt Manufacturing Company 800-253-1561 www.knapeandvogt.com
9. Label Holders: 704 Drawer Label Holder, 3-1/2 inch W by 1-3/4 inch H, anochrome finish, Knape & Vogt Manufacturing Company 800-253-1561 www.knapeandvogt.com
10. Locks: Surface mounting, cylinder length as required for application intended, supply with standard accessories and two keys.
    a. #6810 Million Lock, Sugatsune America, Inc. 800-562-5267 www.sugatsune.com
    b. C8178, pin tumbler, CompX National, Division of CompX Security Products 864-297-6655 www.compxnet.com
11. Grommets: XG Flip-Top Series, 3 inch, color as selected by Architect from manufacturer's full range of standard colors, Doug Mockett & Company, Inc. 800-523-1269 www.mockett.com

D. Accessory Materials:
1. Hang Rods: 770-5 Heavy Duty Round Tubing, 1 5/16 inch O.D., satin chrome finish steel; 768 Adjustable Center Hangers; 766 Flange, Knape & Vogt Manufacturing Company 800-253- 1561 www.knapeandvogt.com
2. Shelf Brackets and Standards: 180 Series Regular-Duty Brackets; 80 Series Regular-Duty Standards; size as required for shelves, Knape and Vogt Manufacturing Company 800-253- 1561 www.knapevogt.com
3. Mop Racks: Grip All, Model #WM-936, as manufactured by Walton-March, Inc., as distributed by Craine Chemical Co. 214-358-3301.
4. Peg board: 1/4" thick, tempered hardboard, S1S; size as indicated on Drawings.
5. Single Prong Coat Hooks: 572 Coat and Hat Hook, aluminum, Ives, Division of Ingersoll Rand Company 877-613-8766 www.ives.ingersollrand.com
6. Double Prong Coat Hooks: 580 Ceiling Hook, cast aluminum, Ives, Division of Ingersoll Rand Company 877-613-8766 www.ives.ingersollrand.com
7. Hook and Shelf Brackets: Model #4800, Solar Hardware Corp. 601-785-4711.
8. L-Shelf Brackets: 204 Series Reinforced L-Bracket, Knape & Vogy Manufacturing Company 800-253-1561 www.knapeandvogt.com
9. Keyboard Tray: CBERGO-TRAY 200, all ball bearing, 3/4 extension slides with angled keyboard and foam palm rest, Accuride International Inc. 562-903-0200 www.accuride.com
10. Flipper Door Slides: 123/1234 vertical cabinet doors up to 30 inch tall that retract into cabinet, Accuride International Inc. 562-903-0200 www.accurdie.com

E. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.3 INSTALLATION MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

2.4 FABRICATION GENERAL

A. Interior Woodwork Grade: AWS Grade: Custom or higher, unless otherwise indicated.

B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.

C. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
   1. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members 3/4 Inch Thick or Less: 1/16 inch.
   2. Edges of Rails and Similar Members More Than 3/4 Inch Thick: 1/8 inch.

D. Fixed Shelves: Fixed shelves shall be fastened to cabinet bodies with full-shelf thickness "Stop Dado" joints. The dado shall stop no farther than 1-1/2 inch from the edge of the vertical support. The dado shall not begin closer than 1 inch from the edge of the vertical support. The depth which the dado cut shall extend into the vertical shelf support shall be no more than half of the thickness of the vertical support. The joint shall be glued for its entire length and all the surfaces of the joint shall be fully glued with no fraction of the joint's "shelf to support" surfaces void of glue.

E. Supported Shelves Up To 36 inch Span: Adjustable and fixed shelves with end supports only, and end-to-end spans shorter than or equal to 36 inches, shall be 3/4 inch thick minimum veneer core plywood. Fixed shelves of end-to-end lengths shorter than or equal to 36 inches, with support along at least one of their long edges, shall also be 3/4 inch thick minimum.

F. Supported Shelves, 36 inch to 42 inch Span: Adjustable and fixed shelves with end supports only, and end-to-end spans between 36 inches and 42 inches, shall be 1 inch thick minimum veneer core plywood. Fixed shelves of end-to-end lengths between 36 inches and 42 inches, with support along at least one of their long edges, shall also be 1 inch thick minimum.

G. Adjustable Supports:
   1. Standards: Adjustable shelves shall be supported by recessed standards. The face of the standard shall be in-line and flush with the face of the panel into which it is installed. Other AWS accepted methods of adjustable shelf support will not be allowed, including the "surface mounted standards" method and the "multiple holes" method. Adjustable shelves shall be made adjustable by the use of metal shelf supports.

H. Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible, before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

I. Shop cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
   1. Seal edges of openings in countertops with a coat of varnish.

J. Install glass to comply with applicable requirements in Division 8 Section "Glazing" and in GANA's "Glazing Manual." For glass in wood frames, secure glass with removable stops.

K. Drawer fronts must be screwed and glued to their drawer bodies.

2.5 MANUFACTURERS FOR WOOD PRODUCTS OTHER THAN CABINETS

A. Manufacturers: Casework Manufacturers choosing to bid the non-cabinet wood work represented by this specification section shall comply with the indicated requirements, or they may exceed them, in accordance with the Architectural Woodwork Institute (AWI) requirements. Subject to compliance with requirements, the following Casework Manufacturers may bid the Work:
   1. Cabinets by Design 770.418.1200 http://216.120.237.3/~cabinets/
   2. Calmar Manufacturing Co. 563-562-3261 www.imperialwoodworking.com/calmar.html
   3. Casework Services, Inc. 800-947-9422 www.caseworkservices.com

2.6 WOOD CABINETS FOR TRANSPARENT FINISH

A. Quality Standard: Comply with AWS Section 10 – Casework.

B. AWS Grade: Custom

C. AWS Type of Cabinet Construction: Reveal overlay.

D. Wood Species and Cut for Exposed Surfaces: Red oak, plain sawn or sliced.
   1. Vertical Matching of Veneer Leaves: End match.

E. Panel Product for Exposed Surfaces: 7-ply, minimum, Hardwood Veneer Core plywood.

F. Semi exposed Surfaces: Provide surface materials indicated below:
   1. Surfaces Other Than Drawer Bodies: Match species and cut indicated for exposed surfaces.
   2. Drawer Sides and Backs: Solid-hardwood lumber, stained to match species indicated for exposed surfaces.
   3. Drawer Bottoms: Hardwood plywood.

G. Manufacturers: Casework Manufacturers bidding the work represented by this specification section shall comply with the indicated requirements, or they may exceed them, in accordance with the Architectural Woodwork Institute (AWI) requirements. Subject to compliance with requirements, the following Casework Manufacturers may bid the Work:
   1. Cabinets by Design 770.418.1200 http://216.120.237.3/~cabinets/
   2. Kewaunee Scientific Corporation 704-873-7202 www.kewaunee.com

2.7 PLASTIC LAMINATE COUNTERTOPS

A. Quality Standard: Comply with AWS Section 11 – Countertops for requirements for high-pressure decorative laminate countertops. At countertops with sinks or other plumbed fixtures or accessories, provide Marine Grade 7-ply, minimum, veneer core hardwood plywood sub top. OVERLAY PLYWOOD AND PARTICLEBOARD sub-tops are not acceptable. Unless otherwise indicated, provide one-piece integral top and splash.

B. High-Pressure Decorative Laminate Grade: HGS.

C. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
   1. Match color, pattern, and finish as indicated by manufacturer's designations for these characteristics.

D. Edges Treatment: Provide Square Rigid PVC extrusions, through color, matching the laminate in color, pattern, and texture 3/32 inch thick for full thickness of counter edge, 1/32 inch thick for

all exposed edges of splashes and other counter-related panels.

2.8 REFINISHING OF WOOD VENEER DOORS

A. Preparations for Finishing: Comply with referenced quality standard for sanding, filling, patching and similar preparations for finishing existing wood veneer doors.

2.9 COUNTERTOP SUPPORTS

A. Cantilever Countertop Supports: Mockett SWS4B 800-523-1269 www.mockett.com/

2.10 SHOP FINISHING

A. Quality Standard: Comply with AWS, unless otherwise indicated.
   1. Grade: Provide finishes of same grades as items to be finished.

B. General: Shop finish transparent finished interior architectural woodwork at fabrication shop as specified in this Section. Refer to Division 9 Section 09 90 00 "Paints & Coatings" for finishing opaque finished architectural woodwork.

C. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.
   1. Back priming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling and to end-grain surfaces. Concealed surfaces of plastic-laminate-clad woodwork do not require back priming when surfaced with plastic laminate, backing paper, or thermoset decorative overlay.

D. Transparent Finish: Comply with requirements indicated below for grade, finish system, staining, and sheen, with sheen measured on 60-degree gloss meter per ASTM D 523:
   1. AWS Finish System 5: Conversion varnish.
   2. Staining: Match approved sample for color.
   3. Wash Coat for Stained Finish at Closed-Grain Wood: Apply a vinyl wash coat before staining and finishing to woodwork made from closed-grain wood, or to any woodwork made from wood with a combination of end-grain wood and any other grain.
   4. Open Finish for Open-Grain Woods: Do not apply filler to open-grain woods.
   5. Sheen: Satin, 30-50 gloss units.
   6. Stain Finish: Semi-transparent and semi-gloss.

PART 3 - EXECUTION

3.1 PREPARATION

A. Condition woodwork to average prevailing humidity conditions in installation areas before installation.

B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packaging.

3.2 INSTALLATION

A. Quality Standard: Install woodwork to comply with AWS for the items specified in Part 2 of this Section for type of woodwork involved.

B. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches.

C. Scribe and cut woodwork to fit adjoining work and refinish cut surfaces and repair damaged finish at cuts.

D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk, and filled flush with woodwork and matching final finish if transparent finish is indicated.

E. Cabinets: Install without distortion so doors and drawers' fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
   1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
   2. Maintain veneer sequence matching of cabinets with transparent finish.
   3. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches O.C. with No. 10 wafer-head screws sized for 1 inch penetration into wood framing, blocking, or hanging strips and No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.
   4. Key cabinet (millwork) locks alike within each room and differently from room to room.
      a. Provide 4 master keys which can operate all cabinet (millwork) locks throughout the areas receiving new cabinets (millwork). Teacher's cabinet locks shall be keyed differently from the other cabinet locks in the room.

F. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop or window stool.
   1. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
   2. Secure backsplashes to countertops with concealed metal brackets at 16 inches O.C. and to walls with adhesive.
   3. Caulk space between countertop backsplash and wall with clear sealant specified in Division Section "Joint Sealants."
   4. Complete the finishing work specified in this Section to extent not completed at shop or before installation of woodwork. Fill nail holes with matching filler where exposed. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats were applied in shop.

G. Existing Wood Veneer Door Refinishing: Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean woodwork on exposed and semi exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 06 40 23

SECTION 06 41 13 – WOOD-VENEER-FACED ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Wood-veneer-faced architectural cabinets.

B. Wood furring, blocking, shims, and hanging strips for installing architectural cabinets that are not concealed within other construction.

C. Shop finishing of architectural cabinets.

D. Cabinet hardware.

1.2 RELATED SECTIONS

A. 05 50 00 – Metal Fabrications

B. 06 10 00 – Rough Carpentry

C. 06 40 23 – Interior Architectural Woodwork.

D. 07 92 00 – Joint Sealants

E. 09 29 00 – Gypsum Board

1.3 REFERENCES

A. ANSI A135.4 - American National Standard for Basic Hardboard; latest edition.

B. ANSI A208.1 - American National Standard for Particleboard; latest edition.

C. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use; latest edition.

D. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute (AWI/AWMAC/WI) - Architectural Woodwork Standards; latest edition.

E. American National Standards Institute / Builders Hardware Manufacturers Association (ANSI/BHMA)
   1. ANSI/BHMA A156.9 - Cabinet Hardware; latest edition.
   2. ANSI/BHMA A156.11 - Cabinet Locks; latest edition.

F. GSA CID A-A-1936 - Adhesive, Contact, Neoprene Rubber; Federal Specifications and Standards; latest edition.

G. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association; latest edition.

1.4 SUBMITTALS

A. See Section 01 31 00 “Project Management & Coordination” for submittal procedures.

B. Shop Drawings

1. Show details full size.
2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
3. Show locations and sizes of cutouts and holes for plumbing and electrical fixtures and devices, and other items installed in plastic-laminate-clad architectural cabinets.
4. Shoe veneer leaves with dimensions, grain direction, exposed face, and identification numbers indicating the flitch and sequence within the flitch for each leaf.
5. Apply AWI Quality Certification Program label to shop drawings.

C. Product Data: For each type of product, including panel products, finishes, and cabinet hardware and accessories.
1. Include data for fire-retardant treatment from chemical treatment manufacturer and certification from treatment plant that treated materials comply with requirements.

D. Samples:
1. For each exposed product and for each color and finish specified, including edge banding, 12”x12” min.; 2 of each type.
2. Pulls, hinges, drawer slides, shelf pins; 2 of each type.
3. Other exposed hardware; 2 of each type.

1.5 QUALITY ASSURANCE

A. Perform all work and manufacture all products in accordance with AWI/AWMAC Architectural Woodwork Standards, Premium Grade, unless other quality is indicated for specific items.

B. Cabinet manufacturer qualifications.
1. Company specializing in manufacturing the products specified in this section with minimum 5 years of experience.
2. Licensed participant in AWI Quality Certification Program or WI Certified Compliance Program.
3. Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

C. Cabinet installer qualifications.
1. Manufacturer of products.

D. Hardware manufacturer qualifications.
1. A manufacturer capable of fabricating hardware that meets or exceeds performance requirements indicated and of documenting this performance by inclusion in lists and by labels, test reports, and calculations.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect units from moisture damage.

B. Do not deliver cabinets until painting and similar operations that could damage woodwork have been completed in installation areas. If cabinets must be stored in other than installation areas, store only in areas where environmental conditions match those required by this Article.

C. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 86 deg. F and relative humidity between 25 and 55 percent during the remainder of the construction period.

1.7 VERIFICATION OF FIELD CONDITIONS

A. Field Measurements

1. Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on shop drawings.
2. Coordinate fabrication schedule with construction progress to avoid delaying the work.
3. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed, and indicate measurements on shop drawings.

B. Established Dimensions
1. Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit.
2. Coordinate construction to ensure that actual dimensions correspond to established dimensions.
3. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related work specified in other sections to ensure that cabinets can be supported and installed as indicated.

1.8 WARRANTY

A. Cabinets and shop finishes: Cabinets will be free in defects from material and workmanship under normal use to the original consumer for a period of five years from the date of Substantial Completion. If the cabinetry fails during the predetermined warranty period due to normal use, the manufacturer will repair the defect or provide replacement parts, including labor.

B. Hardware: Manufacturer agrees to replace hardware components that fail in materials or workmanship within one year from date of Substantial Completion.

C. Exclusions.
1. Abuse and normal wear and tear.
2. Colorfastness of clear finishes.
3. Variations in finish characteristics due to the use of natural wood.

PART 2 - PRODUCT

2.1 Not Used

2.2 WOOD CABINETS FOR TRANSPARENT FINISH

A. Exposed surfaces.
1. Architectural woodwork standards grade: Premium.
2. Type of construction: Frameless.
3. Door and drawer-front style: Flush overlay.
4. Wood for exposed surfaces: American red oak, select and better, quarter-sliced and plank matched.
5. Grain direction: Vertical for doors and fixed panels; Horizontal for drawer fronts as indicated otherwise on drawings.

2.3 WOOD CABINETS FOR OPAQUE FINISH

A. Exposed surfaces.
1. Architectural woodwork standards grade: Custom.
2. Type of construction: Frameless.
3. Door and drawer-front style: Flush overlay.
4. Wood for exposed lumber surfaces: Any closed-grain hardwood.
5. Panel product for exposed surfaces: Medium-density fiberboard.

2.4 WOOD MATERIALS

A. Wood products.
   1. Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
   2. Do not use plain-sawn softwood lumber with exposed, flat surfaces more than 3 inches wide.
   3. Wood moisture content: 8 to 13 percent.

B. Composite wood and agri-fiber products.
   1. Products shall be made without urea formaldehyde.
   2. MDF: ANSI A208.2, Grade 130.
   3. Particleboard: ANSI A208.1, Grade M-2.

C. Softwood plywood: DOC PS 1

D. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1

2.5 CABINET HARDWARE AND ACCESSORIES

A. Cabinet Shelf Standards and Rests: Formed steel channels and rests, cut for fitted rests spaced at 1/2 inch centers; zinc, chrome or nickel; satin finish. Use for all shelves inside cabinets.
   1. Quality standard: BHMA A156.9, Grade 1.
   2. Manufacturer, product: Knape & Vogt, KV255ZC.
   3. Substitutions: refer to Section 01 60 00.

B. Drawer and door pulls: As indicated in drawings.

C. Cabinet Locks
   1. Keyed cylinder, two keys per lock, steel with chrome finish. Keyed alike as noted on drawings.
   2. Quality standard: BHMA A156.11, Grade 1.
   3. Manufacturer, product: Timberline, Interchangeable Lock Plug System.
   4. Substitutions: none permitted.

D. Drawer Slides: Side-mounted, commercial grade, 100 lb. capacity, full extension, ball bearing.
   1. Quality standard: BHMA A156.9, Grade 1HD-100.
   2. Sized for drawer loading with paper (30 lb / cu. ft.).
   3. Manufacturers
      a. Dynaslide
      b. Accuride
      c. Substitutions: refer to Section 01 60 00.

E. Hinges: Concealed (fully mortised) type, self-closing, steel with satin chrome finish. Drawer Slides:
   1. Quality standard: BHMA A156.9, B01602, Grade 2.
   2. Manufacturers: any.

2.6 MISCELLANEOUS COMPONENTS

A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln-dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

C. Adhesives: Do not use adhesives that contain urea formaldehyde.

1. Laminate adhesive: Contact adhesive as recommended by laminate manufacturer and compatible with the specified substrate and service conditions.
2. Wood adhesive: as recommended by AWI for the materials being joined and service conditions.

D. Fasteners: as recommended by AWI or, if recommendation not provided, size and type to suit application.
1. Galvanized or chrome-plated steel in concealed locations.
2. Stainless steel or chrome-plated steel in exposed locations.
3. Furring, blocking, shims and hanging strips: softwood or hardwood lumber, kiln dried.
4. Anchors: select material, type, size and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use non-ferrous metal or hot dip galvanized anchors and inserts at inside face of exterior walls and at floors.

E. Concealed Joint Fasteners: Threaded steel.

F. Grommets: Standard plastic grommets for cut-outs, in color to match adjacent surface.

2.7 CABINET FABRICATION

A. Fabricate architectural cabinets to dimensions, profiles, and details indicated. Ease edges and corners to 1/16-inch radius unless otherwise indicated.

B. Assemble drawer systems in accordance with manufacturer's written instructions.

C. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

D. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

2.8 SHOP FINISHING

A. General: Finish architectural cabinets at manufacturer's shop as specified in this Section. Defer only final touchup, cleaning, and polishing until after installation.

B. Preparation for finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural cabinets, as applicable to each unit of work.
1. Back priming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of cabinets.

C. Transparent finish:
1. Architectural woodwork standards grade: Same as item to be finished.
2. Finish system: Conversion varnish.
3. Apply wash-coat sealer to cabinets made from closed-grain wood before staining and finishing.
4. Staining: As indicated in drawings.
5. Sheen: Flat, 15-30 gloss units measured on 60-degree gloss meter per ASTM D523.

D. Opaque Finish:

1. Architectural woodwork standards grade: Premium.
2. Finish system: Catalyzed acrylic lacquer.
3. Apply wash-coat sealer to cabinets made from closed-grain wood before staining and finishing.
4. Color: As indicated in the drawings.
5. Sheen: Flat, 15-30 gloss units measured on 60-degree gloss meter per ASTM D523.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition cabinets to average prevailing humidity conditions in installation areas for not less than 72 hours.

B. Before installing cabinets, examine shop-fabricated work for completion and complete work as required.

C. Verify adequacy of backing and support framing.

D. Verify location and sizes of utility rough-in associated with work of this section.

3.2 INSTALLATION

A. Grade: Install cabinets to comply with same grade as item to be installed.

B. Assemble cabinets and complete fabrication at Project site to the extent that it was not completed in the shop.

C. Install cabinets level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.

D. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

E. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing.

F. Cabinets: Install without distortion so doors and drawers, fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

G. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.

H. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches O.C. with No. 10 wafer-head screws sized for not less than 1-1/2-inch penetration into wood framing, blocking, or hanging strips, or No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Adjust moving or operating parts to function smoothly and correctly.

C. Clean cabinets on exposed and semi-exposed surfaces.

END OF SECTION 06 41 13

SECTION 07 11 13 - BITUMINOUS DAMP-PROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Cold-applied, emulsified-asphalt damp-proofing.

B. Related Requirements:
   1. Section 03 30 00 "Cast-in-Place Concrete" for bituminous vapor retarders.
   2. Section 07 25 00 "Weather Barriers" for waterproofing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include data substantiating that materials comply with requirements for each damp-proofing material specified. Include recommended method of application, recommended primer, number of coats, coverage or thickness, and recommended protection course.
   1. Certification by damp-proofing manufacturer that products supplied comply with local

B. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

C. Product data for each type of product specified, including data substantiating that materials comply with requirements for each damp-proofing material specified. Include recommended method of application, recommended primer, number of coats, coverage or thickness, and recommended protection course.
   1. Certification by damp-proofing Manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

1.4 FIELD CONDITIONS

A. Weather Limitations: Proceed with application only when existing and forecasted weather conditions permit damp-proofing to be performed according to manufacturers' written instructions.

B. Ventilation: Provide adequate ventilation during application of damp-proofing in enclosed spaces. Maintain ventilation until damp-proofing has cured.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Source Limitations: Obtain primary damp-proofing materials and primers from single source from single manufacturer.

B. VOC Content: Products shall comply with VOC content limits of authorities having jurisdiction unless otherwise required.

2.2 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

A. Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:

1. BASF Construction Chemicals – Building Systems (Sonneborn) 800-433-9517 www.buildingsystems.basf.com
2. The Karnak Corporation 800-526-4236 www.karnakcorp.com
3. Koppers Inc. 412- 227-2001 www.koppers.com
4. W.R. Meadows, Inc. 817-834-1969 www.wrmeadows.com

B. Any of the application methods listed below are acceptable.
1. Trowel Coats: ASTM D 1227, Type II, Class 1.
2. Fibered Brush and Spray Coats: ASTM D 1227, Type II, Class 1.
3. Brush and Spray Coats: ASTM D 1227, Type III, Class 1.

2.3 AUXILIARY MATERIALS

A. General: Furnish auxiliary materials recommended in writing by damp-proofing manufacturer for intended use and compatible with bituminous damp-proofing.

B. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended in writing by manufacturer.

C. Asphalt-Coated Glass Fabric: ASTM D 1668, Type I.

D. Patching Compound: Epoxy or latex-modified repair mortar or asbestos-free fibered mastic of type recommended in writing by damp-proofing manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions with Applicator present, for compliance with requirements for surface smoothness, surface moisture, and other conditions affecting performance of bituminous damp-proofing work.
1. Test for surface moisture according to ASTM D 4263.

B. Proceed with application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with damp proofing. Prevent damp proofing materials from entering and clogging weep holes and drains.

B. Clean substrates of projections and substances detrimental to the damp-proofing work; fill voids, seal joints, and remove bond breakers if any, as recommended in writing by prime material manufacturer.

C. Apply patching compound to patch and fill the holes, honeycombs, reveals, and other imperfections; cover with asphalt-coated glass fabric.

3.3 APPLICATION, GENERAL

A. Comply with manufacturer's written instructions for damp-proofing application, cure time between coats, and drying time before backfilling unless more stringent requirements are indicated.
   1. Apply damp-proofing to provide continuous plane of protection.
   2. Apply additional coats if recommended in writing by manufacturer or to achieve a smooth surface and uninterrupted coverage.

B. Where damp-proofing footings and foundation walls, apply from finished-grade line to top of footing; extend over top of footing and down a minimum of 6 inches over outside face of footing.
   1. Extend damp-proofing 12 inches onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.
   2. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where it is shown as "reinforced," by embedding an 8- inch-wide strip of asphalt-coated glass fabric in a heavy coat of damp proofing. Damp-proofing coat for embedding fabric is in addition to other coats required.

C. Where damp-proofing exterior face of inner wythe of exterior masonry cavity walls, lap damp-proofing at least 1/4 inch onto flashing, masonry reinforcement, veneer ties, and other items that penetrate inner wythe.
   1. Extend damp-proofing over outer face of structural members and concrete slabs that interrupt inner wythe.
   2. Lap damp-proofing at least 1/4 inch onto shelf angles supporting veneer.

D. Where damp-proofing interior face of above-grade, exterior concrete and masonry single-wythe masonry walls, continue damp-proofing through intersecting walls by keeping vertical mortar joints at intersection temporarily open or by damp proofing wall before constructing intersecting walls.

3.4 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

A. Concrete Foundations: Apply two brush or spray coats at not less than 1.5 gal./100 sq. ft. for first coat and 1 gal./100 sq. ft. for second coat, one fibered brush or spray coat at not less than 3 gal./100 sq. ft. or one trowel coat at not less than 4 gal./100 sq. ft.

B. Unparged Masonry Foundation Walls: Apply primer and two brush or spray coats at not less than 1.5 gal./100 sq. ft. for first coat and 1 gal./100 sq. ft. for second coat primer and one fibered brush or spray coat at not less than 3 gal./100 sq. ft. Or primer and one trowel coat at not less than 5 gal./100 sq. ft.

C. Unexposed Face Retaining Walls: Apply one brush or spray coat at not less than 1.25 gal./100 sq. ft.

D. Concrete Backup for Brick Veneer Assemblies, Stone Veneer Assemblies and Dimension Stone Cladding: Apply one brush or spray coat at not less than 1 gal./100 sq. ft.

E. Exterior Face of Inner Wythe of Cavity Walls: Apply primer and one brush or spray coat at not less than 1 gal./100 sq. ft.

F. Interior Face of Exterior Concrete Walls: Where above grade and indicated to be furred and finished, apply one brush or spray coat at not less than 1 gal./100 sq. ft.

G. Interior Face of Single-Wythe Exterior Masonry Walls: Where above grade and indicated to be furred and finished, apply primer and one brush or spray coat at not less than 1 gal./100 sq. ft.

3.5 CLEANING

A. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 07 11 13

SECTION 07 21 00 - BUILDING INSULATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Extruded polystyrene insulation board (XPS) Type VI.

1.2 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 04 20 00 - Unit Masonry

C. Section 07 11 13 – Bituminous Damp-proofing

D. Section 07 21 00 – Building Insulation.

E. Section 07 25 00 - Weather Barriers.

F. Section 07 52 00 – Modified Bituminous Membrane Roofing

G. Section 07 62 00 – Sheet Metal Flashing, Trim & Accessories

H. Section 07 70 00 - Roof Specialty & Accessories

I. Section 07 84 13 - Penetration Fire Stopping.

1.3 REFERENCES

A. ASTM C 578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.

B. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

C. ASTM E 2178 - Standard Test Method for Air Permeance of Building Materials.

D. CAN/ULC-S701 - Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 31 00 – Project Management & Coordination.

B. Product Data: Submit insulation manufacturer's product data, building code compliance reports or test reports and the insulation manufacturer's printed installation guidelines.
   1. Submit product literature or a letter from the insulation manufacturer indicating approval of products not manufactured by the specified insulation manufacturer.
   2. If a letter is submitted, it shall include a statement that materials are compatible with adjacent materials proposed for use.

C. Samples: Submit clearly labeled samples, 5 inches by 7 inches minimum size of each material specified.

D. Shop Drawings of Wall Assembly Mock-Up: Submit shop drawings of proposed wall assembly mock-ups showing the location of the insulation board in the wall assembly and location of all wall window and door openings, penetrations and terminations involving structures attached to the exterior wall, i.e., decks, shelf angles, roof-wall intersections, etc.

1.5 QUALITY ASSURANCE

A. Insulation Manufacturer: Obtain insulation board from a single manufacturer regularly

engaged in manufacturing the extruded polystyrene insulation board (XPS) type specified. Obtain secondary materials from a source acceptable to the primary insulation manufacturer.

B. Accredited Laboratory Testing for XPS insulation board: Laboratory accredited by International Accreditation Service Inc. (IAS), American Association for Laboratory Accreditation (A2LA), or the Standards Council of Canada (SCC).

C. Installer qualifications:
   1. Installer shall have experience with installation of insulation board; and installation shall be in accordance with insulation manufacturer's installation guidelines.
   2. Minimum 2-year experience installing similar products.

1.6 PRE-INSTALLATION MEETINGS

A. Preconstruction Meeting: Convene a minimum of two weeks prior to commencing work of this Section. Agenda shall include, at a minimum, review of wall assembly mock-up drawings, sequence of construction, coordination with substrate preparation, materials approved for use, compatibility of materials, coordination with installation of adjacent and covering materials, and details of construction. Attendance is required by representatives of related trades including covering materials, substrate materials and adjacent materials.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver insulation board to the project site in original packaging, labeled with manufacturer's information, product name, and date of manufacture, and instructions for storage.

B. Store insulation board in its original undamaged packaging or in a clean, dry, protected location and within temperature range required by insulation manufacturer. Protect stored materials from direct sunlight.

C. Handling: Handle materials to avoid damage.

1.8 PROJECT CONDITIONS

A. Temperature: Install insulation board within range of ambient and substrate temperatures recommended by the insulation manufacturer. Do not apply insulation board to a damp or wet substrate.

B. Field Conditions: Do not install insulation board in snow, rain, fog, or mist. Do not install insulation board or auxiliary materials when the temperature of substrate surfaces and surrounding air temperatures are below those recommended by the insulation and auxiliary material manufacturers.

1.9 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

B. Review requirements for sequencing of installation of the insulation board with installation of windows, doors, louvers and flashing materials to ensure a weather-tight air barrier assembly.

C. Schedule installation of exterior cladding within one month of installation of the insulation board.

1.10 WARRANTY

A. Material Warranty: Provide insulation manufacturer's warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Kingspan Insulation LLC, which is located at: 2100 River Edge Pkwy. Suite 175; Atlanta, GA 30328; Toll Free Tel: 800-241-4402; Tel: 678-589-7300; Fax: 678-589-7325; Email:request info (info@kingspaninsulation.us); Web:https://www.kingspan.com/us/en-us/about-kingspan/kingspan-insulation

B. Or Applicable Equal.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 PERFORMANCE REQUIREMENTS

A. Material Performance, Thermal Insulation: Provide extruded polystyrene insulation board (XPS) that meets the requirements of ICC-ES AC12, "Acceptance Criteria for Foam Plastic Insulation", ASTM C 578, Type IV, Type VI and Type VII, and CAN/ULC-S701, Type 4.

B. Mechanically-fastened, Air Barrier Material: Provide extruded polystyrene insulation board (XPS) with an air permeance not to exceed 0.004 cubic feet per minute per square foot under a pressure differential of 0.3 in. water (1.57 psf) when tested in accordance with ASTM E 2178 and shall meet the requirements of CCMC Technical Guide 07273, "Air Barrier Materials" and test reports from accredited testing laboratories shall be made available upon request.

C. Material Performance, Alternate Water-resistive Barrier: Provide extruded polystyrene insulation board (XPS) that meets the requirements of ICC-ES AC71, "Acceptance Criteria for Foam Plastic Sheathing Panels Used as Water- resistive Barriers“ and test reports from accredited testing laboratories shall be made available upon request.

D. Connections to Adjacent Materials: Provide connections to prevent air leakage at the following locations:
   1. Walls, including penetrations, ties and anchors;
   2. Walls, windows, curtain walls or doors;
   3. Different wall assemblies, and fixed openings within those assemblies;
   4. Wall and roof connections;
   5. Wall control and expansion joints;
   6. Wall pipe and duct penetrations; and
   7. Wall seismic and expansion joints.

2.3 EXTRUDED POLYSTYRENE INSULATION BOARD (XPS)

A. Extruded Polystyrene Insulation Board (XPS): Subject to compliance with requirements described in Section 1.2 provide one the following:
   1. Kingspan GreenGuard XPS Insulation Board CM (square edges 1/2 inch to 3 inches Type IV and 1.5 inches to 4 inches Type VI and Type VII).

2.4 AUXILIARY MATERIALS

A. Kingspan GreenGuard Standard Seam Tape and / or Custom Seam Tape.

B. Kingspan GreenGuard Butyl Flashing and / or Kingspan GreenGuard SuperStretch Butyl Flashing.

C. Adhesives, Sealants and Primers: Adhesives, sealants and primers shall be compatible with the insulation board. Adhesives, sealants and primers referenced in the Kingspan Insulation LLC TB-011 and other products approved by the insulation manufacturer shall be acceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions under which the insulation board will be applied, with installer present, for compliance with requirements. Verify that surfaces and conditions are suitable prior to commencing work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Review requirements for sequencing of installation of all wall assembly components as demonstrated in the mock-up wall assembly.

3.2 INSTALLATION - BELOW-GRADE, SLAB-ON-GRADE INSULATION

A. Place a 6-mil polyethylene vapor retarder sheet over graded, smooth dry, well tamped fill. Lap sheet a minimum of 2 inches and extend vertically up the perimeter foundation wall a minimum of 2 inches.

B. Lay insulation boards over the vapor retarder sheet, cutting to size as necessary. Adjacent insulation boards shall be installed with joints staggered. Subsequent layers of insulation board shall be installed over the lower layer with board joints staggered.

C. Use sealant to seal gaps between the insulation board and the perimeter foundation wall. Apply sealant as recommended by the sealant manufacturer.

D. Place concrete over the insulation board and allow to cure before applying loads.

3.3 INSTALLATION - BELOW-GRADE, PERIMETER FOUNDATION INSULATION

A. Install insulation board to the exterior side of masonry walls after the waterproofing membrane has cured according to the manufacturer's installation instructions. If the surface of the cured waterproofing membrane is not sufficiently tacky to hold the insulation board in place until backfilling takes place, then an adhesive shall be used to secure the insulation board to the wall. Apply adhesive to the insulation board as recommended by the adhesive manufacturer using the amount and pattern required for the application.

B. Place backfill directly in contact with the insulation board. Remove all large rocks and other debris that may damage insulation board during backfilling.

C. Do not leave insulation boards exposed above grade. If insulation board is exposed above the grade line, then it shall be covered with an exterior cladding material or foundation covering.

3.4 INSTALLATION - CAVITY WALL INSULATION

A. Install insulation board against the masonry wall using an adhesive or by friction fitting boards between masonry wall ties. When an adhesive is used, apply the adhesive using the amount and pattern recommended by the adhesive manufacturer.

B. Adjacent insulation board seams shall be staggered and all board edges shall be firmly butted together.

C. Install the exterior veneer in accordance with the manufacturer's installation instructions.

3.5 INSTALLATION - FRAMED WALLS - EXTERIOR INSULATING SHEATHING AND ALTERNATE WRB / AIR BARRIER

A. Begin by aligning the first board at a corner of the structure making sure that the bottom of the board overlaps the sill plate. When installing the insulation board as a WRB or air barrier, apply a bead of sealant along the face of the sill plate and press the insulation board into the sealant bead to form a seal.

B. Insulation boards shall be installed with the board length in the vertical direction on the wall. Vertical joints shall be located over framing members.

C. Attach the insulation board using fasteners that are appropriate for the framing type. Refer to the Kingspan Insulation LLC Insulation Installation Guide for requirements of the applicable fastener type and spacing requirements.

D. Seal all gaps, penetrations and repair damaged areas by using a silicone sealant complying with ASTM C 920, Type S, Grade NS, Class 25, or expanding spray foam complying with AAMA 812, or either Kingspan GreenGuard Seam Tape or Kingspan GreenGuard Butyl Flashing.

E. If the insulation board is intended to be used as an alternate WRB or air barrier, then tape seams using Kingspan GreenGuard Seam Tape and use Kingspan GreenGuard Butyl Flashing to seal around doors, windows and other wall penetrations. Use of other seam tape and self-adhering flashings shall approved by Kingspan Insulation LLC prior to installation.

F. Install the exterior siding or cladding in accordance with the manufacturer's installation instructions. Refer to Table R703.4 of the International Residential Code (IRC) for attachment requirements for siding materials.

3.6 INSTALLATION - EXTERIOR INSULATION FINISH SYSTEMS (EIFS)

A. Before proceeding with installation, contact the EIFS manufacturer to confirm that the insulation board is recognized for use with the specified EIFS.

B. Install the insulation board as specified for WRB installation.

C. Install the EIFS in accordance with the manufacturer's installation guidelines.

3.7 INSTALLATION - ROOF SYSTEM INSULATION

A. Examine the roof deck for suitability to receive insulation board. Verify that the substrate is dry, clean and free of foreign materials that may damage insulation or impede installation.

B. Verify that roof drains, scuppers, roof curbs, nailers, equipment supports, vents and other roof accessories are secured properly and installed in conformance with the Contract Documents and approved submittals.

C. Start of installation indicates that the installer accepts the conditions of the roof deck surfaces.

D. Do not proceed with work during inclement weather or install insulation board over wet surfaces.

E. Install only as much insulation board as can be covered by the roofing materials in the same day.

F. Install the insulation board in accordance with the manufacturer's installation guidelines for attachment, using the applicable fasteners and spacing.

G. Install the roof covering materials in accordance with the manufacturer's installation guidelines and the applicable UL LLC or FM Approvals roof system listings.

3.8 FIELD QUALITY CONTROL

A. Owner's Inspection and Testing: Cooperate with Owner's testing agency. Allow access to work areas and staging. Notify Owner's testing agency in writing of schedule for work of this section to allow sufficient time for testing and inspection. Daily inspection and testing may be required. Do not cover Work of this section until testing and inspection is accepted.

3.9 PROTECTING AND CLEANING

A. Protect insulation board from damage during installation and remainder of construction period, according to manufacturer's written instructions.
   1. Coordinate with installation of insulation board to ensure exposure periods do not exceed the manufacturer's recommendations.

END OF SECTION 07 21 00

SECTION 07 22 00 - ROOF INSULATION

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Rigid polyisocyanurate foam roof insulation.

B. Tapered polyisocyanurate foam roof insulation.

C. Perlite rigid roof insulation.

D. Tapered perlite roof insulation.

1.2 RELATED SECTIONS

A. Section 07 52 00- Modified Bituminous Membrane Roofing.

B. Section 07 60 00- Sheet Metal Work: Metal flashing.

1.3 REFERENCE STANDARDS

A. ASTM C177 - Test for Thermal Conductivity of Materials.

B. ASTM C728 - Perlite Thermal Insulation Board.

C. ASTM C1289- Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

D. ASTM 0312 - Asphalt for Use in Constructing Built-up Roof Coverings.

E. ASTM E84 - Surface Burning Characteristics of Building Materials.

F. FM OS 1-28- Design Wind Loads, Factory Mutual Research Corporation (FMRC), 2005.

G. FM OS 1-29- Roof Deck Securement and Above-Deck Roof Components, FMRC, 2005.

1.4 SUBMITTALS:

A. Procedures for Submittals: Section 01 33 00 - “Submittal Procedures “

B. Shop Drawings:
1. Indicate complete installation details of tapered insulation, including identification of each insulation block, sequence of installation, layout, roof slopes, thicknesses, crickets, and saddles.

C. Product Data:
1. Manufacturer's product data sheets for each product.
2. Installing sub-contractor shall have the highest level of certification issued by the insulation system manufacturer and furnish proof of approval for specified system prior to bidding of the Construction Contract and shall enclose said letter stating such in the envelope with the Contractor's bid.

D. Quality Control Submittals (For Information Only):

1. Certifications: Submit roof manufacturer's certification that insulation furnished is acceptable to roofing manufacturer as a component of roofing system and is eligible for roof manufacturer's system warranty.

1.5 QUALITY ASSURANCE:

A. Regulatory Requirements: Listed by Underwriter's Laboratories, Inc. (UL) for use under Class A or B roof covering.

B. Wind Uplift Requirements: Shall perform equal to or exceeding requirements of FMRC - FM OS 1-28, Design Wind Loads, 2005, Windstorm Resistance Classification 1-90.

1.6 DELIVERY, STORAGE AND HANDLING:

A. Deliver products in manufacturer's original, unopened packages, labels intact & legible.

B. Store products off ground and under cover.

C. Provide continuous protection of materials from moisture. Dispose of wet materials.

1.7 SEQUENCING/SCHEDULING

A. Comply with phasing plan specified in Section 07 52 00, or elsewhere.

B. Coordinate installation with removal of existing roofing and installation of new roofing.

PART 2 - PRODUCTS

2.1 RIGID FOAM ROOF INSULATION

A. Qualities: Rigid polyisocyanurate foam bonded to heavy duty glass fiber facers.
1. Installed Thickness: Approximately four inches (as needed to achieve targeted R-value), unless otherwise directed by Architect or indicated in drawings. Maximum thickness per layer shall be 2.7". Stagger each layer in both directions.
2. Size: 48 in. x 48 in. maximum.
3. Overall average R-Value: Not less than 25.
4. UL Rating: Class A.
5. Complies with Factory Mutual 4450 or U. L. 1256 for use directly over metal roof deck (without separate thermal barrier).

B. Standards:
1. Overall Product: ASTM C1289, Class 1, Type II.
2. Fire Hazard: ASTM E84.
3. Thermal Conductance: ASTM C177.

C. Source: Acceptable for membrane manufacturer's system warranty.

2.2 TAPERED RIGID FOAM ROOF INSULATION

A. Qualities: Same as rigid foam roof insulation board.
1. Taper: As indicated but in no case less than ¼:12 in field of roof and ½:12 in crickets and saddles.
2. Thickness: As required to achieve a minimum of R-25.

B. Standards: Same as rigid foam roof insulation board.

C. Source: As approved by membrane manufacturer for inclusion in roof system warranty.

2.3 HIGH DENSITY COVER BOARD

A. Qualities: High density roof cover board.
1. Thickness: 1/2 inch.
2. Size: 24 in. x 48 in. maximum.

B. Standard: ASTM C728.

2.4 RELATED MATERIALS

A. Asphalt: ASTM D312, Type IV EVT Steep asphalt.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Verify that other work which penetrates roof deck has been completed.

B. Verify that wood nailers are properly and securely installed.

C. Verify that nailed base sheet has been properly installed over existing deck.

D. Examine surfaces for defects, rough spots, ridges, depressions, foreign material, moisture, and unevenness, any of which could affect roof insulation or membrane performance or warranty.

E. Do not proceed until defects are corrected.

F. Do not apply insulation until roof deck is completely dry.

G. Broom-clean roof decks immediately prior to application.

3.2 APPLICATION -GENERAL

A. Install insulation with longitudinal joints continuous and end joints staggered over base sheet.

B. Neatly cut and fit insulation around penetrations and at roof perimeters.

C. At penetrations/protrusions, fill all gaps ¼-inch and larger to seal against air and water intrusion.

D. Install no more insulation at one time that can be covered with roofing on same day.

E. Install temporary water cut-offs at completion of each day's work and remove upon resumption of Work.

F. Bitumen:
1. Maximum bitumen temperature in kettle: 500 degrees F. or not to exceed FBT.
2. Bitumen temperature at time and point of application: Within 25 degrees F. of equiviscous temperature (EVT). Do not reheat bitumen.
3. Provide thermostatic controls and visible, operable thermometer at kettle. Keep

the thermometer calibrated.

3.3 APPLICATION

A. Completely cover scheduled roof decks with scheduled type of flat and tapered roof insulation board.

B. Roof Insulation Application: Base layer to be mechanically fastened. Subsequent layers (including tapered) to be hot-mopped with asphalt.
   1. Tightly butt joints between adjoining boards. Field cut and fit board at edges. Stagger joints between layers. Fill all gaps ¼-inch and larger per manufacturer's guidelines.
   2. Fully adhere roof insulation with EVT steep asphalt applied at 20 lbs. per square, in accordance with manufacturer's directions.

C. In multi-layer applications, place boards with joints staggered between layers. Butt joints tightly.

D. Fully-embed cover board in continuous layer of adhesive, staggering joints in both directions, from joints of preceding layer of insulation.

E. Install crickets and saddles and tapered insulation following detailed elevations and slopes in accordance with Shop Drawings.

F. Provide positive slope in all areas.

3.4 CLEANING

A. Remove debris and cartons from roof deck. Leave insulation clean and dry, ready to receive roofing membrane.

END OF SECTION 07 22 00

SECTION 07 25 00 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Vapor retarders.

1.2 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry.

1.3 REFERENCES

A. ASTM International (ASTM):
1. ASTM D779 - Standard Test Method for Water Resistance of Paper, Paperboard and Other Sheet Materials by the Dry Indicator Method.
2. ASTM D5034 - Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test).
3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
4. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
5. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials.
6. ASTM E2273 - Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies.

B. International Code Council (ICC):
1. ICC AC38 - Water Resistive Barriers.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 31 00 - Project Management & Coordination.

B. Product Data:
1. Manufacturer's data sheets on each product to be used.
2. Preparation instructions and recommendations.
3. Storage and handling requirements and recommendations.
4. Typical installation methods.

C. Verification Samples: Two representative units of each type, size, pattern and color.

D. Shop Drawings: Include details of materials, construction and finish. Include relationship with adjacent construction.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.

B. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.

C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

1.6 PRE-INSTALLATION CONFERENCE

A. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall

include schedule, responsibilities, critical path items and approvals.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store and handle in strict compliance with manufacturer's written instructions and recommendations.

B. Protect from damage due to weather, excessive temperature, and construction operations.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.9 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's standard limited warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Supplier: Wolf Home Products, which is located at: 20 West Market Street; York, PA 17401; ASD Toll Free: 800-388-9653; Web: www.wolfhomeproducts.com, or Approved Equal.

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 PERFORMANCE REQUIREMENTS

A. Standards Compliance:
   1. ICC AC38: ICC-ESR-3641 comply with:
      a. UV exposure: Pass.
      b. Accelerated aging: Pass.
      c. Low temperature bend/pliability: Pass.
   2. ASTM E96 for Water Vapor Transmission.
   3. ASTM E2178 for Air Permeance.

B. Water Resistance per ASTM D779: Pass 60 minutes as is and aged.

C. Tensile Strength per ASTM D5034:
   1. Machine direction: 50 pounds-force.
   2. Cross direction: 40 pounds-force.

D. Drainage Efficiency per ASTM D2273 and Oregon Residential Specialty Code Section R703.1: 98 percent.

E. Surface Burning Characteristics per ASTM E84:
   1. Flame spread: Class A.
   2. Smoke developed: Class A.

2.3 VAPOR RETARDERS

A. Basis of Design: BLOCK-IT House Wrap; as supplied by Wolf Home Products.
   1. Materials: Microporous film laminated to spun bound polypropylene fabric composed of small denier fibers, including olefin.
   2. Overall Weight per ASTM D3776: 3.24 ounce per square yard.

3. Roll Width: 10 feet.
4. Roll Length: 100 feet.

2.4 ACCESSORIES

A. Mechanical Fasteners: Cap nails or staples in accordance with vapor retarder manufacturer's written recommendations.

B. Sealing Tape: Self-adhesive acrylic seam sealing tape.

C. Flashing Tape: Flashing tape with acrylic or butyl adhesive in accordance with manufacturer's written recommendations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly constructed and prepared.

B. Verify that substrate and adjacent materials are dry and ready to receive vapor retarder.

C. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.

B. Do not install vapor retarder over saturated substrate.

C. Start at corner and install vapor retarder in shingle fashion with fabric side facing exterior.
1. Ensure vapor retarder continues beyond band joist and extends 2 inches minimum below frame to foundation intersection.
2. Fasten in place using cap nails or staples at 24 inches on center maximum.

D. Ensure fasteners are 4inches minimum away from material edges and 12 inches minimum away from top of doors and windows.

E. Ensure 6 inches minimum overlap at horizontal joint and 12 inches minimum overlap at vertical joints.

F. Install vapor retarder beyond attic and other unoccupied spaces to roofline and under trim.
1. Ensure vapor retarder integrates correctly with flashing.
2. Trim vapor retarder at intersection of wall and roof.

G. Overlap edges 24 inches minimum beyond corner if seams fall within 16 inches of exterior corner of structure.

H. Cut vapor retarder at windows, doors and other penetrations in accordance with manufacturer's written recommendations.

I. Flash around penetrations with flashing tape. Apply flashing tape to vertical edges of vapor

retarder flap in accordance with manufacturer's written recommendations.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

3.5 CLEANING AND PROTECTION

A. Clean products in accordance with the manufacturer's recommendations.

B. Touch-up, repair or replace damaged products before Substantial Completion.
   1. Repair small tears less than 6 inches long in vapor retarder with sealing tape.
   2. Repair tears longer than 6 inches by cutting flap in vapor retarder 2 inches minimum beyond bottom and sides of tear.
      a. Insert wider piece of vapor retarder under flap, shingle style and seal edges.
      b. Do not cover repairs with other work before receipt of approval from Architect.

END OF SECTION 07 25 00

SECTION 07 26 00 - VAPOR RETARDERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Reinforced vapor retarders.

B. Tape to seal joints and repair vapor retarder.

1.2 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 05 31 00 - Steel Roof Decking.

C. Section 05 40 00 - Cold-Formed Metal Framing.

D. Section 06 10 00 - Rough Carpentry.

E. Section 07 52 00 – Modified Bituminous Membrane Roofing.

1.3 REFERENCES

A. ASTM International (ASTM):
1. ASTM D 882 - Tensile Properties of Thin Plastic Sheeting.
2. ASTM D 1709 - Impact Resistance of Plastic Film by the Free-Falling Dart Method.
3. ASTM D 2582 - Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting.
4. ASTM D 3776 - Mass Per Unit Area (Weight) of Woven Fabric.
5. ASTM D 4833 - Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
6. ASTM E 84 - Surface Burning Characteristics of Building Materials.
7. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
8. ASTM E 1643 - Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
9. ASTM E 1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

B. National Fire Protection Association (NFPA): NFPA 701 - Fire Tests for Flame-Resistant Textiles and Films.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 31 00 - Project Management & Coordination.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

C. Samples: Submit manufacturer's samples of reinforced vapor retarders.

D. Verification Samples: For each product specified, two samples, minimum size 5 inches square, representing actual product.

1.5 QUALITY ASSURANCE

A. Preinstallation Meeting: Convene a preinstallation meeting two weeks before start of installation of reinforced vapor retarders. Require attendance of parties directly affecting work of this section, including Contractor, Architect, and installer. Review installation, protection, and coordination with other work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage:
   1. Store products in manufacturer's unopened packaging until ready for installation.
   2. Store materials in a clean, dry area in accordance with manufacturer's instructions.

C. Handling: Protect materials during handling and installation to prevent damage.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Acceptable Manufacturer: Griffolyn, Division of Reef Industries, Inc., which is located at: 9209 Almeda Genoa Rd.; Houston, TX 77075; Toll Free Tel: 800-231-6074; Tel: 713-507-4251; Fax: 713-507-4295; Email: request info (ri@reefindustries.com); Web: https://www.reefindustries.com

B. Substitutions: Not permitted or Approved Equal.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 REINFORCED VAPOR RETARDERS

A. Reinforced Vapor Retarder: Griffolyn Type-65 G for use under concrete slabs; complying with ASTM E 1745 Class A.
   1. Material: 4-ply laminate, combining 2 layers of high-density polyethylene and a high-strength non-woven cord grid with a layer of non-woven geotextile fiber.
   2. Weight: 73 lb/1,000 sq ft, when tested in accordance with ASTM D 3776.
   3. Puncture Propagation Tear: 55 lb, when tested in accordance with ASTM D 2582.
   4. Permeance (Perm): 0.038 grains/hr-sq ft-in Hg, when tested in accordance with ASTM E 96.
   5. Drop Dart: 2300 g, when tested in accordance with ASTM D 1709.
   6. Tensile Strength: 160 lb/1,350psi, when tested in accordance with ASTM D 882, 3-inch-wide specimen.
   7. Puncture Strength: 60 lb, when tested in accordance with ASTM D 4833.
   8. Classification: Class A, when tested in accordance with ASTM E 1745.
   9. Usable Temperature Range: Minus 25 to 170 degrees F.
   10. Application: Use under concrete slabs, over aggregate fill.
   11. Application: Use under concrete slabs, under aggregate fill.

2.3 ACCESSORIES

A. General: Ensure accessories are from same manufacturer as reinforced vapor retarders.

B. Mastic Tape: Griffolyn Fab Tape. RI Part Number: 60-0002.
   1. Description: Black, double-sided, asphaltic, pressure-sensitive, mastic tape.
   2. Weight: 3.75 pounds per 100 feet.
   3. Thickness: 35 mils.
   4. 3 Inch Seam Shear: 35 pounds.

C. Self-Adhesive Repair Tape: Griffolyn Sealant Tape RI Part Number: 60-0153.
   1. Description: Reinforced white backing with Gray Adhesive.
   2. Weight: 3.0 lbs. for 4 inch x 50 foot roll.
   3. Thickness: 26 mils.
   4. 3 inch Seam Shear: 30 lbs

D. Fire Retardant Self-Adhesive Tape: Griff Tape FR RI Part Number 60-0151.
   1. Description: White backed adhesive tape.

2. Weight: 3.75 lbs. per roll, 4 inches x 180 feet long.
3. Thickness: 5 mils.
4. Adhesion to Steel: 66 oz/in.

E. Pipe Boots: Griffolyn pipe boots, factory fabricated.

F. Batten Strips: Manufacturer's standard for required application.

G. Fasteners: Manufacturer's standard for required application.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces and areas to receive reinforced vapor retarders. Notify Architect in writing of defects of work and other unsatisfactory site conditions that would cause defective installation of vapor retarders. Do not begin installation until unacceptable conditions have been corrected.

B. Verify site dimensions.

C. Commencement of work will imply acceptance of substrate.

3.2 INSTALLATION

A. Install reinforced vapor retarders in accordance with manufacturer's instructions.

B. Install reinforced vapor retarders in accordance with manufacturer's instructions and ASTM E 1643 at concrete slabs.

C. Install vapor retarders continuously at locations as indicated on the drawings. Ensure there are no discontinuities in vapor retarder at seams and penetrations.

D. Install vapor retarders in largest practical widths.

E. Ensure surface beneath vapor retarder is smooth with no sharp projections.

F. Join sections of vapor retarder and seal penetrations in vapor retarder with mastic tape. Ensure vapor retarder surfaces to receive mastic tape are clean and dry.

G. Immediately repair holes in vapor retarder with self-adhesive repair tape.

H. Seal around pipes and other penetrations in vapor retarder with pipe boots in accordance with manufacturer's instructions.

3.3 PROTECTION

A. Protect reinforced vapor retarders from damage until covered by roof insulation.

B. Protect reinforced vapor retarders from damage until covered by wall finish.

C. Protect reinforced vapor retarders from damage during installation of reinforcing steel and utilities and during placement of granular materials or concrete slab.

D. Immediately repair damaged vapor retarder in accordance with manufacturer's instructions.

END OF SECTION 07 26 00

SECTION 07 52 00 - MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Removal of existing roof system and designated roofing related sheet metal.

B. Installation of rigid foam roof insulation over prepared metal decks.

C. Installation of cover board over rigid foam roof insulation.

C. Installation of new mop-on and torched applied SBS modified bitumen roof system with reflective cap sheet.

E. Related membrane and penetration flashing.

1.2 RELATED SECTIONS

A. Section 01 22 00 - Unit Prices

B. Section 07 52 00 – Modified Bituminous Membrane Roofing.

C. Section 07 60 00 - Sheet Metal Work

D. Section 07 71 00 - Roof Specialties

E. Section 07 72 00 - Roof Accessories

1.3 REFERENCES

A. FM 4470 – Approval Standard for Class I Roof Cover

B. ASTM C177 – Test for Thermal Conductivity of Materials

C. ASTM C1289-02 Type II, Class I, Grade 2 – Faced Rigid Cellular Polyisocyanurate Insulation

D. ASTM D41 – Asphalt Primer

E. ASTM D312 – Asphalt for Use in Constructing Built-up Roof Coverings

F. ASTM E84 – Surface Burning Characteristics of Building Materials

G. ASTM E108 – Standard Test Methods for Fire Tests of Roof Coverings

H. ASTM E1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces; 2001

I. FM 1-29 – FM Global Property Loss Prevention Data Sheet

J. FM DS1-28 – Design Wind Loads, Factory Mutual Research Corporation

K. FM 4450 – Approval Standard for Class I Insulated Steel Decks

L. U.L. 1256 – Standard for Fire Test of Roof Deck Construction

1.4 SUBMITTALS

A. Procedures for Submittals: Section 01 31 00 - Project Management & Coordination

B. Product Data: Submit latest edition of manufacturer's roofing and base flashing specifications, including list of materials proposed for use, and manufacturer's data sheets for other products. Product data submittal to include at a minimum, roofing membrane, flashing membrane assembly, adhesives, primers, sealants, component, fasteners and accessories.

C. Shop Drawings:
   1. Manufacturer's standard pre-printed details or the reproduction of architect's details will not be acceptable Shop Drawings.
   2. Indicate complete project specific installation details of roofing and flashing, including flashing details, penetration details and accessories.
   3. Include complete flashing detail for each flashing condition. Indicate flashing detail locations on roof plan.
   4. Indicate complete installation details of tapered insulation, including identification of each insulation block, sequence of installation, layout, roof slopes, thicknesses, crickets and saddles.
   5. Submit proposed fastening patterns for the field, perimeter and corners of each individual roof area in accordance with FM Global Data Sheet 1-29.

D. Samples: Submit 8 x 11 in. sample of roof membrane cap sheet with specified color.

E. Quality Control Submittals:
   1. Warranty: Submit specimen copy of roofing contractor and roofing manufacturer's roofing warranty with Product Data submittal, including evidence of application for warranty.
   2. Manufacturer's Reports:
      a. Concurrent with Shop Drawing submittal; submit roof manufacturer's review of Contract Documents, acceptance of applicator and warranty conditions.
      b. At completion of project, submit manufacturer's field quality reports of field inspections, including copy of manufacturer's final inspection punch list.
   3. Certification:
      a. If roof insulation and cover board is not manufactured by the roofing manufacturer, submit roof manufacturer’s certification that insulation furnished is acceptable to roofing manufacturer as a component of roofing system and is eligible for roof manufacturer’s system warranty.

F. Progress Schedule/Phasing Plan:
   1. Submit a complete progress schedule and phasing plan indicating complete sequence of removal and replacement of roofing for each area and phase of work.
   2. Include roof plan with layout of phasing, indicating amount of roof area included in each day's work.
   3. Indicate dates for beginning and completing each activity.
   4. Identify other related work affected by roofing work.

G. Materials Storage: Submit manufacturer’s written materials storage requirements for review.

H. Contract Closeout Submittals:
   1. Maintenance Data: Compile and submit maintenance instructions in accordance with Division 1. Include complete manufacturer's instructions for periodic inspection and maintenance of roofing system, including precautions and warnings to prevent damage and deterioration to roofing system.

I. Warranties: Contractor to provide professionally framed copies of the contractor and roofing manufacturer's warranties mounting such at the roof access point as designated by Owner.

1.5 QUALITY ASSURANCE

A. Applicator:
1. Roofing sub-contractor shall have the highest level of certification issued by the roofing system manufacturer prior to bidding of the Construction Contract and shall provide said letter stating such in along with the roofing related submittals.
2. This documentation shall demonstrate the roofing sub-contractor's experience for a minimum of 5 completed projects of similar size and type within the last 4 years.
3. The Owner reserves the right to reject any proposed roofing sub-contractor, based on the roofing sub-contractor's past performance on Dallas ISD projects. The General Contractor (Contractor), having the ultimate control of Project quality, shall ensure that the proposed roofing sub-contractor meets the Owner's experience criteria and has a positive performance record with the Owner. Should the Owner reject the proposed roofing sub-contractor, the Contractor will not receive an adjustment in the Contract Sum when procuring a roofing sub- contractor acceptable to the Owner's requirements.
4. Roofing sub-contractor shall maintain a permanent office within a reasonable distance of project site to satisfy Owner that projects can be properly serviced during warranty phase.
5. Roofing sub-contractor to submit asphalt fume control plans for equipment and proposed loading and heating procedures to limit ground level asphalt fumes for mop-on applications.

B. Regulatory Requirements: Class A fire hazard classification from a recognized independent testing laboratory.

C. Pre-Installation Conference:
1. Prior to the commencement of roofing related work, conduct a roofing related pre-installation conference at the project site.
2. Attendance: Architect, Contractor, project superintendent, roof foreman and roof manufacturer's technical representative.
3. Agenda:
a. Methods of removing existing roofing and debris and controls required preventing damage to building.
b. Maintaining water tightness of building during reroofing, including night seal procedures and temporary covering of deck openings.
c. Review of previously approved submittals.
d. Quality control.
e. Roofing details and procedures.
f. Critical work sequencing.
g. Contractor's proposed materials storage and set up locations.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's original unopened containers or packages with labels intact and legible, including required fire resistance classification labels.

B. Store rolled goods on end on clean raised platforms with weather protective covering when stored outdoors. The manufacturer's factory applied plastic wrap will not serve in, and of itself, as a weather protective covering. Manufacturer's factory applied plastic wrap shall be removed if required to prevent condensation from forming in the respective stored materials. Adhere to manufacturer's written jobsite storage requirements.

C. Provide continuous protection of materials against wetting and absorption; remove wet materials from project site. All insulation must be stored on dunnage and covered. Insulation left exposed, resting directly on the ground or roof must be immediately removed from the site. Manufacturer's factory applied plastic wrap shall not be considered weather protection. All insulation must be tarped when not in use.

D. Materials stored on roof levels for immediate use shall be:
   1. Distributed to prevent concentrated loads that would impose excessive strain on deck or structural members.
   2. Positively secured to prevent displacement by excessive wind forces.
   3. Stored in a manner that is acceptable to roofing manufacturer.

1.7 PROJECT CONDITIONS

A. Existing Conditions: Examine existing buildings and existing roofing to determine existing physical conditions that affect removal of existing roofing and installation of new roofing.

B. Environmental Requirements:
   1. Apply roofing in dry weather.
   2. Do not remove existing roofing and flashing in inclement weather or when a 25% or higher percentage of rain is forecasted by the local national weather service for the period of time that is planned for the installation of roofing on a given day.
   3. Do not apply roofing when ambient temperature is below 40 degrees F.
   4. Ensure roof deck is structurally sound and sufficiently rigid to support the live and dead load requirements of the construction traffic.

C. Protection:
   1. Provide special protection or avoid heavy traffic on completed work when ambient temperature is above 80 degrees F.
   2. Restore to original condition or replace work or materials damaged during handling of roofing materials.

D. Emergency Equipment: Maintain on-site equipment necessary to apply emergency temporary edge seal in the event of sudden storms or inclement weather.

E. Restrictions:
   1. Comply with requirements of Division 1 on work restrictions of site.
   2. The use of tobacco products on project site is prohibited.

1.8 SEQUENCING/SCHEDULING

A. Do not remove more existing roofing in one day than can be replaced with new roof membrane in the same day.

B. For each day's work, install complete roof system including flashings, penetrations and other materials required for a complete, watertight installation.

C. Coordinate removal and replacement of roofing with work of separate contractors installing work related to roof installation.

1.9 WARRANTIES:

A. Applicator: Furnish a 5-year warranty against leaks and defects in materials and workmanship.

1. Include repairs required to maintain roof and base flashing in a watertight condition and the repair of roofing deficiencies such as blisters even if such has not created a path for moisture entry into the roof system components and subject facility.
2. Make repairs at no expense to Owner.
3. Make repairs in accordance with roofing manufacturer's requirements with such roofing manufacturer inspecting such repairs and providing a letter certifying that all repairs have been properly performed with approved materials leaving all warranties in full effect.

B. Roof Manufacturer: Furnish a 20-year NDL total roof system warranty against leaks and defects in materials and workmanship.
   1. Include agreement to maintain roof and base flashing in a watertight condition for period of warranty. Warranty coverage to include:
      a. Base ply materials, fasteners and adhesives.
      b. Roof membrane components and adhesives.
      c. All accessory products required for installation of membrane roofing system, including surface mastics, coatings, stripping plies, primers, and tapered edge and cant strips.
      d. Roof insulation.
      e. Warranty shall not exclude coverage as a result of winds less than 54 m.p.h.
      f. Make repairs at no expense to Owner.
      g. Monetary liability of warranty shall not be limited.

PART 2 – PRODUCTS

2. 1 MANUFACTURER:

A. System specified for roofing is an SBS modified bitumen sheet roof system manufactured by Johns Manville and is listed as a standard of quality.

B. Other SBS systems by Siplast and Soprema are listed as acceptable substitutions for torch applied or hot a mopped systems and Derbigum is listed as acceptable substitutions for a torch applied system only. These acceptable substitution roof systems shall include modifications and other accessories required by roof system manufacturer to provide same performance and warranty as specified.

C. Products furnished for roofing system shall be products of a single manufacturer.

D. Component products listed for roofing system are product names of Johns Manville, unless otherwise specified.

E. Comply with roofing system manufacturer's recommendations for component roofing system materials not listed in this specification.
Note: Mopped base ply and cap sheet roof system is preferred but torched applied will be acceptable if the product is selected as a substitute for application. The torched applied roof system will need to provide the same 20-year NDL warranty as hop mopped application system. No "cold" application will be acceptable. No "aluminum" clad base flashings are acceptable. Also note for torch application a 4hour fire watch will be required.

2.2 ROOFING SYSTEM - OVER INSULATION

A. Qualities: Mop-on and torch applied multi-ply SBS modified bitumen roofing, consisting of an unsurfaced SBS sheet and reflective mineral surfaced SBS cap sheet, applied over cover board.

B. Roofing System Performance Requirements:

1. Solar Reflectance Index (SRI) for exposed roofing: 78, minimum, calculated in accordance with ASTM E 1980.
    a. Field applied coating may not be used to achieve specified SRI.
2. External Fire Exposure Classification: ASTM E108 Class A, UL or Warnock Hersey listed.
3. Wind Resistance Classification: Factory Mutual I-90, in accordance with FM DS 1- 28.

C. Source: Specification 2FID by Johns Manville consisting of base sheet, one layer of DynaBase and one layer of DynaFlex FR CR G is basis of design.

2.3 ROOF FLASHING MEMBRANES

A. Flashing: 2 ply system with reflective surfaced SBS cap sheet applied over a base sheet.
    1. Base Ply: Unsurfaced base ply sheet. Product: DynaBase by Johns Manville.
    2. Top Sheet: DynaFlex CR G by Johns Manville.

B. Penetration Flashing:
    1. Liquid Applied Flashing: A liquid and fabric reinforced flashing system created with a stitch bonded polyester scrim and a two-component, moisture cured, elastomeric, liquid applied flashing material, consisting of an asphalt extended urethane base material and an activator. Product: Perma-Flash System
    2. Product: Perma-Flash System by Johns Manville.

C. Joint Sealants: Refer to Section 07 92 00.

2.4 ROOF INSULATION:

A. General: Preformed roof insulation boards manufactured or approved by modified bitumen roofing manufacturer.

B. Rigid Foam Roof Insulation:
    1. Qualities: Rigid closed cell polyisocyanurate foam core bonded to heavy duty glass fiber mat facers:
        a. Thicknesses: As indicted on Drawings.
        b. Size: 48 in. x 48 in. maximum.
        c. R Value: LTTR Method.
        d. UL Rating: Class A.
        e. Complies with Factory Mutual 4450 or U.L. 1256 for use directly over metal roof deck without separate thermal barrier.
    2. Standards:
        a. Overall Product: ASTM 1289-02, Type II, Class I, Grade 3
        b. Fire Hazard: ASTM E84.
        c. Thermal Conductance: ASTM C177.

C. Tapered Rigid Foam Roof Insulation:
    1. Qualities: Same as rigid foam roof insulation board.
        a. Taper: As indicated on Drawings.
        b. Minimum Thickness: As indicated on Drawings.
    2. Standards: Same as rigid foam roof insulation board.

2.5 ROOF INSULATION COVER BOARD

A. Asphaltic Cover Board:
    1. Qualities: Asphalt impregnated roofing substrate board:
        a. Thickness: 3/4 inch.
        b. Size: Nominal 4 x 4 ft.

c. Source: Johns Manville

2.6 RELATED MATERIALS:

A. Asphalt Primer: ASTM D41.

B. Asphalt Bitumen: ASTM D312, Type IV.

C. Cold-Applied Flashing Adhesive: Roofing system manufacturer's asphalt-based, two-component, asbestos-free, trowel-grade, cold-applied adhesive specially formulated for compatibility and use with flashing applications. Product: MBR Flashing Cement.

D. Roofing Cement: ASTM D4586, Type II; asbestos free.

E. Fasteners - General:
1. Nails: Non-ferrous, cement-coated, or galvanized fasteners approved by roofing manufacturer.
2. Other: As approved by manufacturer and suitable for application.

F. Fasteners – Roof Insulation:
1. Factory-coated steel fasteners and metal or plastic plates meeting corrosion- resistance provisions set forth in FMG 4470, designed for fastening roof insulation to substrate as supplied or approved by roof manufacturer in writing.

G. Roof Drain Flashing: 4 lb. sheet lead, 30 x 30 in

H. Roof Walkway: DynaTred by Johns Manville

I. Fiber Cants and Tapered Edge Strips: Asphalt impregnated preformed fiberboard or preformed perlite fiberboard.

J. Metal Termination Bar: 1/8 x one inch aluminum bar pre-drilled or punched for fasteners at 6 in. o.c.

K. Synthetic Chips: Synthetic chips to match the factory applied reflective surfacing of the finish ply cap sheet.

L. Low-Rise Foam Adhesive: Insulation manufacturer's recommended, low rise, bead applied adhesive, formulated to attach roof insulation to substrate which may contain asphalt pitch residue.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that work penetrating roof deck has been completed.

B. Examine surfaces for defects, rough spots, ridges, depressions, foreign material, moisture and unevenness.

C. Confirm that roof openings and deck penetrations are located so as to allow for them to be properly flashed, that roof drains are installed at the designated elevations and secured in place and that blocking, curbs and wood nailers are properly installed. Proceed only when conditions are acceptable to manufacturer.

D. Do not proceed until defects are corrected.

3.2 PREPARATION

A. Removing Existing Roofing:
1. Completely remove existing roofing, insulation, and built-up base flashings down to roof deck and flashing substrates. Roof contains coal tar pitch. At locations where composite structural deck are present, remove portions of system as indicated and specified in by Structural documents. Where deck is poured gypsum over form board over bulb tees on bar joists, remove to bar joists as specified and indicated in Structural documents.
2. Do not stockpile debris on roof surface. Promptly remove debris each day. Use cranes to transfer debris from roof surface to dumpsters or trucks.
3. Do not haul debris over existing roof membrane.

C. Patch, renovate or repair existing concrete deck as required to provide a substrate acceptable to manufacturer for installation of roof system in accordance as required.

D. Priming: Prime metal, concrete and masonry surfaces with asphalt primer.

D. Cleaning:
1. Verify that debris has been completely removed.
2. Clean roof deck immediately prior to roofing application.
3. Prevent materials from entering and clogging roof drains and piping.

3.3 APPLICATION – ROOF INSULATION OVER SLOPED METAL DECKING – MECHANICALLY FASTENED AND MOP-ON

A. General:
1. Install insulation with longitudinal joints, continuous straight lines with end joints staggered at 24 inches minimum.
2. Neatly cut and fit insulation around penetrations and at roof perimeters. Any gaps in insulation exceeding ¼ inch in width shall be filled with insulation.
3. Install no more insulation at one time than can be roofed on the same day. Any insulation left exposed at the end of the workday, or which is exposed to water, shall be removed and discarded with no exceptions.
4. Install temporary water cut-offs at completion of each day's work and remove such upon resumption of work.

B. Bitumen:
1. Maximum bitumen temperature in kettle: 500 degrees F. or not to exceed FBT.
2. Bitumen temperature at time and point of application: Within 25 degrees F. of EVT temperature. Do not reheat bitumen.
3. Provide thermostatic controls and visible thermometer on kettle and maintain in working order and keep calibrated.

C. Mechanically Fastened and Mop-On:
1. Mechanically attach scheduled base layer of rigid foam insulation to metal decking in accordance with the approved fastening patterns for the field, perimeters and corners for each roof area in accordance with roofing manufacturer's requirements and ASCE 7-10.
2. Fully adhere top layer of rigid foam or tapered rigid foam insulation with EVT steep asphalt applied at 20 lbs. per square as scheduled with joints being staggered in relation to the base layer of rigid foam insulation and between layers where tapered insulation is scheduled to be installed. All tapered insulation shall be installed in accordance with approved shop drawings.

3. Fully adhere scheduled tapered insulation for crickets with EVT steep asphalt applied at 20 lbs. per square in accordance with approved tapered insulation shop drawings with each layer being staggered in relation to the layer below.

D. Asphaltic Cover Board:
1. Fully adhere asphaltic cover board with EVT steep asphalt applied at 20 lbs. per square, in accordance with roofing manufacturer's requirements.
2. Install insulation with longitudinal joints, continuous straight lines with end joints staggered at 24 inches minimum.
3. Neatly cut and fit insulation around penetrations and at roof perimeters. Any gaps in insulation exceeding ¼ inch in width shall be filled with insulation.
4. Install no more insulation at one time than can be roofed on the same day. Any insulation left exposed at the end of the workday, or which is exposed to water, shall be removed and discarded with no exceptions.
5. Install temporary water cut-offs at completion of each day's work and remove upon resumption of work.

E. Bitumen:
1. Maximum bitumen temperature in kettle: 500 degrees F. or not to exceed FBT.
2. Bitumen temperature at time and point of application: Within 25 degrees F. of EVT temperature. Do not reheat bitumen.
3. Provide thermostatic controls and visible thermometer on kettle and maintain in working order and keep calibrated.

3.4 MOP-ON AND TORCH APPLIED APPLICATION OF SBS MODIFIED BITUMEN ROOFING

A. General:
1. Membrane application: Apply roofing in accordance with roofing manufacturer's instructions and as detailed and specified herein.
2. Install back nailing provisions in accordance with manufacturer's requirements at locations where excessive slope in the roof decking are present.
3. Aesthetic considerations: An aesthetically pleasing overall appearance of the finished roof system will be required prior to the work being accepted. Numerous patches and other repairs that will be sight exposed after the installation of the roof system has been completed will not be acceptable.

B. Roofing Membrane – Mop-On Application of Base Ply:
1. Install in accordance with roofing manufacturer's specifications, and as specified below.
2. Lay sheets at right angles to slope of deck.
3. Fully mop unsurfaced ply sheet to substrate lapping sides a minimum of 3 inches and ends a minimum of 6 inches. Stagger end laps a minimum of 3 ft. Prohibit traffic of all types from ply sheets until asphalt has cooled to 25 degrees below EVT.
4. Prior to the installation of the cap sheet, inspect the roof with the owner, contractor, roofing contractor, roofing manufacturer and owner's third-party consultant. Address all deficiencies in base sheet application prior to the installation of the cap sheet.

C. Roofing Membrane – Torch Applied Application of Cap Sheet:
1. Install in accordance with roofing manufacturer's specification, and as specified below.
2. Phased construction of roofing membrane is strictly prohibited, unless specifically approved by roofing manufacturer.
3. Lay sheets at right angles to slope of deck.
4. Heat weld cap sheet over unsurfaced ply membrane, lapping sides a minimum of 3 inches and ends a minimum of 6 inches. Stagger laps between plies a minimum of 12 inches. Heat weld in accordance with manufacturer's recommendations. Avoid asphalt seepage greater

than 1/2 inch at seams. Check lap seams using edge of a hot trowel. Correct defects.

6. Granule Embedment: Broadcast approved granules into asphalt seepage during installation of cap sheet while bitumen is still hot.
7. Complete application of roofing system without pockets, blisters, wrinkles or fish mouths.
8. Complete installation of roofing system up to line of termination of day's work. Install temporary water cut-offs of asphalt or plastic cement and fiberglass felts at end of each day's work. Remove upon resumption of work.
9. Ponding Water: Areas which pond water in excess of the roofing system manufacturer's definition of acceptable standing or ponding water, shall be corrected by adding additional layers of modified bitumen base ply or by adding a coating to the mineral surfaced cap sheet in accordance with the roofing system manufacturer's written instructions in order eliminate any conditions that will result in a warranty exclusion. The installation of an additional 10,000 S.F. of base ply is to be included in the Base Bid with the actual cost for additional base ply being adjusted on the basis of unit pricing.

D. Base Flashing:
1. Install 2 ply system consisting of unsurfaced ply sheet and mineral surfaced cap sheet in accordance with requirements of roofing system manufacturer, with each ply sheet extending full height of flashing.
2. Mechanically attach leading/top edge of flashings with continuous termination bars with fasteners installed at 6 inches on center.
3. Install where indicated where roofing system abuts vertical surfaces and at curbs.
4. Extend base flashing up rise walls and parapet walls as indicated, with such flashings being extended onto the field of the roof in accordance with the manufacturer’s requirements. The base ply is to be installed with hot asphalt and the cap sheet is to be torch applied.

E. Liquid Applied Penetration Flashing:
1. Install penetration flashings at scheduled penetrations as detailed in accordance with manufacturer's directions.
2. Prepare metal surfaces by sandblasting to bare metal or as otherwise required by roofing manufacturer. Prime all metal surfaces with manufacturer's recommended primers.
3. Install liquid flashing in a layered application with scrim cloth reinforcing.

F. Plumbing Vent Flashing:
1. Install resin penetration flashings at plumbing vent and overflow drain penetrations in accordance with manufacturer's directions, similar to Johns Manville Detail No. PMF-6.
2. Prepare steel surfaces as required by roofing manufacturer. Prime all metal with manufacturer's recommended primers.
3. Install resin flashing in a layered application with scrim cloth reinforcing.

G. Roof Drains:
1. Reuse existing roof drains where possible, renovating as specified in Section 07 52 00 and raising the roof drains to include the extension and insulating of the drain bowl and storm drainage piping. Base bid to include:
   a. The replacement of 33% of the existing roof drain piping 8 feet in length.
   b. Testing of all the roof drains and overflow drains and piping to determine which ones are in working order prior to work commencing.
   c. Testing of all the roof drains and overflow drains and piping to verify new drains and piping is in working order.
2. Extend roof membrane into roof drain and flash with lead flashing and membrane in accordance with manufacturer's directions.
3. Securely tighten clamping rings and securely install strainers. Replace damaged, missing or plastic roof drain strainers with painted cast iron strainers properly sized for each subject roof drain.

H. Roof Walkways: Adhere and additional ply of modified bitumen cap sheet over the surface of the finished modified bitumen cap sheet in accordance with the manufacturer's requirements. Install walkways around three sides of all roof hatches, below doors providing access to roof areas, on each side of roof access ladders installed to provide access from one roof area to another and around all rooftop equipment requiring periodic maintenance. Provide one-inch gaps between walkways at a maximum of 6 ft. on center or as otherwise approved.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service:
1. Attend pre-installation conference.
2. During installation provide one on-site inspection for each 10,000 s.f. of roofing by qualified technical representative employed by roofing manufacturer with such inspections being evenly spaced during the base ply and cap sheet installation.
3. Upon completion of installation of the base ply, provide weekly inspections by a technical representative of roofing manufacturer to confirm that base ply has been installed in accordance with manufacturer's requirements. Issue roofing manufacturer's interim inspection document noting any deficiencies that need to be addressed prior to the cap sheet being installed.
4. Upon completion of roof system installation, provide a final inspection by a technical representative of roofing manufacturer to confirm that roofing system has been installed in accordance with manufacturer's requirements. Issue the roofing manufacturer's final completion checklist to Architect and Owner for review.

B. Provide one copy of the roofing manufacturer's Final Inspection Report to Owner, Architect and Owner's third-party consultant within 2 working days from the date of the Final Inspection having been completed.

C. Contractor shall have copies of their roof warranty and the roofing manufacturer's warranty professionally mounted and framed installed near the main access point to the roof as designated by Owner.

D. Ponding Water: Prior to the installation of the roofing system cap sheet, additional plies of the modified bitumen base sheet shall be applied to address any areas that will pond water in excess of the 48-hour manufacturer's requirements or by adding a coating to the mineral surfaced cap sheet in accordance with the roofing system manufacturer's written instructions in order eliminate any conditions that will result in a warranty exclusion. This shall be done at no additional cost to the Owner. Contractor to monitor ponding and record readings every 2 hours or when conditions change. Contractor will have records available for review by owner.

E. Following is a list of the DISD's Habitual Punch List items as they relate to this project:
1. All roof system base flashings shall be a minimum of 12 inches, or as indicated, above adjacent finish roof elevation. The height of all roof curbs should take this requirement into consideration.
2. Provision of soldered corners on counter flashings installed at roof curbs. Installation of properly sized roof curbs.
3. Provision of soldered joints on all thru wall scuppers. Continuous sealant installed on scupper escutcheon plates.
4. Installation of properly sized pipe supports for all roof level piping at 8 ft. o.c. maximum in linear direction and within 2 ft. of each change in direction. Provide pipe supports with rollers for all piping 1.25 inches or greater in diameter. All pipe supports are to be

installed over an additional ply of modified bitumen cap sheet as protection pas.

5. Provision of non-damaging pads for all equipment installed directly on roof.
6. Provision of temporary roof protection by trades performing work over roof system. Limit storage of materials on roof.
7. Roof system base flashings shall not have aluminum cladding.
8. No penetrations thru base flashings unless resin flashings for such are approved by roofing manufacturer.
9. Installation of resin flashings in lieu of pitch pans or metal penetration dams at piping and conduit penetrations. All piping and conduit penetrations must be hard pipe or conduit and shall be properly anchored to deck.
10. Refrigerant line penetrations. Membrane to be peeled at refrigerant line penetration to determine flashing and sealed.
11. Avoid damage to roof from cutting oils, refrigerant oils, soldering, etc.
12. Provision of overflow provisions in conductor heads.
13. Provision of thru-wall flashings with weeps at all masonry rise walls that occur above roofing.
14. Provision of minimum 12-inch-high roof system base flashings below windows that occur above roofing.
15. Overflow drains shall have their inlet elevations set at 2 inches above the inlet elevation for the primary roof drains.
16. Ponding water 48 hours after rain is unacceptable.
17. New and replaced roof drain strainers to be metal not plastic.
18. Verify all roof drains and overflow drains, thru wall scuppers and downspouts are open and in functioning order.
19. All gas legs should have 1 inch clearance from finish roof elevation.
20. Turn in all lead flashings at plumbing stocks a minimum of 1 inch.
21. Precast concrete splash blocks are required at locations where a given roof area discharges storm water onto a roof system.
22. All condensing units are to be installed on pre-manufactured roof curbs with sheet metal curb caps.
23. Where required sumps are to be provided at all roof drains.
24. Roof penetrations shall not occur within 18 inches of any roof system base flashings.
25. Gutter expansion joints should be every 50ft. maximum or as otherwise required.
26. Roof to roof ladder supports must not penetrate copings. Any supports occurring in the roof system base flashings must be flashed with resin flashings.
27. Clamping rings at drains must be properly secured.
28. All fastener spacing should be 8 in. o.c. maximum.
29. No stepping thru wall flashings and base flashings – be consistent.
30. Provide isolation at support clamps for where dissimilar metals occur.
31. All roof level gas piping shall be primed and painted.
32. Rise wall base flashings must not cover weep holes installed above thru wall flashings.
33. Three course flashing and term bar anchored at 6 in. o.c. to be installed at all base flashings.
34. At all cap sheet installations, a maximum of one patch per membrane roll shall be considered acceptable.

3.6 CLEANING AND PATCHING

A. Clean up debris, excess materials and equipment and remove from site.

B. Remove drippage or spills of coatings, sealant, mastic or primers from finish surfaces.

C. Patch misaligned or inadequately lapped seams, inadequately adhered areas, punctures or other damage to membrane with a patch of membrane sheet that extends at least 6 inches in each direction from deficiency.

3.7 PROTECTION

A. Provide special protection and avoid heavy traffic on completed work. Protect roofing system from damage and wear during the remainder of construction period.

B. Restore to original condition or replace work or materials damaged during handling of roofing materials.

END OF SECTION 07 52 00

SECTION 07 60 00 SHEET METAL WORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Shop or field-formed sheet metal work for moisture protection

B. Reglets and accessories.

1.02 RELATED SECTIONS

A. Section 07 71 00 - Roof Specialties: Metal edging system.

B. Section 07 72 00 - Roof Accessories: Prefabricated equipment curbs.

C. Section 07 92 00 – Joint Sealants.

1.03 REFERENCES

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 1998.

B. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2000.

C. ASTM B 32 - Standard Specification for Solder Metal; 2000.

D. FS FF-S-325 - Shield Expansion; Nail, Expansion; and Nail, Drive-Screw.

E. SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association; 2012.

1.04 SUBMITTALS

A. Procedures for Submittals: Section 01 33 00.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA Architectural Sheet Metal Manual requirements and standard details, except as otherwise indicated.

B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 5 years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials which may cause discoloration or staining.

1.07 WARRANTY:

A. Provide Owner a written warranty which shall warrant sheet metal work to be free of leaks and defects in materials and workmanship for 5 years after date of Substantial Completion.

PART 2 - PRODUCTS

2.01 SHEET MATERIALS

A. Galvanized Steel: ASTM A 653/A 653M, with G90/Z275 zinc coating. Furnish ARMCO Zinc-grip Paint-grip at items indicated to be field painted. Thickness: As indicated on Drawings. Zinc-grip to be painted where visible.

B. Pre-Finished Galvanized Steel: ASTM A 653/A 653M, with G90/Z275 zinc coating; minimum 0.02-inch-thick base metal, shop pre-coated with PVDF coating, color as selected. Thickness: As indicated on Drawings.
   1. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coats, thermally cured fluoropolymer finish system; color as selected from manufacturer's standard colors.

2.02 ACCESSORIES

A. Fasteners: Same material and finish as flashing metal, with soft neoprene washers.
   1. Nails: Flathead, wire, barbed, slating type.
   2. Screws: Self-tapping sheet metal type.
   3. Rivets: Type and size as recommended by sheet metal manufacturer.
   4. Concrete Fasteners: Round-head stainless steel screw and neoprene washer with lead expansion anchor, FS FF-S-325, Group IV, Type 2. Powers Rawl Screw Type Nail ins.

B. Primer: Zinc chromate type.

C. Protective Backing Paint: Zinc chromate alkyd.

D. Sealant: Type silicone sealant specified in Section 07 90 05.

E. Solder: ASTM B 32; Sn50 (50/50) type.

2.03 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Fabricate cleats of same material as sheet, minimum 3 inches wide, interlocking with sheet.

C. Form pieces in longest possible lengths.

D. Make angle bends and folds for interlocking metal with full regard for expansion and contraction to avoid buckling or fullness in metal after installation.

E. Hem exposed edges on underside 1/2 inch; miter and seam corners.

F. Form material with scheduled or specified seams. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

G. Solder shop formed metal joints in galvanized steel fabrications. After soldering, remove flux. Wipe and wash solder joints clean. Weather seal joints.

H. Fabricate corners from one piece with minimum 18-inch-long legs; seam for rigidity, seal with sealant.

I. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

2.04 FABRICATED ITEMS:

A. Flashings, Counter flashings and Misc.: Galv. sheet steel as scheduled, formed in minimum 10 ft. lengths where possible detailed as indicated.

B. Metal Edge: Prefinished galvanized sheet metal, similar to SMACNA Figure 2-5.

C. Overflow Parapet Scuppers: Prefinished sheet steel face trim and 24 ga. galv. sheet steel throat (Zinc Grip Paint Grip), SMACNA Figure 1-30A and 130B, joints of flashing flange and throat fully soldered.

D. Area Divider Curb Cover: 24 ga. galv. sheet steel, formed in 10 ft. lengths, with lapped joints.

E. Continuous Cleats: Minimum 1-1/4-inch continuous strips, same material, and thickness as adjacent sheet metal item, except where heavier gauge is noted on detail drawings.

F. Expansion Joint Cover Assemblies: Gauge and material as indicated on drawings formed in 10-foot maximum lengths where possible. Fabricated as indicated, similar to SMACNA Figure

5-1, 5-3 (near roof edges) and 5-6B.

G. Gutters and Downspouts: Gauge, profile and material as indicated on drawings. Provide gutter expansion joints where indicated as detailed.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

C. Verify that substrates are smooth and clean to extent needed for sheet metal work.

D. Do not start sheet metal work until conditions are satisfactory.

3.02 PREPARATION

A. Install starter and edge strips, and cleats before starting installation. Install at exposed edges of metal cap flashings, and where shown or required, nailed at 4 inches O.C.

B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

3.03 INSTALLATION - GENERAL

A. Install work watertight, without waves, warps, buckles, fastening stresses or distortion, allowing for expansion and contraction.

B. Install fabricated sheet metal items in accordance with SMACNA Architectural Sheet Metal Manual, except as otherwise detailed.

C. Insert flashings into receivers to form tight fit.

D. Secure flashings in place using fasteners as indicated.

E. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

F. Seal prefinished metal joints watertight using sealant specified in Section 07 92 00.

G. Solder metal joints in galvanized steel items for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.

3.04 INSTALLATION - FABRICATED ITEMS:

A. Flashings, Counter Flashings:
   1. Extend flanges into reglets or receivers and securely fasten.
   2. Where nailing is required, nail at 6 inches O.C.
   3. Overlap counter flashing 4 inches over base flashing, lap ends of sheets 3 inches.

B. Area Divider Curb Flashings:
   1. Install over membrane base flashing or rubberized underlayment.
   2. Secure flanges with neoprene washer screws through slotted holes at 24 inches O.C., similar to SMACNA Figure 3-1.
   3. Join sheets with lapped and soldered joints.
   4. Form corners and connections watertight, seamed and soldered.

C. Expansion Joint Curb Cover and Flashings:
   1. Install 45 mil EPDM sling with sealed and overlapped joints and fibrous batt insulation as detailed.
   2. Install metal cover as detailed.
   3. Secure with fasteners and neoprene washers at 12 inches on center.
   4. Slope top to drain.
   5. Furnish prefabricated corners at all changes in plane or direction in accordance with

SMACNA requirements.

D. Hung Gutters:
   1. Prefinished sheet steel formed in minimum 10 ft. lengths. Lap joints one inch and rivet and seal.
   2. Provide outlet thimble to fit downspouts or roof drain leaders complete with downspout strainer.
   3. Provide butt type expansion joints at 50 ft. O.C. maximum per SMACNA requirements and as detailed.

E. Downspouts:
   1. Prefinished sheet steel, upper sections telescoped into lower sections 1-1/2 inch and riveted and sealed.
   2. Fabricate downspouts with elbows discharging onto splash pans or splash blocks.

3.05 CLEANING:

A. Remove flux and residual acid immediately by neutralizing with baking soda and washing with clean water. Leave work clean and free of stains, scrap, and debris.

END OF SECTION 07 60 00

SECTION 07 62 00 - SHEET METAL FLASHING, TRIM AND ACCESSORIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes sheet metal flashing and trim in the following categories:
   1. Roof-drainage systems.
   2. Copings.
   3. Metal flashing.
   4. Reglets.
   5. Roof expansion-joint covers.
   6. Elastic sheet flashing.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   Division 7 Section "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.
   1. Division 7 Section "Joint Sealants" for elastomeric sealants.
   2. Division 9 Section 09 91 00 “Paints and Coatings”.

1.3 PERFORMANCE REQUIREMENTS

A. General: Manufacture and install manufactured roof specialties to resist thermally induced movement and exposure to weather without failing, rattling, leaking, and fastener disengagement.

B. Manufacture and install copings and roof edge flashings tested according to SPRI ES-1 and capable of resisting the area wind zone pressures.

1.4 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification
Sections.

B. Product Data including manufacturer's material and finish data, installation instructions, and general recommendations for each specified flashing material and fabricated product.

C. Shop Drawings of each item specified showing layout, profiles, methods of joining, and anchorage details.

D. Samples of sheet metal flashing, trim, and accessory items, in the specified finish. Where finish involves normal color and texture variations, include Sample sets composed of 2 or more units showing the full range of variations expected.
   1. 8-inch square Samples of specified sheet materials to be exposed as finished surfaces.
   2. 12-inch-long Samples of factory-fabricated products exposed as finished Work. Provide complete with specified factory finish.

E. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project

names and addresses, names and addresses of architects and owners, and other information specified.

F. Product Test Reports: Submit report based on evaluation of comprehensive tests performed by a qualified testing agency, verifying compliance of copings and roof edge flashings with performance requirements.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experience Installer who has completed sheet metal flashing and trim work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

1.6 PROJECT CONDITIONS

A. Coordinate Work of this Section with interfacing and adjoining Work for proper sequencing of each installation. Ensure best possible weather resistance, durability of Work, and protection of materials and finishes.

PART 2 – PRODUCTS

2.1 FLASHING EMBEDDED IN MASONRY

A. Refer to Division 4 Section “Unit Masonry” for flashing embedded in masonry.

2.2 METALS

A. Stainless-Steel Sheet: ASTM A 167, Type 304, soft annealed, with No. 2D finish, except where harder temper is required for forming or performance; minimum 0.0187 inch thick, unless otherwise indicated.

B. Galvanized Steel Sheet: ASTM A 526commercial quality, or ASTM A 527, lock-forming quality, hot-dip galvanized steel sheet with 0.20 percent copper, mill phosphatized where indicated for painting; not less than 0.0396 inch thick, unless otherwise indicated.

C. Coil-Coated Galvanized Steel Sheet: Zinc-coated, commercial-quality steel sheet conforming to ASTM A 755 coating designation, coil coated with high-performance fluoropolymer coating as specified in "Coil-Coated Galvanized Steel Sheet Finish" Article; not less than 0.0336 inch thick, unless otherwise indicated.

2.3 REGLETS

A. General: Units of type, material, and profile indicated, formed to provide secure interlocking of separate Reglet and counterflashing pieces and compatible with flashing indicated.

2.4 MISCELLANEOUS MATERIALS AND ACCESSORIES

A. Solder: ASTM B 32, Grade Sn50, used with rosin flux.

B. Solder for Stainless Steel: ASTM B 32, Grade Sn60, used with an acid flux of type recommended by stainless-steel sheet manufacturer; use a noncorrosive rosin flux over tinned surfaces.

C. Stainless-Steel Welding Rods: Type recommended by stainless-steel sheet manufacturer for type of metal sheets furnished.

D. Fasteners: Same metal as sheet metal flashing or other noncorrosive metal as recommended by sheet metal manufacturer. Match finish of exposed heads with material being fastened.

E. Asphalt Mastic: SSPC-Paint 12, solvent-type asphalt mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil dry film thickness per coat.

F. Mastic Sealant: Polyisobutylene; nonhardening, non-skinning, nondrying, nonmigrating sealant.

G. Elastomeric Sealant: Generic type recommended by sheet metal manufacturer and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 7 Section "Joint Sealants."

H. Epoxy Seam Sealer: 2-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior and interior nonmoving joints, including riveted joints.

I. Adhesives: Type recommended by flashing sheet metal manufacturer for waterproof and weather- resistant seaming and adhesive application of flashing sheet metal.

J. Paper Slip Sheet: 5-lb/square red rosin, sized building paper conforming to FS UU-B- 790, Type I, Style 1b.

K. Polyethylene Underlayment: ASTM D 4397, minimum 6-mil-thick black polyethylene film, resistant to decay when tested according to ASTM E 154.

L. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of Work, matching or compatible with material being installed; noncorrosive; size and thickness required for performance.

M. Roofing Cement: ASTM D 4586, Type I, asbestos free, asphalt based.

2.5 FABRICATION, GENERAL

A. Sheet Metal Fabrication Standard: Fabricate sheet metal flashing and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.

B. Comply with details shown to fabricate sheet metal flashing and trim that fit substrates and result in waterproof and weather-resistant performance once installed. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

C. Form exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder.

D. Expansion Provisions: Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

E. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.

F. Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces

at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.

G. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.

H. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, noncorrosive metal recommended by sheet metal manufacturer.
   1. Size: As recommended by SMACNA manual or sheet metal manufacturer for application but never less than thickness of metal being secured.

2.6 SHEET METAL FABRICATIONS

A. General: Fabricate sheet metal items in thickness or weight needed to comply with performance requirements but not less than that listed below for each application and metal.

B. Gutters with Girth up to 15 Inches: Fabricate from the following material:
   1. Coil-Coated Galvanized Steel: 0.0217 inch thick.

C. Downspouts: Fabricate from the following material:
   1. Coil-Coated Galvanized Steel: 0.0217 inch thick.

D. Cleats: Fabricate from the following material:
   1. Coil-Coated Galvanized Steel: 0.0396 inch thick.

E. Copings: Fabricate from the following material:
   1. Coil-Coated Galvanized Steel: 0.0396 inch thick.

F. Base Flashing: Fabricate from the following material:
   1. Coil-Coated Galvanized Steel: 0.0276 inch thick.

G. Counterflashing: Fabricate from the following material:
   1. Coil-Coated Galvanized Steel: 0.0217 inch thick.

H. Flashing Receivers: Fabricate from the following material:
   1. Coil-Coated Galvanized Steel: 0.0217 inch thick.

I. Drip Edges: Fabricate from the following material:
   1. Coil-Coated Galvanized Steel: 0.0217 inch thick.

J. Eave Flashing: Fabricate from the following material:
   1. Coil-Coated Galvanized Steel: 0.0217 inch thick.

K. Equipment Support Flashing: Fabricate from the following material:
   1. Coil-Coated Galvanized Steel: 0.0276 inch thick.

L. Roof-Penetration Flashing: Fabricate from the following material:
   1. Coil-Coated Galvanized Steel: 0.0276 inch thick.

M. Roof Expansion-Joint Cover: Fabricate from the following material:
   1. Coil-Coated Galvanized Steel: 0.0276 inch thick.

N. Roof-to-Wall Expansion-Joint Cover: Fabricate from the following material:
   1. Coil-Coated Galvanized Steel: 0.0336 inch thick.

2.7 COIL-COATED GALVANIZED STEEL SHEET FINISH

A. High-Performance Organic Coating Finish: Apply the following system by coil-coating process on galvanized steel sheet as recommended by coating manufacturers and applicator.
   1. Flouropolymer 2-Coat Coating System: Manufacturer's standard 2-coat, thermocured system composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 605.2.
      a. Color and Gloss: As indicated by manufacturer's color and gloss designations. Resin Manufacturers: Subject to compliance with requirements, provide fluoropolymer coating systems containing resins produced by one of the following manufacturers:
         1) Ausimont USA, Inc. (Hylar 5000)
         2) Elf Atochem North America, Inc. (Kynar 500)

2.8 ELASTIC SHEET FLASHING

A. Elastic Sheet Flashing: Nonreinforced flexible, black elastic sheet flashing of 50 to 65 mils' thickness and complying with the following:
   1. Shore A Hardness (ASTM D 2240): 50 to 70.
   2. Tensile Strength (ASTM D 412): 1200 psi.
   3. Tear Resistance (ASTM D 624, Die C): 20 lbs. per linear inch.
   4. Ultimate elongation (ASTM D 412): 250 percent.
   5. Low temperature brittleness (ASTM D 746): minus 30 deg F.
   6. Resistance to ozone aging (ASTM D 1149): no cracks for 10 percent elongated sample for 100 hours in 50 PPHM (50.5 MPA) ozone at 104 deg F.
   7. Resistance to Heat Aging (ASTM D 573): maximum hardness increase of 15 points, elongation reduction of 40 percent, and tensile strength reduction of 30 percent, for 70 hours at 212 deg F.

B. Products:
   1. Neoprene synthetic rubber sheet.
   2. Butyl synthetic rubber sheet.
   3. EPDM synthetic rubber sheet.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that Work may properly commence. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Unless otherwise indicated, install sheet metal flashing and trim to comply with performance requirements, manufacturer's installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Anchor units of Work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install Work with laps, joints, and seams that will be permanently watertight and weatherproof.

B. Install exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet

metal.

C. Roof-Edge Flashings: Secure metal flashings at roof edges according to ANSI/SPRI ES-1 Wind Design Standard for Edge Systems.

D. Expansion Provisions: Provide for thermal expansion of exposed sheet metal Work. Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

E. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches except where pre-tinned surface would show in finished Work.
   1. Do not solder the following metals:
      1) Coil-coated galvanized steel sheet.
   2. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

F. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards. Fill joint with sealant and form metal to completely conceal sealant.
   1. Use joint adhesive for nonmoving joints specified not to be soldered.

G. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder.

H. Separations: Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces, at locations of contact, with asphalt mastic or other permanent separation as recommended by manufacturer.
   1. Underlayment: Where installing stainless steel or aluminum directly on cementitious or wood substrates, install a slip sheet of red-rosin paper and a course of polyethylene underlayment.
   2. Bed flanges of Work in a thick coat of roofing cement where required for waterproof performance.

I. Install reglets to receive counterflashing according to the following requirements:
   1. Where reglets are shown in concrete, furnish reglets for installation under Division 3 Section "Cast- in-Place Concrete."
   2. Where reglets are shown in masonry, furnish reglets for installation under Division 4 Section "Unit Masonry."

J. Counter flashings: Coordinate installation of counter flashings with installation of assemblies to be protected by counterflashing. Install counter flashings in reglets or receivers. Secure in a waterproof manner by means of snap-in installation and sealant, lead wedges and sealant, interlocking folded seam, or blind rivets and sealant. Lap counterflashing joints a minimum of 2 inches and bed with sealant.

K. Roof-Drainage System: Install drainage items fabricated from sheet metal, with straps, adhesives, and anchors recommended by SMACNA's Manual or the item manufacturer, to drain roof in the most efficient manner. Coordinate roof-drain flashing installation with roof-drainage system installation. Coordinate flashing and sheet metal items for steep-sloped roofs with roofing installation.

L. Equipment Support Flashing: Coordinate equipment support flashing installation with roofing and equipment installation. Weld or seal flashing to equipment support member.

M. Roof-Penetration Flashing: Coordinate roof-penetration flashing installation with roofing and installation of items penetrating roof. Install flashing as follows:
   1. Seal and clamp flashing to pipes penetrating roof, other than lead flashing on vent piping.

N. Install elastic sheet flashing in accordance with manufacturer's recommendations. Where required, provide for movement at joints by forming loops or bellows in width of flashing. Locate cover or filler strips at joints to facilitate complete drainage of water from flashing. Seam adjacent flashing sheets with adhesive, seal, and anchor edges in accordance with manufacturer's recommendations.

3.3 CLEANING AND PROTECTION

A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.

B. Provide final protection and maintain conditions that ensure sheet metal flashing and trim Work during construction is without damage or deterioration other than natural weathering at the time of Substantial Completion.

END OF SECTION 07 62 00

SECTION 07 70 00 - ROOF SPECIALTIES AND ACCESSORIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Roof specialties and accessories of the following types:
   1. Designer Series commercial gutters.
   2. Drain ware.
   3. Parapet copings.

1.2 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry.

B. Section 07 70 00 – Roof Specialties & Accessories

1.3 SUBMITTALS

A. Submit under provisions of Section 01 31 00 – Project Management & Coordination.

B. Product Data: Submit manufacturer's detailed product data showing dimensions of individual components, profiles, and finishes, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings: Fully dimensioned roof plans, reflective plan views, dimensioned framing requirements, sections and details of components and other related trims.

D. Selection Samples: For each finish product specified, manufacturer's technical data for specified finish and color chart showing full range of colors available.

E. Verification Samples: For each finish product specified, manufacturer's technical data for specified finish and two samples, minimum size 6 inches square, representing actual product, color, and patterns.

1.4 QUALITY ASSURANCE

A. Obtain all components and related accessories from one single source manufacturer.

B. Where pre-engineered manufactured products are specified, other field fabricated or shop/field fabricated substitutions will not be accepted. However, where shop/field fabrications are indicated pre-engineered systems will be considered with Architect approval.

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Finish areas designated by Architect.
   2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
   3. Refinish mock-up area as required to produce acceptable work.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. All products delivered shall be stored in a clean dry location prior to installation.

C. Products furnished with strippable protective masking shall not be exposed to direct sunlight for more than 30 minutes without removing masking.

D. Inspect material before installation. Do not install finished materials with scars or abrasions.

E. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.6 PROJECT CONDITIONS

A. Coordinate work of this Section with adjoining work for proper sequencing to ensure protection from inclement weather and to protect materials and their finish against damage.

B. Do not install cornice and decorative trims during inclement weather. When installing in cold climates warm sealant to at least 50 degrees F prior to application.

1.7 WARRANTY

A. Wind and Finish Warranty

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: SAF, which is located at: 14100 Veterans Memorial Hwy.; Villa Rica, GA 30180; Toll Free Tel: 800-334-9823; Tel: 678-715-3811; Fax: 770-942-4173; Email: request info (cmf@saf.com); Web:https://www.saf.com/perimeter-systems/

B. Substitutions: Permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 DESIGNER SERIES COMMERCIAL GUTTERS

A. Roman Profile - DSR Series as manufactured by Perimeter Systems, a division of Southern Aluminum Finishing Company, Inc.

B. Colonial Profile - DSC Series as manufactured by Perimeter Systems, a division of Southern Aluminum Finishing Company, Inc.

C. Batten Profile - DSB Series as manufactured by Perimeter Systems, a division of Southern Aluminum Finishing Company, Inc.

D. Contemporary Profile - DSCT Series as manufactured by Perimeter Systems, a division of Southern Aluminum Finishing Company, Inc.
   1. Size/Configuration: 6-inch.
   2. Material: 0.080 inch Aluminum.
   3. Finish: EZ Mix Kynar.

E. Drain Receiver and Nozzle:
   1. 4 inches drain outlet

F. Leaf Guard Screen: Manufacturer' standard components.

G. Fabrication:
   1. Concealed Gutter Liner shall be manufactured from 0.040 inch mill finished aluminum in 10 feet lengths. Liner shall be:
      a. Factory notched to receive brackets and straps.
      b. Manufactured with 1 inch telescoping and notched end laps.
      c. Factory punched with fastening holes elongated to allow for thermal movement.
   2. Support Bracket and retainer stem shall be manufactured from 0.125 inch by 1.0-inch extruded aluminum bar, heliarc welded construction, factory punched for fasteners.
   3. Interior Straps shall be manufactured from 0.125 inch by 1.0-inch extruded aluminum.
   4. Snap-on fascia shall be manufactured from aluminum, 10 feet lengths. Fascia shall be press formed with radius dies on a CNC Press to provide repeated true and accurate profiles.
   5. Fascia splices shall be manufactured from 0.040 inch aluminum, 6 inches lengths, formed to fit the inside of the snap-on fascia.
   6. Corners shall be factory mitered corners for both fascia and liner. Fascia profiles shall be precision saw cut, heliarc tack welded to produce a picture frame joint. Concealed liner miter shall be precision saw cut with a continuous heliarc weld watertight joint.
   7. Sculptured end caps shall be factory mitered end caps for fascia’s. Fascia profiles shall be precision saw cut, heliarc tack welded to produce a picture frame joint.
   8. Cornice returns, if shown on drawings, shall be provided at gutter terminations in lengths as indicated on plans.
   9. Liner end caps shall be provided of mill finished aluminum at all fascia end caps and wall abutments.
   10. Liner expansion Joint, provide manufacturer's elastomeric expansion joints at 40 feet intervals or as shown on shop drawings.

2.3 DRAIN WARE

A. Provide downspouts as manufactured by Perimeter Systems, a division of Southern Aluminum Finishing Company, Inc.

B. Downspouts: Finish to match gutters unless noted otherwise.

C. Provide downspout in sizes and locations as indicated on plans. Downspouts shall be manufactured from aluminum, finished to match gutter fascia. Downspout elbows shall have heliarc welded joints.

D. Style: Rectangular Formed - Open Face. Back plate is omitted, edges hemmed, and finish applied to inside surface of downspout.
   1. Size/Configuration: 6 inches by 6 inches rectangular.
   2. Finish: EZ Mix Kynar.
   3. Finish: Mill Finish.

E. Hardware: Finish to match gutters unless noted otherwise.
   1. Outlets: At downspout locations provide aluminum outlets to connect liner to downspout.
   2. Wall Brackets: Provide brackets at 60 inches maximum spacing (minimum 2 brackets). Brackets shall be manufactured from 0.125 inch by 1.0 inch extruded aluminum bar, finished to match downspout.

2.4 PARAPET COPINGS

A. Provide parapet coping system with decorative trims as manufactured by Perimeter Systems, a division of Southern Aluminum Finishing Company, Inc.
   1. Product: Press-Loc Architectural Copings.
   2. Material: 0.080-inch Aluminum.
   3. Size: 6inches exposed face in width as indicated or required.
   4. Finish: EZ Mix Kynar.
   5. Parapet copings shall be manufactured from aluminum, 10 feet lengths. Coping shall be formed with a 1/2-inch wash slope to divert water to roof side of parapet.
   6. Coping joints shall consist of a 6 inches wide concealed splice plate manufactured from 0.050-inch aluminum. Splice plate shall be formed to fit inside the coping and containing a stiffening bend to keep splice from flexing. Gasket strips, field applied to full width and both sides of concealed gutter splice plate.
   7. Compression cleats shall be manufactured from 20-gauge galvanized steel, installed at 30 inches centers and at all joint locations with factory mounted stainless steel spring clips.
   8. Elastomeric roof membrane extends over parapet plate and face fastened - Refer to Section 07 70 00 – Roof Specialties & Accessories.

2.5 ARCHITECTURAL GRAVEL STOPS

A. Provide gravel stops as manufactured by Perimeter Systems, a division of Southern Aluminum Finishing Company, Inc.

B. Product: Press-Loc.
   1. Custom size: Refer to drawings.
   2. Pre-engineered Size: 6 inches.
   3. Fabrication:
      a. Fascia up to 12 inches, over 12 inches provide extenders.
      b. Gravel dam up to 3 inches.
      c. 4 inches roof leg factory punched for fasteners.
      d. Continuous cleat required.

C. Product: Formed on piece gravel stop with continuous cleat. Refer to drawings for dimensions and profile.
   1. Requires wood blocking. Refer to Section 06 10 00 - Rough Carpentry.
   2. Fabrication:
      a. Fascia up to 12 inches, over 12 inches provide extenders.
      b. Gravel dam up to 3 inches.
      c. 4 inches roof leg factory punched for fasteners.
      d. Continuous cleat required.
      e. 3/4 inch hemmed drip edge for stiffness and to engage cleats.
      f. Brick Ledge: Width as indicated or required.
      g. Extender: Length as indicated or required. Material and finish to match gravel stop.

D. Product: Flow-Thru.
   1. Perforated face; hole pattern is 3/16 inch holes at 1/4 inch staggered centers allowing a 50 percent open area. Face is factory notched on one end for a 4 inches lap joint.
   2. Roof leg is factory punched for fasteners.
      a. Brick Ledge: Width as indicated or required.
      b. Extender: Length as indicated or required. Material and finish to match gravel stop.

E. Material/Finish:

1. Material: 0.063 inch Aluminum.
2. Finish: Integral Color Anodized.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for project conditions.

C. The installer shall examine substrates and conditions under which cornice and decorative profiles will be installed. All wood plates and/or fascia boards shall be installed true, straight, and free of splits, cracks, or other irregularities. Do not proceed with installation until unsatisfactory conditions are corrected.

D. The installer shall field verify that framing has been built in accordance with the dimensions furnished by the cornice manufacturer either by shop drawings or published literature. Do not proceed with installation until unsatisfactory conditions are corrected.

3.3 INSTALLATION

A. Install units in accordance with manufacturer's instructions and approved submittals.

3.4 COPING INSTALLATION

A. General: Parapet coping shall be installed in strict accordance with manufacturer's printed instructions and shop drawings.

B. Fastening: Coping shall be snapped onto compression cleats spaced according to manufacturer's instructions. A cleat shall be located at the coping's splice joint and in the middle of each coping section. Cleat shall be fastened with (4) #10 by 1-1/2 inches stainless steel wood screw.

C. Install splice plates at all coping joints. Splice plate shall be sealed with a non-hardening, low modulus, sealant as recommended by coping manufacturer.

3.5 GUTTER INSTALLATION

A. Support Brackets: Layout support brackets to provide 1/2-inch slope in 40 linear feet. Install support brackets with #10 by 2 inches stainless steel wood screws.

B. Liner: Install concealed gutter liner onto support brackets and fasten to substrates with 1-1/2 inches aluminum or stainless-steel nails. Rivet and seal liner joints with high grade exterior sealant as recommended by gutter manufacturer.

C. Expansion Joints: Install elastomeric expansion joints as shown on plans and/or shop drawings. Maximum expansion joint spacing shall be 40 feet centers.

D. Locate and install downspouts before proceeding with fascia installation.

E. Install interior straps by fully engaging them into liner and fascia, complete by securely riveting.

F. Install fascia with concealed splice plates over support brackets and liner. Coordinate and align spacing of joints with associated trims if applicable. Plan spacing of joints so there are no sections of fascia shorter than 48 inches in length. Check horizontal alignment of fascia during installation and adjust as required. At downspout locations, neatly cut fascia to accommodate downspout.

3.6 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 07 70 00

SECTION 07 71 00 ROOF SPECIALITIES

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Manufactured copings.

1.2 RELATED REQUIREMENTS

A. Section 07 72 00 - Roof Accessories.

1.3 REFERENCE STANDARDS

A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels; 2005.

B. ANSI/SPRI ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems, American National Standards Institute/Single-ply Roofing Institute.

C. FM DS 1-49 - Perimeter Flashing; Factory Mutual Research Corporation.

1.4 SUBMITTALS

A. Procedures for Submittals: Section 01 33 00 “Submittal Procedures”.

B. Product Data: Provide data on shape of components, materials and finishes, anchor types and locations.

C. Shop Drawings: Indicate configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected work.

D. Samples: Submit one appropriately sized sample of each coping profile. Submit verification sample of pre-finished metal color.

E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA Architectural Sheet Metal Manual details, FM DS 1-49 and ANSI/SPRI ES-1.

1.6 WARRANTY

A. Provide Owner a written warranty which shall warrant metal coping system to be free of leaks and defects in materials and workmanship for 5 years after date of Substantial Completion.

B. Provide finish warranty for 20 years against defects in finish including fading, chipping and chalking.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Copings:
1. Viridian Systems; Product Permasnap Coping: www.wph.com.
2. MM Systems Corp; Product Snap-Lock Coping: www.mmsystemscorp.com.
3. Construction Specialties; Product Snap-Lock Coping.

2.2 COMPONENTS

A. Copings: Formed 24-gauge prefinished galvanized steel, custom shaped as indicated, including special supports spaced at 60 inches on center. Include cover plates to conceal and weather seal joints and attachment flanges. Copings tested to meet requirements of ANSI/SPRI ES-1
1. Internal Splice Plates: Concealed with matching finish to maintain outside face continuity.
2. Coping Finish: Fluoropolymer coating (High Performance).
3. Color: To match existing.

B. Contractor's Option: Shop fabricated copings may be substituted for manufactured copings providing that independent testing of fabricated copings is performed in accordance with ANSI/SPRI ES-1, refer to Section 07 60 00.

2.3 ACCESSORIES

A. Anchor Cleats: Formed anchor cleat with integral drainable gutter, 20 ga. galvanized steel.

B. Sealant: Type silicone sealant as specified in Section 07 92 00 “Joint Sealants”.

2.4 FINISHES

A. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2604; multiple coats, thermally cured fluoropolymer finish system; color to match existing.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that walls, curbs, roof membrane, base flashing, and other items affecting work of this Section are in place and positioned correctly.

3.2 INSTALLATION

A. Install components in accordance with manufacturer's instructions and in accordance with SMACNA Architectural Sheet Metal Manual.

B. Install work watertight, without waves, warps, buckles, fastening stresses or distortion, allowing for expansion and contraction.

C. Securely fasten copings with concealed fasteners, anchors and cleats.
1. Cleats: Secure with fasteners spaced at 12-inch centers maximum.
2. Copings: Secure at exterior face to continuous cleat and at interior face with neoprene gasketed fasteners at 12-inch centers maximum through slotted holes.

3. Double fasteners (decrease spacing by 1/2) at corners in accordance with ANSI / SPRI ES-.1

D. Install copings plumb and level, and in true alignment.

END OF SECTION 07 71 00

SECTION 07 72 00 ROOF ACCESSORIES

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Molded pipe supports.

B. Prefabricated roof curbs.

C. Precast concrete splash blocks.

1.02 RELATED SECTIONS

A. Section 07 60 00 - Sheet Metal Work: Sheet metal flashing.

B. Section 07 71 00 - Roof Specialties.

1.03 REFERENCES

A. ASTM D4586 - Fibrated Asphalt Roof Cement.

B. FS FF-S-325 - Shield Expansion; Nail, Expansion; and Nail, Drive-Screw.

C. FS TT-C-494A - Coating Compound, Bituminous, Solvent Type, Acid Resistant.

1.04 SUBMITTALS

A. Procedures for Submittals: Section 01 33 00 “Submittal Procedures”.

B. Product Data: Provide manufacturer's product data sheets, including installation instructions.

C. Shop Drawings: Indicate following.
   1. Prefabricated Roof Curbs: Indicate inside and outside dimensions of curbs, height of curbs (at high side and at low side), weights of units being supported, gauge of metal selected to support scheduled load, location and size of fasteners and correlation to adjacent construction.

PART 2 - PRODUCTS

2.01 .DUCT SUPPORTS:

A. Type 1:
   1. Qualities: Base 100% recycled rubber, UV resistant, 4” Height X 6” Width X 9.6” Length (Over all Height 8” or 12”). 14 gage galvanized steel Channel Strut designed to support conduit and condensate pipes above roof. Two ½” electro zinc plated all thread rod risers.
   2. Source: Mifab CE10-8.

B. Type 2:
   1. 100% recycled rubber, UV resistant, 6” Length of X 9.6”. Roller width – 3”, 4’ or 6” with total height 6” or 7”.
   2. Source: Mifab CR10-4.

C. Type 3:
   1. 100% recycled rubber, UV resistant, 4” Height X 6” Width X 9.6” Length (Over all Height 8” or 12”). 12 gage galvanized steel telescoping crossbeams and hot-roiled, zinc plated carbon steel vari-angle brackets
   2. Source: Mifab DSA10

D. Type 4:
   1. E-Custom/PS – model by PHP designed to support hydronic, refrigerant, steam or gas pipes at most any specified height above the roof surface. The frame supports the pipe from above using hanger.

E. Support Spacing subject to local codes and authorities but will not exceed 8 feet on center and within 2 feet each side of any change in direction.

F. Bracing required when using base with swivel, when pipe exceeds 24 inches above roof, or when thermal expansion of pipe is great.

G. Materials:
   1. Bases are high density polypropylene with UV inhibitors and antioxidants conforming to the following:
      a. Color: Black color as molded
      b. Moisture Content: negligible
      c. Shrinking/Swelling due to moisture: Negligible
      d. Resistant to oil, gasoline, antifreeze, battery acid and sulfuric acid
      e. Do not use bases that are made of pressed rubber, steel, stainless steel, recycled tires or carbonated plastics.
      f. Base Dimensions:
         1) 18-inches wide by 18-inches long by 3-inches tall(18x18).
   2. Steel frame: Steel, 12ga 1-5/8” or 1-7/8” strut galvanized per ASTM A123 or 14ga 13/16” strut galvanized per ASTM A653 for PP10 and SS8.
   3. Hanger Type:
      a. Conforms to MSS SP-58 and MSS SP-69
      b. Material: Carbon steel(Standard); 304 SS available
      c. Clevis Hanger: Used for all insulated and uninsulated lines
      d. Roller Hanger: Used for uninsulated lines
      e. Finish: HDG

2.02 PREFABRICATED ROOF CURB:

A. Qualities: Prefabricated insulated curb for mechanical equipment support fabricated from galvanized sheet steel, 18 ga. minimum, welded construction designed to support weight of unit being supported. Provide with preservative treated wood nailer.
   1. Fabricate curbs to compensate for roof slope at location of each curb unit.
   2. Fabricate curbs with minimum 24-inch height above roof deck, unless otherwise detailed.
   3. Fabricate curbs to width and length of unit being supported, less 1-1/2 in. overall to allow for membrane flashing installation.

B. Source:
   1. Model CRC-3 by Custom Curb, Inc.
   2. Model TC-3 by ThyCurb.

2.03 PRECAST CONCRETE SPLASH BLOCKS:

A. Qualities: Reinforced precast concrete splash blocks, fabricated from minimum 2500 psi

concrete, smooth finish, with drainage channel cast in top surface.

B. Size: Minimum 18 x 36 inch unless otherwise scheduled.

C. Source: Custom or standard commodity.

2.04 PIPE PENETRATION HOUSING:

A. Basis of Design Product: The Vault by Roof Penetration Housings. When installed on storm shelters, housings must be storm rated.
   1. Acceptable Manufacturers: Alta Products.
   2. Construction:
      a) 0.080-inch-thick aluminum housing and curb
      b) UV protected powder coated finish (2 mil thick)
      c) Stainless Steel. V.P. fasteners
      d) Gasketed lid to housing and housing to curb connection joints to ensure compliance to ICC 2015 Air Permeance Levels
      e) Standard Color: Beige – To meet an initial SRI of 85 (White available for SRI 100)
      f) Seismic Available upon request. Seismic calculations, conditions to be furnished to RPH by engineer
      g) Constructed to withstand wind to 225+ MPH, third party tested.
   3. Style & Sizes TWO MODELS AW SERIES AND THE AWI SERIES
      a) Series AWI – Same as AW Series w/Pre-Insulated curb, 6” Thick, R-40 Factor, to meet ICC – 2015 Energy Code. (The AWI model allows the A/E to comply with new Building Envelope Requirements to ensure that the complete envelope is insulated to Energy Code Regulations for every area in the country with one insulated curb.)
         1) Small Vault: Model: AWI-161010 L – 16 ½” W – 9 ¾” H – 10”
         2) Medium Vault: Model: AWI-201412 L – 20 ½” W – 14 ½” H – 12”
         3) Mega Vault: Model: AWI-343424 L – 34” W – 34” H – 24”

B. Assembled Roof Penetration Housings (For use in non-storm rated locations):
   1. Housing: Roof Products, Inc.; Model RPPC-90, 90-degree pipe chase.
      a) Finish: Galvanized.
   2. Exit Seal: Alta Products, LLC; Sigrist Exit Seal, Regular and X-Long as required.
      a) Size: As required for penetrating item.

2.08 RELATED MATERIALS

A. Concrete and Masonry Fasteners: Round-head stainless steel screw and neoprene washer with lead expansion anchor, FS FF-S-325, Group IV, Type 2, Powers Rawl Screw Type Nailins.

B. Nails: Stainless steel material, flathead, wire, barbed, slating, type. For washers use lead or neoprene.

C. Flashing Cement: ASTM D4586, Type I; asbestos free.

D. Asphaltic Coating Compound: FS TT-C-494A, Type II.

E. Downspout Nozzle: J.R. Smith Mfg.; Threaded Downspout Nozzle model 1770.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that substrates are smooth and clean to extent needed for roof accessories work.

B. Do not start work until conditions are satisfactory.

3.02 INSTALLATION

A. General:
   1. Install work watertight, without waves, warps, buckles, fastening stresses or distortion, allowing for expansion and contraction.
   2. Coat contact surfaces of dissimilar metals with asphalt coating compound or zinc chromate paint.
   3. Install curbs in accordance with manufacturer's instructions.

B. Pipe/Duct Supports:
   1. Install Pipe Support - Type 1 under single small piping and conduit, other than gas piping.
   2. Install Pipe Support - Type 2 under gas piping and piping and conduit 2 to 4 inch in diameter.
   3. Install scheduled pipe supports at 8 ft. o.c. and within 2 ft. of each change of direction.
   4. Secure pipe and conduit loosely in pipe support using metal strap fastened with two 1/2 in. No. 10 screws and provide pipe sleeves to prevent contact with dissimilar metals.
   5. Install Duct Supports – Type 3 at ductwork at 4’-0” on center in linear direction and within 2’-0” of each in change of direction.

C. Prefabricated Roof Curbs:
   1. Install prefabricated roof curb where shown
   2. Set level and square on roof deck; securely fasten curb flanges to roof deck with appropriate fasteners for type of deck material. Seal bolt heads with flashing cement.

D. Splash Blocks:
   1. Install splash blocks at downspouts discharging on lower roofs and on grounds. Set splash blocks on roof on a layer of roof walkway pad. Set splash blocks on grounds on full bearing of soil and adjust to slope away from building.

E. Pipe Penetration Housing:
   1. Install in accordance with manufacturer’s instructions
   2. Curb & Unit installed by Roofing Contractor
   3. Protect products unit project is complete.

3.03 CLEANING

A. Leave work clean and free of stains, scrap, and debris.

END OF SECTION 07 72 00

SECTION 07 81 00 - CEMENTITIOUS FIREPROOFING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Cementitious fire protection materials including, but is not limited to:
   1. Interior fireproofing, concealed from view and direct contact.
   2. Interior fireproofing, exposed to view and direct contact or abuse.
   3. Exterior fireproofing, exposed to the elements and contact and possible abuse.

B. This specification covers labor, materials, equipment, and application necessary for, and incidental to, the complete and proper installation of cementitious fire protection for application to steel structures and supports in accordance with all applicable requirements of contract documents.
   1. This specification is supplemented by the applicable requirements of building codes, insurance rating organizations and other authorities having jurisdiction.

1.2 RELATED SECTIONS

A. Section 05 21 00 – Steel Joist Framing.

B. Section 05 31 00 – Steel Roof Decking.

C. Section 07 84 13 - Penetration Fire Stopping.

D. Section 09 24 00 – Cement Plastering.

1.3 REFERENCES

A. Association of the Wall and Ceiling Industry (AWCI):
   1. AWCI Technical Manual 12-A - Standard Practice for the Testing and Inspection of Field Applied Sprayed Fire-Resistive Materials.

B. ASTM International (ASTM):
   1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
   2. ASTM E119 - Standard Test Method for Fire Tests of Building Construction and Materials.
   3. ASTM E605 - Standard for Thickness and Density of Sprayed Fire Resistive Materials Applied to Structural Members.
   4. ASTM E736 - Standard for Cohesion/Adhesion of Sprayed Fire Resistive Materials Applied to Structural Members (min 500 PCF).
   5. ASTM E759 - Standard for Effect of Deflection of Sprayed Fire Resistive Materials Applied to Structural Members.
   6. ASTM E761 - Standard for Compressive Strength of Sprayed Fire Resistive Materials Applied to Structural Members.
   7. ASTM E937 - Standard for Corrosion of Steel By Sprayed Fire Resistive Materials Applied to Structural Members.

C. International Building Code (IBC):
   1. IBC Standard - Thickness and Density Determination for Spray Applied Fire Protection.

1.4 DEFINITIONS

A. Approved Factory Finish: Product in compliance with the finish stated in the applicable Specification Section, or in Specification Section.

B. CSP: Concrete Surface Profiles.

C. Definitions of Painting Terms: ASTM D16, unless otherwise specified.

D. Dry Film Thickness (DFT): Thickness of a coat of cured paint measured in mils (1/1000 inch).

E. Environment: Final determination of environmental exposure category to be made by the Architect.
   1. Mild: Areas subject to a low level of external corrosion. Deemed by the owner or Architect to have a mild level of chemical exposure and low corrosion rates.
   2. Moderate: Areas subject to a moderate level of external corrosion. Deemed by the owner or Architect to have a moderate level of chemical exposure and moderate corrosion rates.
   3. Severe: Areas subject to a high level of external corrosion. Deemed by the owner or Architect to have a high level of chemical exposure and severe corrosion rates.

F. Exposed Exterior Surface: Area which is exposed to exterior weathering, but not necessarily UV exposure.

G. Finished Area: An area that is listed in or has finish called for on Room Finish Schedule or is indicated on Drawings to be painted.

H. Installer or Applicator: Personnel performing product installation onsite.

I. Mil: One thousandth of an inch.

J. SSPC SP: Society for Protective Coatings - Surface Preparation Standard for Protective Coatings.

K. VOC: Volatile Organic Compound.

L. Wet Film Thickness (WFT): Thickness of a coat of uncured (wet) paint measured in mils (1/1000 inch).

1.5 SUBMITTALS

A. Submit under provisions of Section 01 31 00 – Project Management and Coordination.

B. Product Data:
   1. Manufacturer's data sheets on each product to be used, use and limitations for each material used, and applicable fire test designs, as listed by approved fire testing organization.
   2. Preparation instructions and recommendations.
   3. Typical installations instructions.
   4. Storage and handling requirements and recommendations.

C. Performance Certification: Submit manufacturer's verification of performance criteria, fire performance and compliance with applicable standards.

D. Shop Drawings: Include details of materials, construction, and finish. Include relationship with adjacent construction.

E. Applicable Standards and Test Methods:

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.
   1. Asbestos: Manufacturer shall provide Certification that products supplied are 100% asbestos free.
   2. Fire Resistance: Provide fireproofing materials that have been listed and classified by one or more of the following testing authorities: Underwriters Laboratories (UL), or other testing and inspecting agency acceptable to the architect and authorities having jurisdiction.

B. Installer: Contractor shall be approved by manufacturer, and be experienced in installing specified products, and is approved by the manufacturer of the fireproofing products. A manufacturer's willingness to sell products to an installer engaged by contractor, does not in itself confer qualification on the buyer.

C. Single Source: Obtain spray applied fireproofing products from a single source for each product required. Provide secondary materials, which are acceptable to the fireproofing manufacturer which, are included in the tested and/or listed designs.

D. NFCA 200 - Field Quality Assurance Procedures for Application of Spray-Applied Fire Resistive Materials.
   1. Must be followed to help ensure material application meets design requirements for substrate surface conditions, water control, wet density, and thickness.

E. Special inspections shall be conducted by an owner engaged ICC Certified Special Inspector for SFRM to perform code mandated inspections following SFRM application.

1.7 PRE-INSTALLATION CONFERENCE

A. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda to include schedule, responsibilities, critical path items and approvals.
   1. Establish a procedure to maintain optimum working conditions and to coordinate this work with related an/or adjacent work.

1.8 COORDINATION

A. Sequence and coordinate application of sprayed fireproofing with other related work specified in other Sections to comply with the following requirements:
   1. Provide temporary enclosure for interior applications to prevent deterioration of applied materials exposed to unfavorable environmental conditions.
   2. Avoid exposure of fireproofing to unnecessary damage or abrasion.
   3. Do not apply fireproofing to metal roof decking until roofing is complete including installation of all air handling systems. Prohibit all roof traffic until application of fireproofing is completed and dry.
   4. Do not apply fireproofing until all hangers, clips and other necessary supports are in place, requiring penetration of fireproofing if installed after the application of fireproofing.
   5. Ducts, piping, and other items that would interfere with the application of fireproofing

shall not be installed, until application is completed.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the project in manufacturer's unopened packages, fully identified as to trade name, type, and other identifying data.
   1. Packaging: To bear the ULI labels and seals for fire resistance ratings.
      a. Products must be packaged with proper identifications and approval indications acceptable to the testing and/or listing agency.

B. Store materials at a temperature above 40 degrees F in a dry location, protected from the weather.

C. Damaged packages found unsuitable for use and any materials which have come into contact with contaminants prior to use shall be rejected and removed from the project.

1.10 PROJECT CONDITIONS

A. Environmental Limitations: Do not apply sprayed fireproofing material when ambient or substrate temperatures are 40 degrees F or lower, unless temporary heat and protection is provided to maintain temperatures at or above this level for 24 hours before, during and 24 hours after application of fireproofing.

B. Ventilation: Ventilate building spaces during and after application of fireproofing at a rate of four air changes per hour until fireproofing is dry. If natural ventilation is insufficient, employ mechanical means, as necessary.

C. Surfaces to be sprayed: Surfaces to be sprayed must be free of any substance that would impair proper adhesion.

D. Dedicated Pumping Station Area: The contractor shall make available to the fireproofing contractor suitable areas for permanent locations for mixing and pumping fireproofing. This site must be:
   1. Convenient to the structure.
   2. Be able to accommodate delivery of product.
   3. Allow for space for truck storage and trailer parking, and for materials and equipment.
   4. Be well drained.
   5. Be near a suitable source of potable water of quantity required.
   6. Have a proper source of electrical power, if required.
   7. Provide temporary heat and ventilation to comply with manufacturers recommendations.

1.11 WARRANTY

A. General Warranty: Submit a written warranty, executed by the contractor, and cosigned by the installer, agreeing to repair or replace sprayed fireproofing materials that fall within the specified warranty period.
   1. Failures include, but are not limited to cracking, flaking, eroding in excess of specified requirements, peeling and delaminating of sprayed fireproofing from substrates due to defective materials or installation.
   2. Not covered in this warranty are failures due to damage by others, such as occupants and owner maintenance personnel, exposure to environmental conditions other than those investigated and approved during fire-response testing, excessive flexing of floor systems, and work on said roof systems, and other causes not reasonably foreseeable under conditions of normal use.

B. Warranty Period: 1 year, from date of substantial completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Carboline, which is located at: 2150 Schuetz Rd.; St. Louis, MO 63146; Toll Free Tel: 800-848-4645; Tel: 314-644-1000; Fax: 314-644-4617; Email:request info (rfrye@carboline.com); Web:https://www.carboline.com

B. Substitutions: Approved Equal.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 PERFORMANCE AND DESIGN REQUIREMENTS
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A. Products to be cementitious fireproofing materials. A mixture of gypsum and/or cement-based materials, with lightweight aggregates mixed with water to form a slurry for conveyance and application.
   1. Mineral (dry spray) fiber-based products not permitted.

B. Physical properties must be in accordance with listed properties.

2.3 MEDIUM DENSITY CEMENTITIOUS FIREPROOFING

A. Medium Density Cementitious Fireproofing: Must meet the below listed minimum physical properties. For use in exposed regular conditioned areas.
   1. Exposed fire protection includes, but is not limited to the following areas:
      a. Stairwell columns and beams.
      b. Elevator shafts structural steel.
      c. Mechanical room columns.
      d. Areas where physical abuse may be encountered.

B. Basis of Design: Sprayed fire-resistive materials.
   1. Southwest Fireproofing Products, Type 7 GP as manufactured by Carboline for humidity conditions.
   2. Carboline P-239 for fire protection and acoustical value.

C. Physical Properties: Minimum values unless otherwise indicated or higher values required to attain designated fire resistance ratings. Measured per ASTM standard test methods as listed in the "Reference" Article of this specification
   1. ASTM E84: Flame Spread: 0. Smoke Developed: 0.
   2. ASTM E136: Passes. Determined to be non-combustible.
   3. ASTM E605: Density: 22 PCF.
   4. ASTM E736: Cohesion/Adhesion: Greater than 1268 psf.
   5. ASTM E759: No cracking, spalling or delamination.
   6. ASTM E760: Impact: No delamination, cracking, or spalling.
   7. ASTM E761: Compresión: 118 psi.
   8. ASTM E937: Corrosion: No evidence of corrosion allowed.
   9. ASTM G21: Mold Resistance: No evidence of growth.

2.4 MISCELLANEOUS MATERIALS

A. Miscellaneous Materials: Provide the following materials as standard with each of the fireproofing systems, as recommended by manufacturer for each condition and substrate.
   1. Primers: It is not recommended that any structural steel primers are used on any steel surfaces, unless tested and listed by ULI in designs proposed to be used. Compatible primers may be used, providing the fireproofing manufacturer can verify such compatibility in accordance with UL requirements.
   2. Adhesives: Provide adhesives as necessary, to comply with manufacturer requirements for adhesion of fireproofing. Acceptable adhesives are:
      a. TC-55 water based acrylic adhesive.
      b. Type DK Spatter Coat.
   3. Reinforcements: Provide fiberglass mesh or wire lath for areas where adhesion is not compatible and for application of fireproofing to steel joists.
   4. Mold Inhibitor: Provide factory added mold inhibitor tested in accordance with ASTM G 21 for areas such as hospitals, testing laboratories, health facilities and other areas of hygienic requirements.
   5. Top Coats: Use as required and recommended by fireproofing manufacturer or compatible products.

PART 3 - EXECUTION

3.1 PRE-INSTALLATION EXAMINATION

A. The Applicator and Contractor must examine surfaces to be fire protected and determined if the surfaces are satisfactory. Substrate conditions must comply with the following:
   1. Substrates: Must be free of grease, oil, rolling compounds, incompatible primers, loose mill scale, dirt or any other foreign matter which would prevent proper bonding of fireproofing.
   2. Structural Steel: Must be unprimed. Steel roof and floor decking shall be galvanized only.
   3. Any objects such as hangers, piping attachments, and other suspended retainer devices shall be properly secured.
   4. Ducts, piping, and other equipment shall not be placed or suspended until the fire protection materials are in place.

B. Do not begin installation until substrates have been properly constructed and prepared.
   1. Steel Surfaces: Structural steel and steel decking shall be unprimed.
   2. Painted Steel Surfaces: Steel surfaces requiring fireproofing that are painted and/or primed, shall meet UL requirements for application and adhesion characteristics.
   3. Provide certifications from fireproofing manufacturer of compatibility of fireproofing and painted systems. Restrictions published by UL shall apply.
   4. Remedial Work: Steel surfaces with incompatible primers or paint shall be remedied by removal of the primer or paint, be lathed, or otherwise remedied within the requirements of UL, so that adequate and approved bonding can occur, acceptable to authorities having jurisdiction.

C. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean any substrate not ready to receive fireproofing. Consult with manufacturer if conditions exist that are not easily remedied.

B. Apply adhesives, as necessary.

C. Cover all work subject to over sprays during application. Provide temporary enclosure when necessary to temporarily confine fireproofing and protect the environment.

D. Assure maintenance of ambient temperatures, and/or heat and ventilation when required.

3.3 APPLICATION PARAMETERS

A. The fireproofing contractor must be allowed to move freely to apply products, as necessary. Materials stored on the floor, are to be protected by the contractor, or relocated if these materials prevent the proper application of fireproofing.

B. Patching, repairing, and cleaning of fireproofing, due to damage done by others, is to be performed by the fireproofing applicator.

C. After completion of fireproofing, the fireproofing applicator will remove all equipment, and broom sweep all floor areas of overspray materials.

D. Application of fireproofing is not to commence until the project is at a stage to allow the applicator to apply product continuously and efficiently, without undue interference and delay by other trades.

E. Conference: Convene a pre-installation conference to establish a procedure to maintain optimum working conditions and to coordinate this work with related an/or adjacent work.

3.4 INSTALLATION

A. Spray Applied Fire Resistive Materials (SFRM) shall be installed in accordance with NFCA 100, "Standard Practice For The Application of Spray-Applied Fire Resistive Materials."

B. Comply with manufacturers written application instructions and procedures for mixing, conveying, and applying products, in accordance with the types of recommended equipment, admixtures and specific procedures regarding special conditions.

C. Coat substrates with adhesives if necessary.

D. Extend fireproofing materials in full thickness per approved design, to be protected. Unless otherwise recommended, install fireproofing complete in each area, prior to another.

E. Provide a uniform surface matching UL requirement for designs approved. Apply products at the minimum densities required, or greater.

F. Cure fireproofing to prevent premature drying; protect from freezing as listed in Section 1.05 of this specification.

G. Exposed to View Applications: Where exposed to view, provide appearance of fire protection as follows:
   1. Provide a troweled surface of appearance previously determined prior to installation.
   2. Surfaces shall be within tolerances of 1/16 inch.
   3. Mask edges of terminations to achieve neat and sharp edges.

3.5 FIELD QUALITY CONTROL

A. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

B. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.

C. Testing Agency: The owner shall engage, and the Contractor and Applicator shall approve a qualified independent testing agency to perform field quality inspections of applied fireproofing and prepare reports.
   1. Testing shall be done in accordance with AWCI "Technical Manual 12 - A, Standard Practice for the Testing and Inspecting of Field Applied Sprayed Fire - Resistive Materials" and ASTM E 605.
   2. Tests shall be done to determine thickness, density, and adhesion.
   3. Variances shall be corrected with the testing agency present and when the applicator is performing work in the same area to allow for expedient corrections.
   4. A schedule of tests to be performed shall be agreed upon by applicator, contractor, and testing agency.

3.6 CLEANING AND REPAIR

A. After completion of each day's work, the applicator shall broom clean the area fireproofed. Areas not to receive fireproofing and that are finished surfaces shall be masked.

B. Touch-up, repair or replace damaged fireproofing before Substantial Completion.
   1. All Touch-up, repair or replacing of damaged fireproofing must be completed by the Applicator.

END OF SECTION 07 81 00

SECTION 07 84 13 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Penetrations in fire-resistance-rated walls.
2. Penetrations in horizontal assemblies.
3. Penetrations in smoke barriers.

B. Related Requirements:

1. Joint Firestopping for joints in or between fire-resistance-rated construction, at exterior curtain-wall / floor intersections, in smoke barriers, and joints between rated construction and unrated construction.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 DEFINITIONS

A. TX-CHPS (CHPS for short, within the context of this project): TEXAS - COLLABORATIVE FOR HIGH PERFORMANCE SCHOOLS - 2015.

1.5 ACTION SUBMITTALS

A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.

B. Product Data: For each type of product.

1. Certification by firestopping manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs) and are nontoxic to building occupants.

C. CHPS Submittals

1. Product Data for CHPS Credits EQ7.1.1 “Additional Low Emitting Materials” for Adhesives and Sealants products showing compliance with CHPS. Submittals shall document compliance with requirements of the South Coast Air Quality Management District (SCAQMD) Rule 1168, Adhesive and Sealant Applications, amended January 2005.

2. Product Data for Credit EQ7.1.6 “Additional Low-Emitting Materials” Ceiling & Wall Systems. For ceiling and wall systems including but not limited to ceiling **insulation** installed within the structural envelop, wall insulation, acoustical ceiling panels, gypsum board wall panels, tackable wall panels, and wall coverings used inside the weatherproofing system, include printed statement of VOC content in submittals. Refer to Division 1 section “CHPS REQUIREMENTS” for full requirements. Statements of VOC content must show that product was measured (units shall match) and tested to be in compliance with (meet or exceed) the testing and VOC emission requirements of the California Department of Public Health’s (CDPH) Standard Method V1.1, 2010 (CDPH Standard Method). The test results shall be compliant with the Standard Method when modeled to the school classroom scenario using the classroom ceiling area and/or wall area as appropriate.
3. Refer to Division 1 section “CHPS REQUIREMENTS” for full requirements.

D. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.
1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire- resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

E. Shop drawings detailing materials, installation methods, and relationships to adjoining construction for each through-penetration firestop system, and each kind of construction condition penetrated and kind of penetrating item. Include firestop design designation of qualified testing and inspecting agency evidencing compliance with requirements for each condition indicated.
1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop configuration for construction and penetrating items. Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration approved by firestopping manufacturer's fire protection engineer with modifications marked.

F. Product certificates signed by manufacturers of firestopping products certifying that their products comply with specified requirements.

G. Product test reports from, and based on tests performed by, a qualified testing and inspecting agency evidencing compliance of firestopping with requirements based on comprehensive testing of current products.

H. Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, names of Architects and Owners, and other information specified.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.

1.7 CLOSEOUT SUBMITTALS

A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.10 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

1.11 DELIVERY, STORAGE AND HANDLING

A. Deliver firestopping products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.

B. Store and handle firestopping materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics:
   1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
   2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:

a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.
   1) UL in its "Fire Resistance Directory."
   2) Intertek Group in its "Directory of Listed Building Products."
   3) FM Global in its "Building Materials Approval Guide."

2.2 PENETRATION FIRESTOPPING SYSTEMS

A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
   1. Subject to compliance with requirements, provide products by one of the following
      a. 3M Fire Protection Products (800) 328–1687 http://solutions.3m.com/wps/portal/3M/en_US/fire-protection-systems-NA/firestop/?WT.mc_id=www.3m.com/firestop
      b. Tremco, Inc. (800) 562–2728 www.tremco.com

B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01- inch wg.
   1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

C. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
   1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
   2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.

D. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E 84.

E. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
   1. Permanent forming/damming/backing materials.
   2. Substrate primers.
   3. Collars.
   4. Steel sleeves

2.3 FILL MATERIALS

A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.

E. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.

F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a non-shrinking, homogeneous mortar.

H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.

I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam.

J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

2.4 MIXING

A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
   1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
   2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
   3. Remove laitance and form-release agents from concrete.

B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage

and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestopping materials. Remove tape as soon as it is possible to do so without disturbing firestopping's seal with substrates.

3.3 INSTALLATION

A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.

B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.
   1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.

C. Install fill materials by proven techniques to produce the following results:
   1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
   2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
   3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.
   4. Tool non-sag sealants immediately after sealant application and prior to the time skinning or curing begins. Form smooth, uniform beads of configuration indicated or required to produce fire-resistance rating, as well as to eliminate air pockets, and to ensure contact and adhesion of sealants with sides of joint. Remove excess sealant from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

3.4 IDENTIFICATION

A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with minimum 0.375-inch strokes.
   1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet from end of wall and at intervals not exceeding 30 feet on center.

B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
   1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
   2. Contractor's name, address, and phone number.
   3. Designation of applicable testing and inspecting agency.
   4. Date of installation.
   5. Manufacturer's name.
   6. Installer's name.

3.5 FIELD QUALITY CONTROL

A. Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2174.

B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.

C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

END OF SECTION 07 84 13

SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Silicone joint sealants.
   2. Urethane joint sealants.
   3. Mildew-resistant joint sealants.
   4. Latex joint sealants.

B. Related Requirements:
   1. Section 07 92 00 "Joint Sealants" for preformed compressible foam and precured joint seals.
   2. Concrete Paving Joint Sealants" for sealing joints in paved roads, parking lots, walkways, and curbing.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 DEFINITIONS

A. TX-CHPS (CHPS for short, within the context of this project): TEXAS - COLLABORATIVE FOR HIGH PERFORMANCE SCHOOLS - 2015.

1.5 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Joint-Sealant Schedule: Include the following information:
   1. Joint-sealant application, joint location, and designation.
   2. Joint-sealant manufacturer and product name.
   3. Joint-sealant formulation.
   4. Joint-sealant color.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified testing agency.

B. CHPS Submittals
   1. Product Data for CHPS Credits EQ7.1.1 “Additional Low Emitting Materials” for Adhesives and Sealants products showing compliance with CHPS. Submittals shall document compliance with requirements of the South Coast Air Quality Management District (SCAQMD) Rule 1168, Adhesive and Sealant Applications, amended January 2005.

2. Product Data for Credit EQ7.1.6 “Additional Low-Emitting Materials” Ceiling & Wall Systems. For ceiling and wall systems including but not limited to ceiling insulation installed within the structural envelop, wall insulation, acoustical ceiling panels, gypsum board wall panels, tackable wall panels, and wall coverings used inside the weatherproofing system, include printed statement of VOC content in submittals. Refer to Division 1 section “CHPS REQUIREMENTS” for full requirements. Statements of VOC content must show that product was measured (units shall match) and tested to be in compliance with (meet or exceed) the testing and VOC emission requirements of the California Department of Public Health’s (CDPH) Standard Method V1.1, 2010 (CDPH Standard Method). The test results shall be compliant with the Standard Method when modeled to the school classroom scenario using the classroom ceiling area and/or wall area as appropriate.
3. EQ17.1 Building Envelope Integrity - Construction Review
    a. Photographs and check off sheets shall be submitted to demonstrate that openings have been sealed after installation of a pipe, conduit, cable, duct, other MEP de- vice, and any wall envelope penetration installation or abandonment.
4. Refer to Division 1 section “CHPS REQUIREMENTS” for full requirements.

C. Product Test Reports: For each kind of joint sealant, for tests performed by manufacturer and witnessed by a qualified testing agency or for tests performed by a qualified testing agency.

D. Preconstruction Field-Adhesion-Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.

E. Field-Adhesion-Test Reports: For each sealant application tested.

F. Sample Warranties: For special warranties.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Product Testing: Test joint sealants using a qualified testing agency.
1. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

C. Pre-Installation Conference: Conduct conference at Project site to comply with requirements of the Division 1 section covering this activity. Joint sealants shall be discussed as integral components of other specified items/systems which require pre-installation conferences, e.g. masonry, envelope systems, roofing, openings, etc., as applicable.

1.8 PRECONSTRUCTION TESTING

A. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:
1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
2. Conduct field tests for each kind of sealant and joint substrate.
3. Notify Architect seven days in advance of dates and times when test joints will be erected.
    a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

4. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
5. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time and mixing instructions for multicomponent materials.

B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.10 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by joint- sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.11 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: Five years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

1. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):
   a. Architectural Sealants: 250 g/L.
   b. Sealant Primers for Nonporous Substrates: 250 g/L.
   c. Sealant Primer for Porous Substrates: 775 g/L.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

A. Silicone, S, NS, 25, NT: Single-component, non-sag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
   a. Pecora 890, Pecora Corporation 800-523-6688 www.pecora.com
   b. Pecora 895, Pecora Corporation 800-523-6688 www.pecora.com
   c. Sika Sil – 290, Sika Corporation, USA 800-933-7452 www.sikaconstruction.com
   d. Sika Sil – 295, Sika Corporation, USA 800-933-7452 www.sikaconstruction.com
   e. Spectrem 1, Tremco, Incorporated 800-852-9068 www.tremco.com
   f. Spectrem 2, Tremco, Incorporated 800-852-9068 www.tremco.com
   g. Spectrem 3, Tremco, Incorporated 800-852-9068 www.tremco.com
   h. Spectrem 4, Tremco, Incorporated 800-852-9068 www.tremco.com
2. Application: Interior vertical and non-traffic horizontal joints. Use Mildew Resistant Silicone sealant at showers, kitchens, perimeter joints of toilet fixtures, as indicated later in this specification.

2.3 URETHANE JOINT SEALANTS

A. Urethane, S, NS, 25, NT: Single-component, non-sag, nontraffic-use, plus 25 percent and minus 25 percent movement capability, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
   a. MasterSeal NP 1, BASF Construction Chemicals – Building Systems 800-433-9517 www.buildingsystems.basf.com (CHPS) class 25
   b. Chem-Calk 900, Bostik, Inc. 800-726-7845 www.bostik-us.com
   c. Chem-Calk 2639, Bostik, Inc. 800-726-7845 www.bostik-us.com
   d. Dynatrol I-XL, Pecora Corporation 800-523-6688 www.pecora.com (CHPS, ASTM D3960) class 50
   e. Permapol RC-1, Products Research & Chemical Corp.
   f. Sikaflex-1a, Sika Corporation, USA 800-933-7452 www.sikaconstruction.com (CHPS, EPA24) class 35
   g. Sikaflex-15LM, Sika Corporation, USA 800-933-7452 www.sikaconstruction.com
   h. Vulkem 116, Tremco, Incorporated 800-852-9068 www.tremco.com (CHPS) class 25
   i. DyMonic, Tremco, Incorporated 800-852-9068 www.tremco.com (CHPS) class

25

2. Application: Exterior joints in vertical surfaces and nontraffic horizontal surfaces as indicated below:
   a. Control and expansion joints in cast-in-place concrete.
   b. Control and expansion joints in unit masonry.
   c. Joints between different materials listed above.
   d. Perimeter joints between materials listed above and frames of doors and windows.
   e. Control and expansion joints in ceiling and overhead surfaces.
   f. Joints between precast concrete units and between precast units and other building elements.
   g. Other joints as indicated.

B. Urethane, S, NS, 25, T, NT: Single-component, non-sag, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Uses T and NT.
   1. Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
      a. MasterSeal NP 1, BASF Construction Chemicals – Building Systems 800-433-9517 www.buildingsystems.basf.com
      b. Chem-Calk 900, Bostik, Inc. 800-726-7845 www.bostik-us.com
      c. Permapol RC-1, Products Research & Chemical Corp.
      d. Sikaflex-1a, Sika Corporation, USA 201-933-8800 www.sikaconstruction.com
      e. Vulkem 116, Tremco, Incorporated 800-852-9068 www.tremco.com

C. Urethane, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade P, Class 25, Uses T and NT.
   1. Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
      a. MasterSeal SL 2, BASF Construction Chemicals – Building Systems 800-433-9517 www.buildingsystems.basf.com
      b. NR-201 Urexpan, Pecora Corporation 800-523-6688 www.pecora.com
      c. Stonflex SN6, Stonhard, Inc. 800-257-7953 www.stonhard.com
      d. Vulkem 45, Tremco, Incorporated 800-852-9068 www.tremco.com
      e. Vulkem 45SSL, Tremco, Incorporated 800-852-9068 www.tremco.com
      f. Sikaflex 1c SL, Sika Corporation, USA 201-933-8800 www.sikaconstruction.com
   2. Application: Exterior joints in exterior horizontal traffic surfaces.

D. Urethane, M, NS, 25, T, NT: Multicomponent, non-sag, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade NS, Class 25, Uses T and NT.
   1. Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
      a. Dymeric 240-240FC, Tremco, Incorporated 800-852-9068 www.tremco.com (T, NT, M, A, O):
      b. THC 900-901, Tremco, Incorporated 800-852-9068 www.tremco.com (T, M, A, O)
      c. Sikaflex 2c NS EZ mix, Sika Corp. 201-933-8800 www.sikaconstruction.com (T, NT, M, A, O)

2.4 MILDEW-RESISTANT JOINT SEALANTS

A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, non-sag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.
   1. Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
      a. 786, Dow Corning Corporation 800-248-2481 www.dowcorning.com (CHPS)
      b. SCS 1700 Sanitary, GE 877-943-7325 www.siliconeforbuilding.com (CHPS)
      c. 860 White, Pecora Corporation 800-523-6688 www.pecora.com (CHPS, ASTM D3960)
      d. Tremsil 200, Tremco, Incorporated 800-852-9068 www.tremco.com (CHPS)
      e. Sikasil GP Sika Corporation, USA 201-933-8800 www.sikausa.com
   2. Application: Interior vertical and nontraffic horizontal joints in wet areas (e.g. showers, kitchens, perimeter joints of toilet fixtures).

2.5 LATEX JOINT SEALANTS

A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
   1. Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following
      a. Chem-Calk 600, Bostik, Inc. 800-726-7845 www.bostik-us.com (CHPS)
      b. AC-20, Pecora Corporation 800-523-6688 www.pecora.com (CHPS)
      c. NR-201 Urexpan, Pecora Corporation 800-523-6688 www.pecora.com
      d. Tremflex 834, Tremco Incorporated 800-852-9068 www.tremco.com (CHPS)
   2. Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces as indicated below:
      a. Control and expansion joints on exposed interior surfaces of exterior walls.
      b. Perimeter joints of exterior openings.
      c. Vertical control joints on exposed surfaces of interior unit masonry and concrete walls and partitions.
      d. Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
      e. Joints between precast concrete units and between precast units and other building elements.
      f. Other joints as indicated.

2.6 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Non-staining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing. Backings shall be pre-formed, compressible, resilient, non-waxing, non-extruding strips of flexible, non-gassing polyethylene foam nonabsorbent to water and gas.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.7 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of

sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
   1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
   2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
      a. Concrete.
      b. Masonry.
      c. Unglazed surfaces of ceramic tile.
      d. Other porous joint substrates.
   3. Remove laitance and form-release agents from concrete.
   4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
      a. Metal.
      b. Glass.
      c. Porcelain enamel.
      d. Glazed surfaces of ceramic tile.
      e. Other nonporous joint substrates.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact

or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
   1. Do not leave gaps between ends of sealant backings.
   2. Do not stretch, twist, puncture, or tear sealant backings.
   3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
   1. Place sealants so they directly contact and fully wet joint substrates.
   2. Completely fill recesses in each joint configuration.
   3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Non-sag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
   1. Remove excess sealant from surfaces adjacent to joints.
   2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
   3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.
   4. Provide flush joint profile at where indicated, according to Figure 8B in ASTM C 1193.
   5. Provide recessed joint configuration of recess depth and at locations indicated according to Figure 8C in ASTM C 1193.
      a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

G. 2015 Texas CHPS Requirement: Any wall that is cored, drilled, cut (creating small holes), cut out during construction or left after the removal of a building system must be sealed and completely closed to prevent the flow of air or water through the opening. Compatible sealants, such as but not limited to the following, expandable foam, rubber, flexible sealant, epoxy or pourable polymer sealant, may be used to complete seals.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
   1. Extent of Testing: Test completed and cured sealant joints as follows:
      a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
      b. Perform one test for each 1000 feet of joint length thereafter or one test per each

floor per elevation.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
   a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
3. Inspect tested joints and report on the following:
   a. Whether sealants filled joint cavities and are free of voids.
   b. Whether sealant dimensions and configurations comply with specified requirements.
   c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.
4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 07 92 00

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes hollow-metal doors and frames.

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to SDI A250.8.

B. TX-CHPS (CHPS for short, within the context of this project): TEXAS - COLLABORATIVE FOR HIGH PERFORMANCE SCHOOLS - 2015.

1.4 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, temperature-rise ratings, and finishes.

B. Shop Drawings: Include the following:
   1. Elevations of each door type.
   2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
   3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
   4. Locations of reinforcement and preparations for hardware.
   5. Details of each different wall opening condition.
   6. Details of anchorages, joints, field splices, and connections.
   7. Details of accessories.
   8. Details of moldings, removable stops, and glazing.
   9. Details of conduit and preparations for power, signal, and control systems.

C. CHPS Submittals
   1. Product Data for Credit EQ7.0 “Low Emitting Materials” for Paints and Coatings and Credit EQ7.1.5 “Additional Low Emitting Materials” for Paints and Coatings. Submittals shall document compliance with requirements for Texas CHPS – refer to Section 09 91 00 “Painting and Coatings”.
   2. Refer to Division 1 section “CHPS REQUIREMENTS” for full requirements.

D. Samples for Initial Selection: For units with factory-applied color finishes.

E. Samples for Verification:
   1. For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches.
   2. For "Doors" and "Frames" subparagraphs below, prepare Samples approximately 8 by 10 inches to demonstrate compliance with requirements for quality of materials and construction:
      a. Doors: Show vertical-edge, top, and bottom construction; core construction; and hinge and other applied hardware reinforcement. Include separate section showing glazing if applicable.
      b. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow-metal panels and glazing if applicable.

F. Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.7 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.

B. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.
   1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4- inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers shall be current members of the Steel Door Institute, at time of bidding. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include the following:
   1. Steel Doors and Frames:

a. Black Mountain Door, LLC. 855-370-4580 www.blackmountaindoor.com/
b. Ceco Door, an ASSA ABLOY Group company 888-264-7474 www.cecodoor.com
c. CURRIES Company, an ASSA ABLOY Group company 641-423-1334 www.curries.com
d. Deansteel Manufacturing Company, Inc. 800-825-8271 www.deansteel.com
e. Mesker Door, Inc. 256-851-6670 www.meskerdoor.com
f. Pioneer Industries, Division of Security Holdings, LLC 201-933-1900 www.pioneerindustries.com
g. Rocky Mountain Metals, Inc. 575-445-2756 www.rockymountainmetals.com

2. Metal Louvers for Doors:
a. Air Louvers, Inc., A Division of Activar Construction Products Group 800-766-0660 www.airlouvers.com
b. Anemostat, A Mestek Company 310-835-7500 www.anemostat.com
c. Leslie-Locke, The Lehigh Group 800-755-9520 www.lehighgroup.com

B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.2 REGULATORY REQUIREMENTS

A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature- rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

B. Fire-Rated, Borrowed-Lite Assemblies: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

2.3 INTERIOR DOORS AND FRAMES

A. Construct interior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3. At all locations where doors are indicated in the Door and Frame Schedule.
1. Physical Performance: Level A according to SDI A250.4.
2. Doors:
a. Type: As indicated in the Door and Frame Schedule.
b. Thickness: 1-3/4 inches.
c. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 0.053 inch.
d. Edge Construction: Model 1, Full Flush.
a. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate core at manufacturer's discretion. A rated door core shall be as necessary to achieve the required door rating.
3. Frames:
a. Materials: Uncoated, steel sheet, minimum thickness of 0.053 inch.
b. Side-lite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
c. Construction: Full profile welded.

4. Exposed Finish: Prime.

2.4 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3. At all locations where doors are indicated in the Door and Frame Schedule.
   1. Physical Performance: Level A according to SDI A250.4.
   2. Doors:
      a. Type: As indicated in the Door and Frame Schedule.
      b. Thickness: 1-3/4 inches.
      c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A40 (ZF120) coating. Doors exceeding 36 inch in width, shall be made from a minimum thickness of 0.0747-inch steel sheet.
      d. Edge Construction: Model 1, Full Flush.
      e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate core at manufacturer's discretion. A rated door core shall be as necessary to achieve the required door rating.
         1) Thermal-Rated Doors: Provide doors fabricated with thermal-resistance value (R-value) of not less than 2.1 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.
   3. Frames:
      a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A40 (ZF120) coating.
      b. Shape: As indicated, including custom shapes with extra-long “2-inch back bend”.
      c. Construction: Full profile welded.
   4. Exposed Finish: Prime.

2.5 BORROWED LITES

A. Hollow-metal frames of uncoated steel sheet, minimum thickness of 0.053 inch.

B. Construction: Full profile welded.

2.6 FRAME ANCHORS

A. Jamb Anchors:
   1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
   2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
   3. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
   4. Post installed Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:
   1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
   2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing

not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

2.7 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.

D. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.
   1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

F. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

G. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.

H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

I. Glazing: Comply with requirements in Section 08 80 00 "Glazing."

J. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.8 FABRICATION

A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Hollow-Metal Doors:
   1. Fire Door Cores: As required to provide fire-protection and temperature-rise ratings indicated.
   2. Vertical Edges for Single-Acting Doors: Bevel edges 1/8 inch in 2 inches unless square edges are indicated.
   3. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets.
   4. Bottom Edge Closures: Close bottom edges of doors with end closures or channels of same material as face sheets.

5. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
6. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.

C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
1. Side-lite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
5. Jamb Anchors: Provide number and spacing of anchors as follows or at rated frames, as required to construct the rated assembly:
    a. Masonry Type: Locate anchors not more than 16 inches from top and bottom of frame. Space anchors not more than 32 inches o.c., to match coursing, and as follows:
        1) Two anchors per jamb up to 60 inches high.
        2) Three anchors per jamb from 60 to 90 inches high.
        3) Four anchors per jamb from 90 to 120 inches high.
        4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
    b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
        1) Three anchors per jamb up to 60 inches high.
        2) Four anchors per jamb from 60 to 90 inches high.
        3) Five anchors per jamb from 90 to 96 inches high.
        4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
    c. Compression Type: Not less than two anchors in each frame.
    d. Post-installed Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inche O.C.
6. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
    a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
7. Terminated Stops: Terminate stops 6 inches above finish floor with a 45-degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.

D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.

E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
1. Reinforce doors and frames to receive non-templated, mortised, and surface-

mounted door hardware.

2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with mitered hairline joints.

1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow- metal work.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
4. Provide loose stops and moldings on inside of hollow-metal work.
5. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

2.9 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.10 ACCESSORIES

A. Louvers: Provide louvers for interior doors, where indicated, which comply with SDI 111C, with blades or baffles formed of 0.020-inch- thick, cold-rolled steel sheet set into 0.032-inch- thick steel frame.

1. Sight-proof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.
2. Lightproof Louver: Stationary louvers constructed with baffles to prevent light from passing from one side to the other.
3. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link and listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same qualified testing and inspecting agency that established fire-resistance rating of door assembly.

B. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

C. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.

B. Hollow-Metal Frames: Install hollow-metal frames for doors, transoms, sidelights, borrowed lites, and other openings, of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    a. At fire-rated openings, install frames according to NFPA 80.
    b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    c. Install frames with removable stops located on secure side of opening.
    d. Install door silencers in frames before grouting.
    e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
    g. Where grout is indicated to be filled into frames, field apply bituminous coating to backs of frames that will be filled with grout containing anti-freezing agents.
2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post installed expansion anchors.
    a. Floor anchors may be set with power-actuated fasteners instead of post installed expansion anchors if so indicated and approved on Shop Drawings.
3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
5. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.
6. In-Place Concrete or Masonry Construction: Secure frames in place with post installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
7. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
8. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
    a. Squareness: Plus, or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    b. Alignment: Plus, or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
    c. Twist: Plus, or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.

d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Steel Doors:
a. Between Door and Frame Jambs and Head: 1/8 inch plus or minus 1/32 inch.
b. Between Edges of Pairs of Doors: 1/8 inch to 1/4 inch plus or minus 1/32 inch.
c. At Bottom of Door: 5/8 inch minus 1/32 inch, and no more than 3/4 inch.
d. Between Door Face and Stop: 1/16 inch to 1/8 inch plus or minus 1/32 inch.
2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

D. Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow-metal manufacturer's written instructions.
1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow-metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

D. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

E. Protection Removal: Immediately before final inspection, remove protective wrappings from doors and frames.

END OF SECTION 08 11 13

SECTION 08 14 16 - FLUSH WITH FRAME INTERIOR WOOD DOORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Flush with frame interior wood doors.

1.2 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry.

B. Section 08 71 00 - Door Hardware

C. Section 09 29 00 - Gypsum Board.

1.3 SUBMITTALS

A. Submit under provisions of Section 01 31 00 - Project Management and Coordination.

B. Product Data:
1. Manufacturer's data sheets on each product to be used.
2. Preparation instructions and recommendations.
3. Storage and handling requirements and recommendations.
4. Typical installation methods.

C. Verification Samples: Two representative units of each type, size, pattern, and color.

D. Shop Drawings: Include details of materials, construction, and finish. Include relationship with adjacent construction.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.

B. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.

C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

D. Mock-Up: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Locate mock-up as acceptable to Architect and provide temporary foundations and support.
1. Intent of mock-up is to demonstrate quality of workmanship and visual appearance.
2. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
3. Retain mock-up during construction as a standard for comparison with completed work.
4. Do not alter or remove mock-up until work is completed or removal is authorized.

1.5 PRE-INSTALLATION CONFERENCE

A. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store and handle in strict compliance with manufacturer's written instructions and

recommendations.

B. Protect from damage due to weather, excessive temperature, and construction operations.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.8 WARRANTY

A. Manufacturer's standard limited warranty unless indicated otherwise.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Bartels Doors, which is located at: 1901 Tigertail Blvd.; Dania Beach, FL 33004; Toll Free Tel: 866-529-679; Tel: 954-924-6137; Fax: 954-924-6138; Email:sales@bartelsusa.com; Web:http://www.bartelsusa.com

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 FLUSH WITH FRAME INTERIOR DOORS

A. Basis of Design: Standard Edge Door System, as supplied by Bartels Doors. Made of wood and come as a full system with all components included. Factory finished in furniture grade laminate, wood veneer or lacquer finish, so there is no difference between the door leaf, frame and edge. Concealed hinges provide an interior door panel that is flush with the casing (frame) on the "room side" of the door.
   1. Door type: Single. With door frame.
   2. Door Type: Double. With door frame. One door will be an inactive panel. With flush bolt for locking in place. If door is 96 inches in height the inactive panel to have automatic flush bolts.
      a. Latch: Roller Catch.
   3. Door Construction: All cores have an internal frame of solid wood to receive hinges, mortise and MWE barn door hardware combined with solid/tubular chipboard.
   4. Door perimeter: 1 to 2 inch solid wood.
      a. Door Core: Tubular chipboard. Allow heat and humidity to pass through freely.
      b. Door Core: Solid chipboard.
   5. Door Jamb and Casing: Various wall thickness and casing widths available provided in matching finish or other specified finish.
   6. Split Jamb and Casing for wall thicknesses up to 13 inch wall thickness.
   7. Minimum Wall Thickness: 3-15/16 inches.
   8. Casing Widths: 2-3/4 inches for white lacquered finished.
   9. Casing Widths: 4 inches.
   10. Rubber Sound Seal: Factory installed onto jamb to seal against door.
   11. Door Height: See Door Schedule
   12. Door Widths: See Door Schedule
   13. Magnetic Mortise and Strike Plate: Stainless steel. Finish: Matte.
   14. Door Lever: Karcher Design - Nevada
   15. Door Lever, Stainless Steel: Karcher Design - Montana
   16. Glazing Type: Tempered glass.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly constructed and prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.
   1. add other items such as tolerances if applicable; do not include step-by-step installation instructions.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

B. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.

3.5 CLEANING AND PROTECTION

A. Clean products in accordance with the manufacturer's recommendations.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 08 14 16

SECTION 08 41 13 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Exterior and interior storefront framing.
   2. Storefront framing for window walls.
   3. Exterior and interior manual-swing entrance doors and door-frame units.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 DEFINITIONS

A. TX-CHPS (CHPS for short, within the context of this project): TEXAS - COLLABORATIVE FOR HIGH PERFORMANCE SCHOOLS - 2015.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. CHPS Submittals:
   1. Product Data for Credit EQ7.0 “Low Emitting Materials” for Paints and Coatings and Credit EQ7.1.5 “Additional Low Emitting Materials” for Paints and Coatings. Submittals shall document compliance with requirements for Texas CHPS – refer to Section 09 91 00 “Painting”.
   2. Product Data for CHPS Credits EQ7.1.1 “Additional Low Emitting Materials” for Adhesives and Sealants products showing compliance with CHPS. Submittals shall document compliance with requirements of the South Coast Air Quality Management District (SCAQMD) Rule 1168, Adhesive and Sealant Applications, amended January 2005.
   3. Refer to Division 1 section “CHPS REQUIREMENTS” for full requirements.

C. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work prepared by storefront manufacturer on a system engineered by the storefront Manufacturer’s Engineer.
   1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
   2. Include full-size isometric details of each vertical-to-horizontal intersection of aluminum- framed entrances and storefronts, showing the following:
      a. Joinery, including concealed welds.
      b. Anchorage.
      c. Expansion provisions.
      d. Glazing.
      e. Flashing and drainage.
   3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.

D. Samples for Initial Selection: For units with factory-applied color finishes.

E. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

F. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch (300-mm) lengths of full-size components and showing details of the following:
   1. Joinery, including concealed welds.
   2. Anchorage.
   3. Expansion provisions.
   4. Glazing.
   5. Flashing and drainage.

G. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

H. Delegated-Design Submittal: For aluminum-framed entrances and storefronts indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and field-testing agency.

B. Energy Performance Certificates: For aluminum-framed entrances and storefronts, accessories, and components, from manufacturer.
   1. Basis for Certification: NFRC-certified energy performance values for each aluminum- framed entrance and storefront.

C. Product Test Reports: For aluminum-framed entrances and storefronts, for tests performed by manufacturer and witnessed by a qualified testing agency or by a qualified testing agency.

D. Source quality-control reports.

E. Field quality-control reports.

F. Sample Warranties: For special warranties.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated and accredited by IAS or ILAC Mutual Recognition Arrangement as complying with ISO/IEC 17025.

C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are

indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.9 MOCKUPS

A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation. Build mockups to comply with the following requirements, using all conditions and materials indicated in the drawings to be present in the completed Work.

1. Build mockup of typical wall area as shown on Drawings. Mockups shall be built by the Subcontractor responsible for the Project Work.
2. Locate mockups on-site in the location and of the size indicated or, if not indicated, as directed by Architect. Coordinate mockups with mockups for Division 4 Section “Unit Masonry Assemblies”.
3. Notify Architect 7 days in advance of the dates and times when mockups will be constructed.
4. Demonstrate the proposed range of aesthetic effects and workmanship.
5. Obtain Architect's approval of mockups before start of glazed aluminum curtainwall Work.
6. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
7. Testing shall be performed on mockups according to requirements in "Field Quality Control" Article.
8. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
9. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
    a. Structural failures including, but not limited to, excessive deflection.
    b. Noise or vibration created by wind and thermal and structural movements.
    c. Deterioration of metals and other materials beyond normal weathering.
    d. Water penetration through fixed glazing and framing areas.
    e. Failure of operating components.
2. Warranty Period: Two years from date of Substantial Completion.

B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:
    a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design aluminum-framed entrances and storefronts.

B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
   1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
   2. Failure also includes the following:
      a. Thermal stresses transferring to building structure.
      b. Glass breakage.
      c. Noise or vibration created by wind and thermal and structural movements.
      d. Loosening or weakening of fasteners, attachments, and other components.
      e. Failure of operating units.

C. Structural Loads:
   1. Wind Loads: As indicated on Drawings.
   2. Other Design Loads: As indicated on Drawings.

D. Deflection of Framing Members: At design wind pressure, as follows:
   1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
   2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch, whichever is smaller.
   3. Cantilever Deflection: Where framing members overhang an anchor point, as follows:
      a. Perpendicular to Plane of Wall: No greater than 1/240 of clear span plus 1/4 inch for spans greater than 11 feet 8-1/4 inches or 1/175 times span, for spans less than 11 feet 8-1/4 inches.

E. Structural: Test according to ASTM E 330 as follows:
   1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
   2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
   3. Test Durations: As required by design wind velocity, but not less than 10 seconds.

F. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
   1. Fixed Framing and Glass Area:
      a. Maximum air leakage of 0.06 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.
   2. Entrance Doors: Test according to ASTM E 283.
      a. Pair of Doors: Maximum air leakage of 1.0 cfm/sq. ft. at a static- air-pressure differential of 1.57 lbf/sq. ft.
      b. Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. at a static- air-pressure differential of 1.57 lbf/sq. ft.

G. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:
   1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.

H. Inter-story Drift: Accommodate design displacement of adjacent stories indicated.
   1. Design Displacement: H/400 or as indicated on Drawings, whichever is more stringent.
   2. Test Performance: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.4 at design displacement and 1.5 times the design displacement.

I. Energy Performance: Certify and label energy performance according to NFRC as follows:
   1. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than 35 as determined according to NFRC 500.

J. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:
   1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
   2. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.
      a. High Exterior Ambient-Air Temperature: That which produces an exterior metal- surface temperature of 180 deg F.
      b. Low Exterior Ambient-Air Temperature: 0 deg F.
      c. Interior Ambient-Air Temperature: 75 deg F.

2.2 MANUFACTURERS

A. Basis-of-Design (interior storefront system – single pane glazing, front glazing location, non-thermal isolated): Trifab VG 450, Kawneer North America 972-438-1212 www.kawneer.com

B. Basis-of-Design (exterior storefront system – interior glazed, insulated glazing, front glazing location, thermal isolated): Trifab VG451T, Kawneer North America 972-438-1212 www.kawneer.com

C. Basis-of-Design (entrance system): 500 Wide Stile, Kawneer North America 972-438-1212 www.kawneer.com

D. Manufacturers: Subject to compliance with requirements, provide the named product, or a comparable product by one of the following:
   1. Arcadia Incorporated 713-398-3227 www.arcadiainc.com/
   2. EFCO, a Pella Company 800-221-4169 www.efcocorp.com
   3. Kawneer North America 972-438-1212 www.kawneer.com
   4. Manko Window Systems, Inc. 800-642-1488 www.mankowindows.com
   5. YKK AP America Inc. 800-955-9551 www.ykkap.com

E. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing spandrel panels and accessories, from single manufacturer.

2.3 FRAMING

A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of

thickness required and reinforced as required to support imposed loads.

1. Construction: Thermally broken and Nonthermal.
2. Glazing System: Retained mechanically with gaskets on four sides.
3. Glazing Plane: Front.
4. Finish: Clear anodic finish.
5. Fabrication Method: Field-fabricated stick system.

B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

D. Provide manufacturer’s standard continuous extruded aluminum sub-sill receptors at all exterior frames. Basis of Design: Kawneer 451T-HP-037 thermally isolated sub-sill – use with the clip designed for the system. Sub-sill receptors shall have end dams made from the clipped sub-sill extrusion bent to form the end dams with sealant on both sides of the joint between the end dam legs. End dams shall be provided adjacent to jambs and at lower receptors where sills step. Sub- sill receptors shall be prefabricated with color to match framing. Allow for expansion of sub-sill receptors according to requirements of other Articles of this specification. “Break metal” sub-sill receptors will not be accepted.

E. Materials:

1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
   a. Sheet and Plate: ASTM B 209 (ASTM B 209M).
   b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
   c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
   d. Structural Profiles: ASTM B 308/B 308M.
2. Steel Reinforcement: Steel shall be coated with manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.
   a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
   b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
   c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.4 ENTRANCE DOOR SYSTEMS

A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.

1. Door Construction: 1-3/4-inch overall thickness, with minimum 0.125-inch-thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated, and fillet welded or that incorporate concealed tie rods.
2. Door Design: Wide stile; 5-inch nominal width.
3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
   a. Provide nonremovable glazing stops on outside of door.

2.5 GLAZING

A. Glazing: Comply with Section 08 80 00 "Glazing."

B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black,

resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

C. Glazing Sealants: As recommended by manufacturer.

2.6 ACCESSORIES

A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, non-staining, nonbleeding fasteners, and accessories compatible with adjacent materials.
   1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
   2. Reinforce members as required to receive fastener threads.
   3. If exposed fasteners are used, they shall be supplied with countersunk Phillips screw heads, finished to match framing system.
   4. Stops for glass lights, louvers, and other accessories shall be fastened in place using vandal proof fasteners.

B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
   1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.

C. Concealed Flashing: Manufacturer's standard corrosion-resistant, non-staining, nonbleeding flashing compatible with adjacent materials.

D. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.7 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:
   1. Profiles that are sharp, straight, and free of defects or deformations.
   2. Accurately fitted joints with ends coped or mitered.
   3. Physical and thermal isolation of glazing from framing members.
   4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
   5. Provisions for field replacement of glazing from interior for vision glass and exterior for spandrel glazing or metal panels.
   6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
   1. At exterior doors, provide compression weather stripping at fixed stops.
   2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.

F. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
   1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
   2. At exterior doors, provide weather sweeps applied to door bottoms.

G. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.8 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General:
   1. Comply with manufacturer's written instructions.
   2. Do not install damaged components.
   3. Fit joints to produce hairline joints free of burrs and distortion.
   4. Rigidly secure nonmovement joints.
   5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
   6. Seal perimeter and other joints watertight unless otherwise indicated.

B. Metal Protection:
   1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
   2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Set continuous sill members and flashing in full sealant bed as specified in Section 07 92 00 "Joint Sealants" to produce weathertight installation.

D. Install components plumb and true in alignment with established lines and grades.

E. Install glazing as specified in Section 08 80 00 "Glazing."

F. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.
   1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
   2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door

hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.3 ERECTION TOLERANCES

A. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:
   1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
   2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
   3. Alignment:
      a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
      b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
      c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
   4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections.

B. Field Quality-Control Testing: Perform the following test on representative areas of aluminum- framed entrances and storefronts.
   1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
      a. Perform a minimum of three tests in areas as directed by Architect.
      b. Perform tests in each test area as directed by Architect. Perform at least three tests, prior to 10, 35, and 70 percent completion.

C. Aluminum-framed entrances and storefronts will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

END OF SECTION 08 41 13

SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Door hardware for doors specified in "Hardware Sets" and required by actual conditions. Include screws, bolts, expansion shields, electrified door hardware, and other devices for proper application of hardware.

B. Products supplied but not installed under this Section:
1. Hardware for aluminum doors will be furnished under this Section but installed under Division 08 Openings.
2. Electrified hardware will be furnished under this Section but installed by the security contractor.
3. Final replacement of cylinder cores shall be installed by Owner.
4. Hold open wall magnets.

1.2 RELATED DIVISIONS

A. Division 08 - Openings.

B. Division 26 - Electrical.

C. Division 28 - Fire Detection and Alarm.

1.3 REFERENCES

A. American National Standards Institute/Builders Hardware Manufacturers Association (ANSI):
1. ANSI/BHMA A156.1 Butts & Hinges (2006).
2. ANSI/BHMA A156.2 Bored & Preassembled Locks & Latches (2011).
3. ANSI/BHMA A156.3 Exit Devices (2008).
4. ANSI/BHMA A156.4 Door Controls - Closers (2008).
5. ANSI/BHMA A156.5 Cylinders and Input Devices for Locks (2010).
6. ANSI/BHMA A156.6 Architectural Door Trim (2010).
7. ANSI/BHMA A156.7 Template Hinge Dimensions (2009).
8. ANSI/BHMA A156.10 Power Operated Pedestrian Doors (2011).
9. ANSI/BHMA A156.12 Interconnected Locks & Latches (2005).
10. ANSI/BHMA A156.13 Mortise Locks & Latches (2005).
11. ANSI/BHMA A156.14 Sliding & Folding Door Hardware (2007).
12. ANSI/BHMA A156.15 Closer Holder Release Devices (2011).
13. ANSI/BHMA A156.16 Auxiliary Hardware (2008).
14. ANSI/BHMA A156.17 Self Closing Hinges & Pivots (2010).
15. ANSI/BHMA A156.18 Materials & Finishes (2006).
16. ANSI/BHMA A156.19 Power Assist & Low Energy Power Operated Doors (2007).
17. ANSI/BHMA A156.21 Thresholds (2009).
18. ANSI/BHMA A156.22 Door Gasketing Systems (2012).
19. ANSI/BHMA A156.23 Electromagnetic Locks (2010).
20. ANSI/BHMA A156.24 Delayed Egress Locks (2003).
21. ANSI/BHMA A156.25 Electrified Locks (2007).
22. ANSI/BHMA A156.26 Continuous Hinges (2006).
23. ANSI/BHMA A156.28 Keying Systems (2007).
24. ANSI/BHMA A156.29 Exit Locks and Alarms (2007).
25. ANSI/BHMA A156.30 High Security Cylinders (2007).
26. ANSI/BHMA A156.36 Auxiliary Locks (2010).
27. ANSI/BHMA A156.115W Hardware Preparation in Wood Doors with Wood or Steel Frames (2006).
28. ANSI/BHMA A250.13 Testing and Rating of Severe Windstorm Resistant Components for Swinging Door Assemblies (2003).

B. International Code Council/American National Standards Institute (ICC/ANSI)/ADA:
   1. ICC/ANSI A117.1 Standards for Accessible and Usable Buildings and Facilities 2009.
   2. Americans with Disabilities Act Accessibility Guidelines (ADAAG).

C. Underwriters Laboratories, Inc. (UL):
   1. UL 10C Positive Pressure Fire Test of Door Assemblies.
   2. UL 1784 Air Leakage Test of Door Assemblies.
   3. UL/ULC Listed.

D. Door and Hardware Institute (DHI):
   1. DHI Publication - Keying Systems and Nomenclature (1989).
   2. DHI Publication - Abbreviations and Symbols.
   3. DHI Publication - Installation Guide for Doors and Hardware.
   4. DHI Publication - Sequence and Format of Hardware Schedule (1996).

E. National Fire Protection Agency (NFPA)
   1. NFPA 70 National Electrical Code 2011.
   2. NFPA 80 Standard for Fire Doors and Other Opening Protective's 2010.
   3. NFPA 101 Life Safety Code 2012.
   4. NFPA 105 Standard for the Installation of Smoke Door Assemblies 2010.

F. Building Codes
   1. IBC International Building Code 2012.

G. Miami Dade Building Code Compliance:
   1. Provide products where indicated with NOA numbers approved by Miami-Dade Building Code Compliance.

H. Florida Building Code Compliance:
   1. Provide products where indicated with Florida Building Code Certification Number.

1.4 SUBMITTALS

A. Submit in accordance with Conditions of the Contract and provisions of Section 01 30 00 - Administrative Requirements.

B. Shop Drawings: Hardware schedule shall be organized in vertical format illustrated in DHI Publications Sequence and Formatting for the Hardware Schedule. Include abbreviations and symbols page according to DHI Publications Abbreviations and Symbols. Complete nomenclature of items required for each door opening as indicated.
   1. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of hardware.
   2. Architectural Hardware Consultant (AHC), as certified by DHI, who shall affix seal attesting to completeness and correctness, shall review hardware schedule prior to submittal.

C. Submit manufacturer's catalog sheet on design, grade and function of items listed in hardware schedule. Identify specific hardware item per sheet, provide index, and cover sheet.

D. Coordination: Distribute door hardware templates to related divisions within fourteen days of receiving approved door hardware submittals.

E. Electrified Hardware: Provide electrical information to include voltage, and amperage requirements for electrified door hardware and description of operation.
   1. Description of operation for each electrified opening to include description of component functions including location, sequence of operation and interface with other building control systems.
   2. Wiring Diagrams: Detail wiring for power, signal, and control system and differentiate

between manufacturers installed and field installed wiring. Include the following:
a. System schematic.
b. Point to point wiring diagram.
c. Riser diagram.
d. Elevation of each door.
3. Detail interface between electrified door hardware and fire alarm, access control, security, and building control systems.

F. Upon door hardware submittal approval, provide for each electrified opening, three copies of point-to-point diagrams.

G. Maintenance Tool and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, removal, and replacement of door hardware.

H. Closeout Submittals: Submit to Owner in a three-ring binder or CD if requested.
1. Warranties.
2. Maintenance and operating manual including list of maintenance tools.
3. Maintenance service agreement.
4. Record documents.
5. Copy of approved hardware schedule.
6. Copy of approved keying schedule with bitting list.
7. Door hardware supplier name, phone number and fax number.

1.5 QUALITY ASSURANCE

A. Electrified door hardware shall be Listed and Labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authority having jurisdiction.

B. Hardware supplier shall employ an Architectural Hardware Consultant (AHC) as certified by DHI and a member of the seal program who shall be available at reasonable times during course of work for Project hardware consultation.
1. Electrified Door Hardware Supplier Qualifications: Experienced door hardware supplier who has completed projects with electrified door hardware similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

C. Door hardware shall conform to ICC/ANSI A117.1. Handles, Pulls, Latches, Locks, and operating devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.

D. Fire Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL 10C, unless otherwise indicated.

E. Fire Door Inspection: Prior to receiving certificate of occupancy have fire rated doors inspected by an independent certified Fire and Egress Door Assembly Inspector (FDAI), as certified by Intertek (ITS), a written report shall be submitted to Owner and Contractor. Doors failing inspection shall be adjusted, replaced, or modified to be within appropriate code requirements.

F. Smoke and Draft Control Door Assemblies: Where smoke and draft control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.

G. Door hardware shall be certified to ANSI/BHMA standards as noted, participate, and be listed in BHMA Certified Products Directory.

H. Pre-installation Meeting: Comply with requirements in Division 1 Section "Project Meetings".
   1. Convene meeting seven days before installation. Participants required to attend:
   2. Contractor, installer, material supplier, manufacturer representatives, electrical contractor, security consultant and fire alarm consultant.
   3. Include in conference decisions regarding proper installation methods and procedures for receiving and handling hardware.
   4. Review sequence of operation for each type of electrified door hardware, inspect, and discuss electrical roughing-in and other preparatory work performed by other trades.
   5. Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.

I. Within fourteen days of receipt of approved door hardware submittals contact Owner with representative from hardware supplier to establish a keying conference. Verify keyway, visual key identification, number of master keys and keys per lock. Provide keying system per Owner’s instructions.

J. Installer Qualifications: Specialized in performing installation of this Section and shall have five years minimum documented experience.

K. Hardware listed in Par.: Hardware Schedule is intended to establish a type and grade.

1.6 DELIVERY, STORAGE AND HANDLING

A. Provide a clean, dry and secure room for hardware delivered to Project but not yet installed.

B. Furnish hardware with each unit marked and numbered in accordance with approved finish hardware schedule. Include door and item number for each type of hardware.

C. Pack each item complete with necessary parts and fasteners in manufacturer's original packaging.

D. Deliver permanent key, cores, access control credentials, software, and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to Owner shall be established at "Keying Conference."

E. Waste Management and Disposal: Separate waste materials for reuse or recycling in accordance with Division 1.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.8 WARRANTY

A. General Warranty: Owner may have under provisions of the Contract Documents and shall be in addition to and run concurrent with other warranties made by Contractor under requirements of the Contract documents.

B. Special Warranty: Warranties specified in this article shall not deprive Owner of other rights. Contractor, hardware supplier, and hardware installer shall be responsible for servicing hardware and keying related problems.
   1. Ten years for manual door closers.
   2. Five years for mortise, auxiliary and bored locks.
   3. Five years for exit devices.
   4. Two years for electromechanical door hardware.

C. Products judged defective during warranty period shall be replaced or repaired in

accordance with manufacturer's warranty at no cost to Owner. There is no warranty against defects due to improper installation, abuse, and failure to exercise normal maintenance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Hager Companies, which is located at: 139 Victor St.; St. Louis, MO 63104; Toll Free Tel: 800-325-9995; Tel: 314-772-4400; Fax: 800-782-0149; Email:request info (bwilkins@hagerco.com); Web:http://www.hagerco.com

B. Substitutions: Approved Equal.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 HINGES

A. Hinges, including electric hinges and self-closing hinges when scheduled, shall be of one manufacturer as listed for continuity of design and consideration of warranty and shall be certified and listed by the following:
   1. Butts and Hinges: ANSI/BHMA A156.1
   2. Template Hinge Dimensions: ANSI/BHMA A156.7
   3. Self-Closing Hinges: ANSI/BHMA 156.17

B. Butt Hinges:
   1. Hinge weight and size unless otherwise indicated in hardware sets:
      a. Doors up to 36 inches wide and up to 1-3/4 inches thick provide hinges with a minimum thickness of .134 inch and a minimum of 4-1/2 inches in height.
      b. Doors from 36 inches wide up to 42 inches wide and up to 1-3/4 inches thick provide hinges with a minimum thickness of .145 inch and a minimum of 4-1/2 inches in height.
      c. For doors from 42 inches wide up to 48 inches wide and up to 1-3/4 inches thick provide hinges with a minimum thickness of .180 inch and a minimum of 5 inches in height.
      d. Doors greater than 1-3/4 inches thick provide hinges with a minimum thickness of 0.180 inch and a minimum of 5 inches in height.
      e. Width of hinge is to be minimum required to clear surrounding trim.
   2. Base material unless otherwise indicated in hardware sets:
      a. Exterior Doors: 304 Stainless Steel, Brass or Bronze material.
      b. Interior Doors: Steel material.
      c. Fire Rated Doors: Steel or 304 Stainless Steel materials.
      d. Stainless Steel ball bearing hinges shall have stainless steel ball bearings. Steel ball bearings are unacceptable.
   3. Quantity of hinges per door unless otherwise stated in hardware sets:
      a. Doors up to 60 inches in height provide 2 hinges.
      b. Doors 60 inches up to 90 inches in height provide 3 hinges.
      c. Doors 90 inches up to 120 inches in height provide 4 hinges.
      d. Doors over 120 inches in height add 1 additional hinge per each additional 30 inches in height.
      e. Dutch doors provide 4 hinges.
   4. Hinge design and options unless otherwise indicated in hardware sets:
      a. Hinges are to be of a square corner five-knuckle design, flat button tips and have ball bearings unless otherwise indicated in hardware sets.
      b. Out-swinging exterior and out-swinging access-controlled doors shall have non-removable pins (NRP) to prevent removal of pin while door is in closed position.
      c. When full width of opening is required, use hinges that are designed to swing door completely from opening when door is opened to 95 degrees.
      d. Electric Through Wire (ETW) to have appropriate number of wires to transfer

power through door frame to door for proper connection of finish hardware and certified to handle an amperage rating of 3.5AMPS/continuous duty with 16.0AMPS/intermittent duty.

e. Provide mortar boxes for frames that require any electrically modified hinges if not an integral part of frame.

f. When shims are necessary to correct frame or door irregularities, provide metal shims only.

5. Acceptable Manufacturer:

a. Hager Companies BB1279/BB1191 standard weight, BB1168/BB1199 heavy weight.

2.3 RESCUE HARDWARE

A. Rescue hardware sets shall be of one manufacturer as listed for continuity of design and consideration of warranty. Manufacturer shall meet the requirements for:

1. Butts and Hinges: ANSI/BHMA A156.1

B. Material and Design: Head and floor pivots shall consist of stainless steel and polycarbonate top and bottom units. Provide walking type cam operated pivots for top and bottom. Use with wood or hollow metal doors not exceeding 36 by 70 inches and 135 pounds. Edge of doors shall be square on pivot side.

C. Acceptable Manufacturer: Hager Companies, which is located at: 139 Victor St.; St. Louis, MO 63104; Toll Free Tel: 800-325-9995; Tel: 314-772-4400; Fax: 800-782-0149; Email:request info (bwilkins@hagerco.com); Web:http://www.hagerco.com

1. Hager Companies 512.

D. Combination Rescue Door Stop and Double Lipped Strike: Door release allows doors to be opened in both directions without damage to frame. Strike shall be full lip and be width dimension of jamb depth.

E. Acceptable Manufacturer:

1. Hager Companies 455 for 5-3/4 inches jamb depth.

2.4 FLUSH BOLTS AND COORDINATORS

A. Flush bolts shall be of one manufacturer as listed for continuity of design and consideration of warranty. Manufacturer to be listed for Auxiliary Hardware: ANSI/BHMA A156.16

B. Labeled openings: Provide automatic or constant latching flush bolts per hardware schedule for inactive leaf of pairs of doors. Provide dust proof strikes for bottom bolt.

C. Non-Labeled openings: Provide two flush bolts for inactive leaf of pairs of doors per hardware schedule. Top bolt shall not be more than 78 inches centerline from floor. Provide dust proof strike for bottom bolt.

D. Acceptable Manufacturer:

1. Hager Companies 282D manual flush bolt, 292D/295W/296W auto flush bolt, 280X dust proof strike.

E. Coordinators: Provide for labeled pairs of doors with automatic flush bolts or with vertical rod exit device with a mortise-locking device per hardware schedule. Provide filler piece to extend full width of stop on frame. Provide mounting brackets for closers and special preparation for latches where applicable.

F. Acceptable Manufacturer:

1. Hager Companies 297 coordinator, 297M bracket, 297N bracket for stops greater than 2-1/4 inches.

2.5 FLUSHBOLTS FOR ALUMINUM DOORS

A. Provide two-point flush-bolt for inactive leaf of pairs of doors with locked and unlocked indicator. Match cylinder height of lock on active leaf with indictor. Provide stainless steel top and bottom bolts.

B. Acceptable Manufacturer:
   1. Adams Rite: MS1880.

2.6 REMOVABLE MULLIONS

A. Keyed and non-keyed removable mullions shall be of one manufacturer as listed for continuity of design and consideration of warranty. Manufacturer to be listed by UL/cUL/Warnock Hersey for fire rated pairs of doors up to 8 feet tall by 8 feet wide opening. Material and Design:
   1. For use with rim exit devices on non-rated and fire rated pairs of doors. Mullion 2 inches x 3 inches x 11 gage steel tube.
   2. Top Fitting:
      a. Mullion shall be locked in place without use of a key.
      b. Deadlock on fire rated device.

B. Acceptable manufacturers for keyed removable mullions:
   1. Hager Companies: 4900TF, keyed fire rated, 4900T keyed non-fire rated.

C. Acceptable manufacturers for removable mullions:
   1. Hager Companies: 4900UF fire rated, 4900U non-fire rated.

2.7 ELECTRIC STRIKES

A. Provide for use with type of locks shown on hardware schedule. Manufacturer shall meet the following:
   1. ANSI/BHMA A156.31 Electric Strikes and Frame Mounted Actuators Grade 1.
   2. UL Tested 1500 lb static strength.
   3. UL listed for Fire Doors and Frames where applicable.
   4. UL 1034 Burglary Resistance.
   5. UL10C.3H fire rated, 4 feet by 8 feet door.

B. Material and Design:
   1. To accept up to 3/4-inch latch bolt and 1 inch deadbolt.
   2. Field reversible, Fail Safe of Fail Secure
   3. Dual voltage 12/24 VDC.
   4. Tamper resistant, stainless steel corrosion resistance parts, and cast body and keeper.

C. Options:
   1. Latch Bolt Monitoring (LBM) Signals the door is closed and latched or unlatched and open.
   2. Door Secure Monitor (DSM) Door secure and unlocked monitoring.
   3. Deadbolt Monitoring (DBM) Signals deadbolt projected or retracted.
   4. Plug in buzzer (BUZZ) Indicates Fail Secure strike is energized and unlocked.
   5. Rectifier (RECT) Converts AC to DC

D. Acceptable Manufacturer:
   1. Hager Companies 2930 series.

2.8 LOCKS AND LATCHES (GRADE 1 CYLINDRICAL)

A. Locks and latches shall be of one manufacturer as listed for continuity of design and consideration of warranty. Product to be certified and listed by following:

1. ANSI/BHMA A156.2 Series 4000 Certified to Grade 1.
2. ANSI/BHMA A250.13 Certified for a minimum design load of 1150lbf for single out swinging doors measuring 36 inches in width and 84 inches in height and a minimum design load of 1150lbf for out swinging single doors measuring 48 inches in width and 84 inches in height.
3. UL/CUL Labeled and listed for functions up to 3 hours for single doors up to 48 inches in width and up to 96 inches in height.
4. UL10C/UBC 7-2 Positive Pressure Rated.
5. ICC/ANSI A117.1.

B. Lock and latch function numbers and descriptions of manufacturer's series as listed in hardware sets. Material and Design:
1. Lock and Latch chassis to be Zinc dichromate for corrosion resistance.
2. Keyed functions to be of a freewheeling design to help resists against vandalism.
3. Non-handed, field reversible.
4. Thru-bolt mounting with no exposed screws.
5. Levers shall be Zinc cast and plated to match finish designation in hardware sets.
6. Roses shall be of solid Brass or Stainless-Steel material.

C. Latch and Strike:
1. Stainless Steel latch bolt with minimum of 1/2 inch throw and deadlocking for keyed and exterior functions. Provide 3/4-inch latch-bolt for pairs of fire rated doors where required by door manufacture. Standard backset to be 2-3/4 inches and faceplate shall be adjustable to accommodate a square edge door or a standard 1/8-inch beveled edge door.
2. Strike is to fit a standard ANSI A115 prep measuring 1-1/4 inches by 4-7/8 inches with proper lip length to protect surrounding trim.
3. Doors requiring lead line protection provide locks with 1/16-inch lead applied to lock and 1/16-inch lead wrapped around latch bolt.
4. Provide knurled levers on entry side of doors that are potentially dangerous to visually impaired persons.

D. Electric Locks:
1. Fail Safe (power locks lever) outside trim is locked when power is applied and unlocked when power is removed. Lockset will unlock in the event of a power failure. (EL).
2. Fail Secure (power unlocks lever) outside trim is locked when there is no power and unlocked when power is applied. Lockset will be locked in the event of a power failure. (EU).
3. Request to Exit: Monitors inside lever rotation. (RX).

E. Acceptable Manufacturer:
1. Hager Companies: 3400 Series.

2.9 PUSHBUTTON LOCK

A. Locks and latches shall be of one manufacturer as listed for continuity of design and consideration of warranty. Product to be listed by UL/CUL labeled and listed for functions up to 3 hours for single doors up to 48 inches in width and up to 96 inches in height.

B. Lock and latch function numbers and descriptions of manufacturer's series as listed in hardware sets. Material and Design:
1. Support 100 to 2000 PIN codes, multi-level user code and one time service codes. Provide free passage, group, and total lock-out modes.
2. Provide metal keypad with key override.

C. Acceptable Manufacturer:
1. Alarm Lock: DL2700 Series.

2.10 PUSH/PULL LATCH

A. Latches shall be of one manufacturer as listed for continuity of design and consideration of warranty. Product shall meet the following:
   1. ICC/ANSI A117.1 Standards for Accessible and Usable Buildings and Facilities (2009).
   2. UL listed.

B. Material and Design:
   1. Latch: Stainless Steel.
   2. Push/Pull levers 1-15/16 inches by 4-1/2 inches, escutcheon 3-1/16 inches by 5 inches (127 mm), and projection 2-5/8 inches.
   3. Latch Bolt Throw 1/2 inch with 2-3/4 inches backset or 5 inches backset (optional).
   4. Mounts five positions: Levers down, levers up, one lever up one lever down (push), one lever up one lever down (pull), and levers point away from latch.
   5. Engraving: "PUSH", "PULL" (optional).

C. Acceptable Manufacturer:
   1. Hager Companies: 311H or 311L for lead lined.

2.11 DEADBOLTS (GRADE 1)

A. Deadbolts shall be of one manufacturer as listed for continuity of design and consideration of warranty. Manufacturer to be certified by the following:
   1. Auxiliary Locks: ANSI/BHMA A156.5 Grade 1.
   2. UL/CUL listed for functions up to 3 hours for "A" label.
   3. UL10C/UBC 7-2 Positive Pressure Rated.

B. Deadbolt function numbers and descriptions of manufacturer's series as listed in hardware sets. Material and Design:
   1. Latch bolt 1 inch throw, material brass with concealed harden steel roller to prevent sawing or cutting.
   2. Freewheeling collar design to help resists against vandalism.
   3. Non-handed, field reversible.

C. Acceptable Manufacturer:
   1. Hager Companies: 3100 Series.

2.12 MAGNETIC LOCKS

A. Shall be of one manufacturer as listed for continuity of design and consideration of warranty. Manufacturer shall meet requirements for ANSI/BHMA A156.23 Grade 1 Compliant. Design:
   1. Epoxy free, field upgradeable and repairable.
   2. Interlocking mounting plate to secure wiring and mounting screws.
   3. 1,200 lb. holding force.
   4. Surfaces plated and anodized.
   5. Built-in field adjustable 0-30 seconds re-lock delay (TIME).
   6. Indicates door open and door closed (DPS).
   7. Indicates locked and unlocked, low holding power, tampering and obstruction between armature and magnetic core. (MBS).
   8. Indicates access cover removed, SPDT dry, 1 amp @ 30 VDC.
   9. Door coordinator mounting kit (DC-1).
   10. Spacer bracket for concrete filled and blade stop applications. (UF11V).

B. Acceptable Manufacturer:
   1. Hager Companies 2953 single, 2954 double.

2.13 EXIT DEVICES (GRADE 1)

A. Shall be touch pad type, finish to match balance of door hardware. Exit Devices shall be of one manufacturer as listed for continuity of design and consideration of warranty. Manufacturer to be certified and or listed by the following:
   1. BHMA Certified ANSI A156.3 Grade 1.
   2. UL/CUL Listed for up to 3 hours for "A" labeled doors.
   3. UL10C/UBC 7-2 Positive Pressure Rated.
   4. UL10B Neutral Pressure Rated.
   5. UL 305Listed for Panic Hardware.
   6. 2007 Florida Building Code Certification Number: FL9481.1.
   7. ANSI/BHMA A250.13 Severe Windstorm Resistant Component.

B. Material and Design:
   1. Touch pad shall extend a minimum of one half-door width. Freewheeling lever design shall match design of locks levers. Exit device to mount flush with door.
   2. Latch bolts: Rim device - 3/4 inch throw, Pullman type with automatic dead-latching, stainless steel. Surface vertical rod device - Top 1/2 inch throw, Pullman type with automatic dead-latching, stainless steel. Bottom 1/2 inch throw, Pullman type, held retracted during door swing, stainless steel.
   3. Fasteners: Wood screws, machine screws and thru-bolts.

C. Lock and Latch Functions: Function numbers and descriptions of manufacturer's series and lever styles indicated in door hardware sets.

D. Acceptable Manufacturer: Hager Companies, which is located at: 139 Victor St.; St. Louis, MO 63104; Toll Free Tel: 800-325-9995; Tel: 314-772-4400; Fax: 800-782-0149; Email:bwilkins@hagerco.com; Web:http://www.hagerco.com
   1. Hager Companies: 4500/4600 Series.

E. Electric Modifications:
   1. Electric Latch Retraction: Continuous duty solenoids retract the latch bolt for momentary or maintained periods of time.
   2. Provide Request to Exit (REX) switches as scheduled.
   3. Electrified Trim: Outside trim locked (EL) or unlocked (EU) by electric current.
   4. Delayed Egress with Wall Mounted Controller (4501 DE).

2.14 NON-LATCHING PRESURE SENSE PUSH BAR

A. Shall be finish to match balance of door hardware. Non-latching push bars shall be of one manufacturer as listed for continuity of design and consideration of warranty.

B. Design: No moving parts. Tri-Failsafe, third redundant switch is automatically activated to release door if both sensors or electronics fail. Minimum projection from door 1.875 inches. Two dry contact for lock release, request to exit, alarm, or CCTV. Activation force 5 lbs, field adjustable to 15 lb (6.75 Kg).

C. Acceptable Manufacturer:
   1. Hager Companies 4801.

2.15 CYLINDERS AND KEYING

A. Cylinders shall be of one manufacturer as listed for continuity of design and consideration of warranty.

B. Standards: Manufacturer shall meet the following:
   1. Auxiliary Locks: ANSI/BHMA A156.5
   2. DHI Handbook "Keying systems and nomenclature" (1989)

C. Cylinders:
   1. Manufacturer's standard tumbler type, seven-pin IC core and seven-pin conventional core supported by the Hager H1 keyway.
   2. Shall be furnished with cams/tailpieces as required for locking device that is being furnished for project.

D. Keying:
   1. Copy of Owners approved keying schedule shall be submitted to Owner and Architect with documentation of which keying conference was held and Owner's sign-off.
   2. Provide a bitting list to Owner of combinations as established and expand to twenty five percent for future use or as directed by Owner.
   3. Key into Owner's existing keying system if applicable.
   4. Keys to be shipped to Owner's representative, individually tag per keying conference.
   5. Provide visual key control identification on keys.
   6. Provide interchangeable cores with construction cores as required per hardware schedule.
   7. Single seven-pin key shall operate both conventional cores and SFIC small format interchangeable cores.

E. Acceptable Manufacturer: Hager Companies, which is located at: 139 Victor St.; St. Louis, MO 63104; Toll Free Tel: 800-325-9995; Tel: 314-772-4400; Fax: 800-782-0149; Email: request info (bwilkins@hagerco.com); Web:http://www.hagerco.com
   1. Hager Companies: 3900 Series H1 keyway.

2.16 PUSH/PULL PLATES AND BARS

A. Push and pull plates shall be of one manufacturer as listed for continuity of design and consideration of warranty. Manufacturer to be certified by the following:
   1. Architectural Door Trim: ANSI/BHMA A156.6.
   2. Americans with Disabilities Act Accessibility Guidelines (ADAAG).

B. Push plates: .050-inch thick, square corner and beveled edges with counter sunk screw holes. Width and height as stated in hardware sets.
   1. Acceptable Manufacturer:
      a. Hager Companies: 30S.

C. Pull plates: .050-inch thick, square corner and beveled edges. Width and height as stated in hardware sets, 3/4-inch diameter pull, with clearance of 2-1/2 inches from face of door.
   1. Acceptable Manufacturer:
      a. Hager Companies: H33J.

D. Push Pull Bar Sets: 1 inch round bar stock with 2-1/2 inches clearances from face of door. Offset to be 3 inches, 90-degree standard. Center to center size should be door width less 1 stile width.
   1. Acceptable Manufacturer:
      a. Hager Companies: H160D.

2.17 CLOSERS (ALUMINUM BODY GRADE 1)

A. Shall be product of one manufacturer. Unless otherwise indicated on hardware schedule, comply with manufacturer's recommendations for size of closer, depending on width of door, frequency of use, atmospheric pressure, ADAAG requirements, and fire rating. Manufacturer to be certified by the following:
   1. BHMA Certified ANSI A156.4 Grade 1.
   2. ADA Complaint ANSI A117.1.
   3. UL/CUL Listed up to 3 hours.
   4. UL10C Positive Pressure Rated.
   5. UL10B Neutral Pressure Rated.

B. Material and Design:
   1. Provide aluminum non-handed bodies with full plastic covers.
   2. Closer shall have separate staked adjustable valve screws for latch speed, sweep speed, and backcheck.
   3. Provide Tri-Pack arms and brackets for regular arm, top jamb, and parallel arm mounting.
   4. Double heat-treated steel, tempered springs.
   5. Precision machined, heat-treated steel piston.
   6. Triple heat-treated steel spindle.
   7. Full rack and pinion operation.

C. Mounting:
   1. Out swing doors shall have surface parallel arm mount closers except where noted on hardware schedule.
   2. In swing doors shall have surface regular arm mount closers except where noted on hardware schedule.
   3. Provide brackets and shoe supports for aluminum doors and frames to mount fifth screw.
   4. Furnish drop plates where top rail conditions on door do not allow for mounting of closer and where backside of closer is exposed through glass.

D. Size closers in compliance with requirements for accessibility (ADDAG). Comply with following maximum opening force requirements. Interior hinged openings: 5.0 lb Fire rated and exterior openings shall have minimum opening force allowable by authority having jurisdiction.

E. Fasteners: Provide self-drilling and tapping wood screws, machine screws and sex nuts and bolts for each closer.

F. Acceptable Manufacturer: Hager Companies, which is located at: 139 Victor St.; St. Louis, MO 63104; Toll Free Tel: 800-325-9995; Tel: 314-772-4400; Fax: 800-782-0149; Email: bwilkins@hagerco.com; Web: http://www.hagerco.com
   1. Hager Companies: 5200/5300 Series.

2.18 FLOOR CLOSERS

A. Shall be product of one manufacturer. Unless otherwise indicated on hardware schedule, comply with manufacturer's recommendations for size of closer, depending on width of door, frequency of use atmospheric pressure, and fire rating. Manufacturer to be certified or listed by the following:
   1. Closers ANSI/BHMA A156.4.
   2. UL/cUL Listed up to 3 hours.
   3. ADA Complaint ANSI A117.1.

B. Material and Design: Closer to have separate, independent, and adjustable valves for closing speed, latch speed and have built-in dead stop to prevent door from swinging beyond required opening degree. Provide cement cases, install before floor construction.

C. Acceptable Manufacturer:
   1. Rixson.

2.19 ROTECTIVE TRIM

A. Size of protection plate: Single doors, size two inches less door width (LDW) on push side of door, and one inch less on pull side of door. For pairs of doors, size one inch less door width (LDW) on push side of door, and 1/2 inch on pull side of door. Kick plates 10 inches high or sized to door bottom rail height. Mop Plates 4 inches high. Armor Plates 36 inches high. Manufacturer shall meet requirements for:
   1. Architectural Door Trim: ANSI/BHMA A156.6.

2. UL.

B. Material and Design:
1. .050-inch gage stainless steel.
2. Corners shall be square. Polishing lines or dominant direction of surface pattern shall run across the door width of plate.
3. Bevel top, bottom and sides uniformly leaving no sharp edges. Edges shall be de-burred.
4. Countersink holes for screws. Screws holes shall be spaced equidistant eight inches CTC, along a centerline not over 1/2 inch in from edge around plate. End screws shall be a maximum of 0.53 inch from corners.

C. UL label stamp required on protection plates when top of plate is more than 16 inches above bottom of door on fire rated openings. Verify door manufacturers UL listing for maximum height and width of protection plate to be used.

D. Acceptable Manufacturer:
1. Hager Companies: 194S.

2.20 STOPS AND HOLDERS

A. Wall Stops: Provide door stops wherever necessary to prevent door or hardware from striking an adjacent partition or obstruction. Provide wall stops when possible. Door stops and holders mounted in concrete floor or masonry walls shall have stainless steel machine screws and lead expansion shields. Manufacturer shall meet requirements for Auxiliary Hardware: ANSI/BHMA A156.16.

B. Acceptable Manufacturer:
1. Hager Companies 232W convex, 236W concave.

C. Overhead Stops and Holders: Provide overhead stop and holders for doors that open against equipment, casework sidelights and other objects that would make wall stops/holders and floor stops/holders inappropriate. Provide sex bolt attachments for mineral core wood door applications.

D. Standards: Manufacturer shall be certified by the following: Overhead Stops and Holders: ANSI/BHMA A156.8 Grade 1.

E. Acceptable Manufacturer:
1. Hager 7000 SRF Series, heavy duty surface, 7000 CON Series heavy duty concealed.

2.21 ELECTROMAGNETIC HOLDERS

A. Shall be of one manufacturer as listed for continuity of design and consideration of warranty. Manufacturer shall meet requirements for:
1. ANSI 156.15 Grade 1.
2. UL/ULC listed.
3. California State Fire Marshall listed (CSFM).
4. City of New York MEA approved.

B. Material and Design: Provide electromagnetic holders where self-closing fire doors and smoke barrier doors are required to be held open. Electromagnetic holders to be fail safe, when electrical current is interrupted, doors release to close automatically. Holding force shall be 25-40 lb.

C. Acceptable Manufacturer:
1. Hager Companies: 380 Series.

2.22 PROXIMITY/ PIN READER

A. Shall be of one manufacturer as listed for continuity of design and consideration of warranty. Provide access up to 650 card users and shall be a HID compatible proximity reader. Material and Design:
   1. Weather resistance two-piece enclosure standalone access control reader.
   2. Access mode selectable, proximity card only, proximity card plus pin number, or key in card number only.
   3. Keypad programmable does not need software or computer.
   4. Keypad lockout and flashing red LED activated when wrong password is entered more than five times.
   5. Lock and alarm outputs relays programmable 1-99 seconds or on-off latching.

B. Options:
   1. HID ProxCards II, 25ea. cards 2-679-0021.
   2. HID ProxKey II, 10ea key fobs 2-679-0023.

C. Acceptable Manufacturer:
   1. Hager Companies 2920.

2.23 KEYPADS

A. Shall be of one manufacturer as listed for continuity of design and consideration of warranty. Standalone digital keypad, control access of single-entry point with up to 500 users. Material and Design:
   1. 1 to 6 digit PIN codes with 4 outputs, 2 relays and solid status outputs timed or latching (on/off).
   2. LED status: access, lockout.
   3. Tactile audible key press with selectable volume.
   4. Timed anti-pass back with keypad tamper lockout.
   5. Choice of door sense/relay inhibit input functions; Forced Entry/Door prop alarm; Door ajar; Inhibit relay 1 or 2; Auto re-locks when door closes.
   6. Choice of 2 solid status output functions: Alarm shunt; Forced entry; Door ajar; Tamper lockout; Keypad active.

B. Acceptable Manufacturer:
   1. Hager Companies 2915 indoor keypad; 2916 outdoor keypad.

2.24 PRESENCE INFARED EGRESS SENSOR

A. Shall be of one manufacturer as listed for continuity of design and consideration of warranty. Manufacturer shall meet requirements for UL 294 infrared egress sensor. Design:
   1. Unlocks door automatically when persons approaching door are detected.
   2. Code compliant Fail-Safe mode releases locks when power to PRI sensor is interrupted.
   3. 2 SPDT dry contacts.

B. Acceptable Manufacturer:
   1. Hager Companies 2-679-0612 Black; 2-679-0611 White.

2.25 POWER SUPPLY (for fail safe or fail secure locking devices)

A. Shall be of one manufacturer as listed for continuity of design and consideration of warranty. Manufacturer shall meet requirements for UL listed power supply. Design:
   1. Interface with building alarm controls, card readers, keypads, and other door controls.
   2. Filtered and regulated 24 VDC constant voltage; 2 AMP load capacity; Over voltage/short circuit protection; Surge protection for locking devices.
   3. Interface relay; Adjustable time delay.

B. Acceptable Manufacturer:
   1. Hager Companies: 2903.

2.26 POWER SUPPLY (for electrified locking devices and automatic door operator)

A. Shall be of one manufacturer as listed for continuity of design and consideration of warranty. Manufacturer shall meet requirements for UL listed power supply. Design:
   1. Power and control for openings with electrified locking device and automatic door operator.
   2. Filtered and regulated 24 VDC constant voltage; 2 AMP load capacity.
   3. Voltage overload/short circuit protection; Surge protection for locking devices.
   4. Interface relay; Adjustable time delay.
   5. Separate inputs for activation switch on entry and egress and ingress side of opening.
   6. Relay contact output to automatic operator.
   7. Input optional emergency release switch.
   8. Auxiliary 24 VDC output and separate 24VDC outputs for Fail SAFE and FAIL SECURE electrified locking devices.

B. Acceptable Manufacturer:
   1. Hager Companies: 2904.

2.27 DOOR GASKETING AND WEATHERSTRIP

A. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing where indicated on hardware schedule. Provide non-corrosive fasteners for exterior applications.
   1. Perimeter gasketing: Apply to head and jamb, forming seal between door and frame.
   2. Meeting stile gasketing: Fasten to meeting stiles, forming seal when doors are in closed position.
   3. Door bottoms: Apply to bottom of door, forming seal with threshold or floor when door is in closed position.
   4. Sound Gasketing: Cutting or notching for stop mounted hardware not permitted.
   5. Drip Guard: Apply to exterior face of frame header. Lip length to extend 4 inches beyond width of door.

B. Standards: Manufacturer shall meet requirements for:
   1. Door Gasketing and Edge Seal Systems: ANSI/BHMA A156.22.
   2. Shall be BHMA certified for door sweeps, automatic door bottoms, and adhesive applied gasketing. (721).

C. Smoke-Labeled Gasketing: Comply with NFPA 105 listed, labeled, and acceptable to authorities having jurisdiction, for smoke control indicated. Provide smoke labeled gasketing on 20-minute rated doors and on smoke rated doors.

D. Fire-Rated Gasketing: Comply with NFPA 80 listed, labeled, and acceptable to Authorities Having Jurisdiction, for fire ratings indicated.

E. Refer to Wood Doors specification for Category A or Category B. Comply with UBC 7-2 and UL10C positive pressure where frame applied intumescent seals are required. Provide Hager # 720 for single and 720 by 724 for a pair of doors.

F. Acceptable Manufacturer: Hager Companies, which is located at: 139 Victor St.; St. Louis, MO 63104; Toll Free Tel: 800-325-9995; Tel: 314-772-4400; Fax: 800-782-0149; Email:bwilkins@hagerco.com; Web:http://www.hagerco.com
   1. Perimeter Gasketing: Hager Companies: 721S/720 x 724, adhesive applied, 881S stop applied.
   2. Sound Seal: Hager Companies: 864S.
   3. Meeting Stile Weather-strip: Hager Companies: 872SN.
   4. Door Bottom Sweeps: Hager Companies: 750S.

5. Automatic Door Bottoms: Hager Companies: 740S.
6. Overhead Drip Guard: Hager Companies: 810S.

2.28 THRESHOLDS

A. Set thresholds for exterior and acoustical openings in full bed of sealant with lead expansion shields and stainless-steel machine screws complying with requirements specified in Division 7 Section "Joint Sealants". Notched in field to fit frame by hardware installer. Refer to Drawings for special details. Manufacturer to be certified by the following:
   1. Thresholds: ANSI/BHMA A156.21.
   2. Americans with Disabilities Act Accessibility Guidelines (ADAAG).

B. Acceptable Manufacturer:
   1. Hager Companies: 413S/520S.

2.29 SILENCERS

A. Where smoke, light, or weather seal are not required, provide three silencers per single door frame, two per double door frame and four per Dutch door frame. Manufacturer shall meet requirements for: Auxiliary Hardware: ANSI/BHMA A156.16.

B. Acceptable Manufacturer:
   1. Hager Companies: 307D for hollow metal frame, 308D for wood frame.

2.30 KEY CABINET

A. Provide key cabinet, surface mounted to wall. Key control system: Include two sets of key tags, hooks, labels, and envelopes. Contain system in metal cabinet with baked enamel finish. Capacity shall be able to hold actual quantities of keys, plus 25 percent. Provide tools, instruction sheets and accessories required to complete installation.

B. Acceptable Manufacturer:
   1. Lund Equipment.
   2. Telkey Incorporated.
   3. Key Control.

2.31 FINGER GUARDS

A. Shall be of one manufacturer as listed for continuity of design and consideration of warranty. Manufacturer to be UL listed for use on fire doors rated up to 3 hours for metal door and 1 hour for wood doors.

B. Materials and Design: Provide aluminum tube with internal spring mechanism that maintains constant tension against the fabric that prevents fingers from entering area behind edge of door on hinge side.

C. Finishes: Available in clear anodized aluminum with white polyethylene material or dark bronze anodized aluminum with black polyethylene material.

D. Acceptable Manufacturer:
   1. National Guard: 2248 push side mount, 2252 pull side mount or approved equal.

2.32 FINISHES

A. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if within range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within range of approved Samples.

B. Comply with base material and finish requirements indicated by ANSI/BHMA A156.18

designations in hardware schedule.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.
B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install hardware per manufacturer's instructions and in compliance with the following as applicable:
   1. NFPA 80; NFPA 105; ICC/ANSI A117.1; ANSI/BHMA A156.115 Hardware Preparation in Steel Doors and Steel Frames; ANSI/BHMA A156.115W Hardware Preparation in Wood Doors with Wood or Steel Frames; DHI Publication - Installation Guide for Doors and Hardware; UL10C/UBC7-2; Local building code.
   2. Approved shop drawings.
   3. Approved finish hardware schedule.

B. Do not install surface mounted items until finishes have been completed on substrates involved. Set unit level, plumb and true to line location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

3.3 FIELD QUALITY CONTROL

A. Material supplier to schedule final walk through to inspect hardware installation ten business days before final acceptance of Owner. Material supplier shall provide a written report detailing discrepancies of each opening to General Contractor within seven calendar days of walk through.

3.4 ADJUSTMENT, CLEANING AND DEMONSTRATING

A. Adjustment: Adjust and check each opening to ensure proper operation of each item of finish hardware. Replace items that cannot be adjusted to operate freely and smoothly or as intended for application at no cost to Owner.
B. Cleaning: Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no cost to Owner.
C. Demonstration: Conduct a training class for building maintenance personnel demonstrating the adjustment, operation of mechanical and electrical hardware. Special tools for finished hardware to be turned over and explained usage at this meeting.

3.5 PROTECTION

A. Leave manufacturer's protective film intact and provide proper protection for all other finish hardware items that do not have protective material from the manufacture until Owner accepts Project as complete.

3.6 HARDWARE SET SCHEDULE

A. Leave manufacturer's protective film intact and provide proper protection for all other finish hardware items that do not have protective material from the manufacture until Owner accepts Project as complete.

3.7 PROTECTION

A. Guide: Door hardware items have been placed in sets which are intended to be a guide of design, grade, quality, function, operation, performance, exposure, and like characteristics of door hardware, and may not be complete. Provide door hardware required to make each set complete and operational.

B. Hardware schedule does not reflect handing, backset, method of fastening and like characteristics of door hardware and door operation.

C. Review door hardware sets with door types, frames, sizes, and details on drawings. Verify suitability and adaptability of items specified in relation to details and surrounding conditions.

END OF SECTION 08 71 00

SECTION 08 80 00 – GLAZING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
   1. Windows.
   2. Doors.
   3. Glazed entrances.
   4. Interior borrowed lites.
   5. Storefront framing.

B. Related Sections include the following:
   1. Division 8 Section "Mirrors”.
   2. Division 8 Section “Aluminum Framed Entrances and Storefronts”.

1.3 DEFINITIONS

A. Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

D. Deterioration of Coated Glass: Defects developed from normal use, which are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.

E. Deterioration of Insulating Glass: Failure of hermetic seal under normal use, which is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

F. TX-CHPS (CHPS for short, within the context of this project): TEXAS - COLLABORATIVE FOR HIGH PERFORMANCE SCHOOLS - 2015.

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
   1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:

      a. Specified Design Wind Loads: As indicated, but not less than wind loads applicable to Project as required by ASCE 7 "Minimum Design Loads for Buildings and Other Structures": Section 6.0 "Wind Loads."
      b. Probability of Breakage for Vertical Glazing: 8 lites per 1,000 for lites set vertically or not more than 15 degrees off vertical and under wind action.
         1) Load Duration: 3 seconds.

      c. Maximum Lateral Deflection: For the following types of glass supported on all 4 edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1 inch, whichever is less.
         1) For monolithic glass lites heat treated to resist wind loads.
         2) For insulating glass.

      d. Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.
      e. Thickness of Tinted and Heat-Absorbing Glass: Provide the same thickness for each tint color indicated throughout Project.

C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range):120 deg F, ambient; 180 deg F, material surfaces.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:
   1. For monolithic glass lites, properties are based on units with lites 1/4 inch thick.
   2. For insulating-glass units, properties are based on units with lites1/4 inch thick and a nominal 1/2-inch-wide interspace.
   3. Center-of-Glass Values: Based on using LBL-44789 WINDOW 5.0 computer program for the following methodologies:
      a. U-Factors: NFRC 100 expressed as Btu/ sq. ft. x h x deg F.
      b. Solar Heat Gain Coefficient: NFRC 200.
      c. Solar Optical Properties: NFRC 300.

1.5 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data: For each glass product and glazing material indicated.

C. CHPS Submittal:
   1. Product Data for CHPS Credits EQ7.1.1 “Additional Low Emitting Materials” for Adhesives and Sealants products showing compliance with CHPS. Submittals shall document compliance with requirements of the South Coast Air Quality Management District

(SCAQMD) Rule 1168, Adhesive and Sealant Applications, amended January 2005. Refer to Division 1 section “CHPS REQUIREMENTS” for full requirements.

D. Shop Drawings: Showing design and pattern location for each glass unit. Include the following:
   1. Glazing method.
   2. Size and location of penetrations.

E. Samples: For the following products, in the form of 12-inch square Samples for glass and of 12 inch long Samples for sealants. Install sealant Samples between two strips of material representative in color of the adjoining framing system.
   1. Each color of tinted float glass.
   2. Ceramic-coated spandrel glass.
   3. Insulating glass for each designation indicated.
   4. For each color (except black) of exposed glazing sealant indicated.

F. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

G. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.
   1. For solar-control low-e-coated glass, provide documentation demonstrating that manufacturer of coated glass is certified by coating manufacturer.

H. Qualification Data: For installers.

I. Preconstruction Adhesion and Compatibility Test Report: From glazing sealant manufacturer indicating glazing sealants were tested for adhesion to glass and glazing channel substrates and for compatibility with glass and other glazing materials.

J. Warranties: Special warranties specified in this Section.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).

B. Source Limitations for Glazing Accessories: Obtain glazing accessories through one source from a single manufacturer for each product and installation method indicated.

C. Glass Product Testing: Obtain glass test results for product test reports in "Submittals" Article from a qualified testing agency based on testing glass products.
   1. Glass Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.

D. Elastomeric Glazing Sealant Product Testing: Obtain sealant test results for product test reports in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36-month period.
   1. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.
   2. Test elastomeric glazing sealants for compliance with requirements specified by reference to ASTM C 920, and where applicable, to other standard test methods.

E. Preconstruction Adhesion and Compatibility Testing: Submit to elastomeric glazing sealant manufacturers, for testing indicated below, samples of each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member that will contact or affect elastomeric glazing sealants:
   1. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
   2. Submit not fewer than eight pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
   3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
   4. For materials failing tests, obtain sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.
   5. Testing will not be required if elastomeric glazing sealant manufacturers submit data based on previous testing of current sealant products for adhesion to, and compatibility with, glazing materials matching those submitted.

F. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 and, for wired-glass, ANSI Z97.1.
   1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency or manufacturer acceptable to authorities having jurisdiction and manufacturer’s name.

      a. Permanent mark shall be acid etched, sand blasted, ceramic fired, laser etched, embossed, or of a type that once applied, cannot be removed without being destroyed.
      b. Multilight glazed assemblies having individual lights not exceeding 1 sq. ft. in exposed areas shall have at least one light in the assembly marked as indicated. Other lites in the assembly shall be marked “CPSC 16 CFR 1201”.
      c. Fully tempered safety spandrel glass is permitted to be identified by the manufacturer with a removable paper designation.
   2. Lites more than 9 sq. ft. in area and lites of any area in certain hazardous locations such as sliding glass doors, doors and enclosures for bathtubs, showers, hot tubs, whirlpools, saunas, and steam rooms are required to be Category II materials.
   3. Where glazing units, including Kind FT glass are specified in Part 2 articles for glazing lites more than 9 sq. ft. in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft. or less in exposed surface area of one side, provide glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorities having jurisdiction.

G. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
   1. GANA Publication: “Glazing Manual”.
   2. GANA Publication: “Sealant Manual”.
   3. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units”.

H. Mockups: Prior to installing glazing, construct mockups for each form of construction and finish required to verify selections made under Sample Submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Mockups shall be built by the Subcontractor responsible for the Project Work. Build mockups to comply with the following requirements, using all conditions and materials indicated for the completed Work.

1. Locate mockups on-site in the location and of the size indicated or, if not indicated, as directed by Architect. Coordinate mockups with mockups for Division 4 Section “Unit Masonry”.
2. Notify Architect 7 days in advance of the dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's approval of mockups before start of glazed aluminum curtainwall Work.
5. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. When directed, demolish and remove mockups from Project site.
7. Approved mockups in an undisturbed condition at the time of Substantial Completion may become part of the completed Work if allowed by and coordinated with the Architect in the field.

I. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.7 DELIVERY, STORAGE AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Retain packaging and sequencing numbers for glass units.

C. For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturer's written recommendations for venting and sealing to avoid hermetic seal ruptures.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
   1. Do not install liquid glazing sealants when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 40 deg F.

1.9 WARRANTY

A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form, made out to Owner and signed by coated-glass manufacturer agreeing to replace coated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
   1. Warranty Period: 10 years from date of Substantial Completion.

C. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form, made out to Owner and signed by insulating-glass manufacturer agreeing to replace insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
   1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with outdoor and indoor faces.

C. Grind smooth and polish exposed glass edges and corners.

2.2 GLAZING UNITS (GL-T, GL-DITT)

A. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; of class, kind, and condition indicated.
   1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
   2. Provide Kind HS (heat-strengthened) float glass in place of annealed float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
   3. For uncoated glass, comply with requirements for Condition A.
   4. For coated vision glass, comply with requirements for Condition C (other uncoated glass).
   5. Provide Kind FT (fully tempered) float glass.

B. Monolithic Float-Glass:
   1. Uncoated Clear Float Glass: Class 1 (clear) Kind FT (fully tempered) float glass. (GL-T)
   2. Manufacturers: Subject to compliance with requirements, manufacturers offering monolithic float-glass units which may be incorporated in the Work include, but are not limited to, the following:
      a. AGC Glass Company North America 800-251-0441 us.agc.com/
      b. Guardian Industries Corp. 248-340-1800 www.guardian.com
      c. Inter-pane Glass Industries AG +49-5273-809-0 www.interpane.com
      d. Oldcastle Building Envelope 866-653-2278 www.oldcastlebe.com
      e. Pilkington North America Inc. 800-221-0444 www.pilkington.com
      f. Vira span Ceramic Frit, Viracon, Inc. 800-533-2080 www.viracon.com
      g. Virginia Glass Products Corporation 800-368-3011 www.va-glass.com
      h. Vitro Architectural Glass / PPG Industries, Inc. 800-377-5267 www.ppg.com

C. Monolithic Pyrolytic-Coated Float Glass: ASTM C 1376, float glass with metallic-oxide coating applied by pyrolytic deposition process during initial manufacture and complying with other requirements specified.

D. Monolithic Sputter-Coated Float Glass: Use only where surface is protected from being touched at air space of insulated glazing. ASTM C 1376, float glass with metallic-oxide or -nitride coating deposited by vacuum deposition process after manufacture and heat treatment (if any) and complying with other requirements specified.

E. Monolithic Coated Spandrel Float Glass (pyrolytic or sputter coating on second surface): Float glass complying with requirements as follows:
   1. Fallout Resistance: Provide spandrel units identical to those passing the fallout-resistance test for spandrel glass specified in ASTM C 1048.

2. Factory apply manufacturer's standard opacifier of the following material to coated second surface of lites, with resulting products complying with Specification No. 89-1-6 in GANA Tempering Division's "Engineering Standards Manual."
    a. Manufacturer's standard opacifier material.

F. Insulating-Glass, General: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements as follows:
1. Provide Kind FT (fully tempered) glass lites.
2. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated for insulating-glass units are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
3. Sealing System: Dual seal, with primary and secondary sealants as follows:
    a. Manufacturer's standard sealants.
4. Spacer Specifications: Manufacturer's standard spacer material and construction.
5. Passive Solar (Clear) Low-E Insulating-Glass (GL-DITT):
    a. Basis-of-Design: Solar ban 90 (2) Clear + Clear by Vitro Architectural Glass.
    b. Overall Unit Thickness and Thickness of Each Lite: 25 and 6.0 mm.
    c. Interspace Content: Air.
    d. Outdoor Lite: Class 1 (Clear) Kind FT (fully tempered) float glass.
    e. Indoor Lite: Class 1 (Clear) Kind FT (fully tempered) float glass.
    f. Low-E Coating: Sputtered on second or Pyrolytic on second surface.
    g. Visible Light Transmittance: 51 percent minimum.
    h. Winter Nighttime U-Factor: 0.29 maximum.
    i. Solar Heat Gain Coefficient: 0.23 maximum.
    j. Outdoor Visible Reflectance: 12 percent maximum.

2.3 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:
1. EPDM, ASTM C 864.
2. Silicone, ASTM C 1115.
3. Thermoplastic polyolefin rubber, ASTM C 1115.
4. Any material indicated above.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal:
1. EPDM.
2. Silicone.
3. Thermoplastic polyolefin rubber.
4. Any material indicated above.

2.4 GLAZING SEALANTS

A. General: Provide products of type indicated, complying with the following requirements:
1. Compatibility: Select glazing sealants of proven compatibility with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Elastomeric Glazing Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
   1. Single-Component Neutral- and Basic-Curing Silicone Glazing Sealants:
      a. Products: Subject to compliance with requirements, products which may be incorporated in the Work include the following:
         1) 790, Dow Corning Corporation 800-248-2481 www.dowcorning.com
         2) SilPruf LM SCS2700, GE 877-943-7325 www.siliconeforbuilding.com
         3) Spectrem 1 (Basic), Tremco Incorporated 800-852-9068 www.tremco.com
      b. Type and Grade: S (single component) and NS (non-sag).
      c. Class: 100/50.
      d. Use Related to Exposure: NT (nontraffic).
      e. Uses Related to Glazing Substrates: M, G, A, and, as applicable to glazing substrates indicated, O.
         1) Use O Glazing Substrates: Coated glass; color anodic aluminum; aluminum coated with a high-performance coating; galvanized steel; and wood.
   2. Neutral-Curing Silicone Glazing Sealants:
      a. Products: Subject to compliance with requirements, products which may be incorporated in the Work include the following:
         1) 795, Dow Corning Corporation 800-248-2481 www.dowcorning.com
         2) UltraPruf II SCS2900, GE 877-943-7325 www.siliconeforbuilding.com
         3) 895, Pecora Corporation 800-523-6688 www.pecora.com
      b. Type and Grade: S (single component) and NS (non-sag).
      c. Class: 50.
      d. Use Related to Exposure: NT (nontraffic).
      e. Uses Related to Glazing Substrates: M, G, A, and, as applicable to glazing substrates indicated, O.
         1) Use O Glazing Substrates: Coated glass; color anodic aluminum; aluminum coated with a high-performance coating; galvanized steel; and wood.

C. Class 25 Neutral-Curing Silicone Glazing Sealant:
   1. Products: Subject to compliance with requirements, products which may be incorporated in the Work include the following:
      a. 799, Dow Corning Corporation 800-248-2481 www.dowcorning.com
      b. UltraGlaze SSG4000, GE 877-943-7325 www.siliconeforbuilding.com
      c. Proglaze SF, Tremco Incorporated 800-852-9068 www.tremco.com
   2. Type and Grade: S (single component) and NS (nonsag).
   3. Class: 25.
   4. Use Related to Exposure: NT (nontraffic).
   5. Uses Related to Glazing Substrates: M, G, A, and, as applicable to glazing substrates indicated, O.
      a. Use O Glazing Substrates Coated glass; color anodic aluminum; aluminum coated with a high-performance coating; galvanized steel; and wood.

2.5 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; non-staining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
   1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.

2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:
   1. Type 1: For glazing applications in which tape acts as the primary sealant.
   2. Type 2: For glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.6 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.7 FABRICATION

A. General: Fabricate glass units and other glazing products in sizes required to glaze openings indicated for the Project, with edge and face clearances, edge and surface conditions, and bit complying with recommendations of product manufacturer and referenced glazing standards.

B. Clean cut or flat grind vertical edges of butt-glazed lites in a manner that produces square edges with slight kerfs.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing glazing, with Installer present, for compliance with the following:
   1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
   2. Presence and functioning of weep system.
   3. Minimum required face or edge clearances.
   4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches as follows:
   1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
   2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are

flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until just before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

END OF SECTION 08 80 00

SECTION 08 83 00 – MIRRORS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Silvered mirrored glass.

B. Related Sections include the following:
   1. Division 8 Section "Glazing" for glass with reflective coatings used for vision and spandrel lites.
   2. Division 10 Section "Toilet and Bath, and Laundry Accessories" for metal-framed mirrors.

1.3 DEFINITIONS

A. Deterioration of Mirrors: Defects developed from normal use that are attributable to the manufacturing and installation process and not to causes other than breakage and practices for maintaining and cleaning mirrors contrary to mirror manufacturer's written instructions. Defects include breakage, discoloration, black spots, and clouding of the silver film.

B. TX-CHPS (CHPS for short, within the context of this project): TEXAS - COLLABORATIVE FOR HIGH PERFORMANCE SCHOOLS - 2015.

1.4 SUBMITTALS

A. Product Data: For the following:
   1. Mirrors: Include description of materials and process used to produce mirrors that indicates source of glass, glass coating components, edge sealer**,** and quality-control provisions.
   2. Mirror mastic.

B. Shop Drawings: Include elevations, sections, details, and attachments to other Work.

C. CHPS Submittal:
   1. Product Data for CHPS Credits EQ7.1.1 “Additional Low Emitting Materials” for Adhesives and Sealants products showing compliance with CHPS. Submittals shall document compliance with requirements of the South Coast Air Quality Management District (SCAQMD) Rule 1168, Adhesive and Sealant Applications, amended January 2005.
   2. Refer to Division 1 section “CHPS REQUIREMENTS” for full requirements.

D. Product Certificates: Signed by manufacturers of mirrors and mirror mastic certifying that products furnished comply with requirements.

E. Mirror Mastic Glass Coating Compatibility Test Reports: From an organic protective coating manufacturer and mirror manufacturer indicating that mirror mastic has been tested for
compatibility and adhesion with organic protective coating applied to silvered mirrored glass. Include organic coating manufacturers' and mirror manufacturer’s interpretation of test results relative to performance and recommendations for use of mastics with organic protective

coating.

F. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed mirrored glass installations similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.

B. Source Limitations: Obtain silvered mirrored glass and mirror units from one source for each type of mirror indicated.

C. Source Limitations for Glazing Accessories: Obtain glazing accessories from one source for each type of accessory indicated.

D. Glazing Publications: Comply with published recommendations in GANA's "Glazing Manual," unless more stringent requirements are indicated. Refer to this publication for definitions of glass and glazing terms not otherwise defined in this Section or in referenced standards.

E. NAAMM's Publication: For silvered mirrored glass, comply with recommendations in NAAMM's "Mirrors, Handle with Extreme Care, Tips for the Professional on the Care and Handling of Mirrors."

F. Safety Glass: Category II materials complying with testing requirements in 16 CFR 1201 and ANSI Z97.1.

G. Preconstruction Mirror Mastic Glass Coating Compatibility Test: Submit mirror mastic products to organic protective coating manufacturer for testing to determine compatibility of adhesive with mirrored glass coating.

1.6 DELIVERY, STORAGE AND HANDLING

A. Protect mirror materials according to mirror manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. For silvered mirrored glass, comply with mirrored glass manufacturer's written instructions for shipping, storing, and handling mirror units as needed to prevent deterioration, damage to edges, and abrasion of mirror surfaces. Store indoors, protected from moisture including condensation.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install mirror units until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

1.8 WARRANTY

A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Manufacturer's Special Warranty for Mirrors: Written warranty, made out to Owner and signed

by mirror manufacturer agreeing to replace mirror units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below:

1. Warranty Period: Five years from date of manufacture.

PART 2 - PRODUCTS

2.1 SILVERED MIRRORED GLASS

A. Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:
   1. American Mirror Company, Inc. 800-762-6259 www.americanmirror.com
   2. Carolina Mirror Company 336-838-2151 www.carolinamirror.com
   3. Donisi Mirror Company 513-683-3110 www.donisimirror.com
   4. Gardner Glass Products, Inc. 800-334-7267 www.gardnerglass.com

B. Safety (fully tempered) Float Glass: ASTM C 1048, Type I (transparent glass, flat), Condition A (uncoated), Kind FT (fully tempered), Quality-Q3 (glazing select) float glass, Class 1 (clear).

   1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of mirror as installed, unless otherwise indicated.
   2. Thickness: 6 mm.

C. Silvered Mirroring: Annealed and tempered, clear float glass with successive layers of chemically deposited silver, electrically or chemically deposited copper, and manufacturer's standard organic protective coating applied to second glass surface to produce a coating system complying with FS DD-M-411.

2.2 FABRICATION

A. Mirror Sizes: Cut mirror substrates to final sizes and shapes to suit Project conditions.

B. Cutouts: Fabricate cutouts for notches and holes in mirror substrates without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrors.

C. Edge Treatment: Treat edges as follows:
   1. Flat polished edge.
   2. Seal edges of silvered mirrored glass after edge treatment to prevent chemical or atmospheric penetration of glass coating.
   3. Silvered mirrored glass manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.

2.3 MISCELLANEOUS MATERIALS

A. Setting Blocks: Neoprene, 70 to 90 Shore A hardness.
B. Edge Sealer: Coating compatible with glass coating and approved by mirrored glass manufacturer for use in protecting against silver deterioration at mirrored glass edges.
C. Mirror Mastic: An adhesive setting compound, produced specifically for setting mirrored glass by spot application, certified by both mirrored glass manufacturer and mastic manufacturer as compatible with glass coating and substrates on which mirrored glass will be installed.
   1. Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:
      a. Gunther Mirror Mastics 800-227-6181 www.gunthermirrormastics.com
      b. Palmer Products Corporation 800-431-6151 www.mirro-mastic.com

D. Extruded-Aluminum Top and Bottom Trim: J-channels formed with a return deep enough to produce a glazing channel to accommodate mirrored glass units of thickness indicated and in lengths required to cover bottom edge of each mirrored glass unit in a single piece.
   1. Bottom Trim: J-channels formed with front leg and back leg not less than 3/8 and 7/8 inch in height, respectively, and a thickness of not less than 0.05 inch.
   2. Top Trim: J-channels formed with front leg and back leg not less than 5/8 and 1 inch in height, respectively, and a thickness of not less than 0.062 inch.

E. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.

F. Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls and where indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, over which mirrored glass units are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance.
   1. Verify compatibility with and suitability of substrates, including compatibility of mirror mastic with existing finishes or primers.
   2. Proceed with mirrored glass installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating surfaces with mastic manufacturer's special bond coating where applicable.

3.3 INSTALLATION

A. General: Install mirror units to comply with written instructions of mirror manufacturer and with referenced GANA and NAAMM publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.

B. Provide space for air circulation between back of mirror units and face of mounting surface.

C. Mastic Spot Installation System: Install mirror units with mastic as follows:
   1. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirror and backing material.
   2. Apply mastic in spots to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirror units and face of mounting surface.
   3. After mastic is applied, align mirror units and press into place while maintaining a minimum air space of 1/8 inch between back of mirror and mounting surface.

D. For wall-mounted mirror units, install permanent means of support at bottom and top edges with bottom support designed to withstand mirror weight and top support designed to prevent mirror from coming away from wall along top edges.
   1. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed

with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirror units.

2. For continuous bottom supports, provide setting blocks 1/8 inch thick by 4 inches long at quarter points. For channels or other continuous supports in which water could be trapped, provide, between setting blocks, two slotted weeps not less than 1/4 inch wide by 3/8 inch long.

3.4 PROTECTION AND CLEANING

A. Protect mirror units from breakage and contaminating substances resulting from construction operations.
   1. Do not permit edges of mirrors to be exposed to standing water.
   2. Maintain environmental conditions that will prevent silvered mirrored glass from being exposed to moisture from condensation or other sources for continuous periods of time.

B. Wash mirror units not more than four days before date scheduled for inspections intended to establish date for Substantial Completion. Wash silvered mirrored glass units by methods recommended in NAAMM publication and in writing by mirror manufacturer. Use water and cleaners free from substances capable of damaging mirror edges or coatings.

END OF SECTION 08 83 00

SECTION 08 84 00 - PLASTIC GLAZING, FRAMING, AND ACCESSORIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Acrylic sheets.

B. Polycarbonate sheets.

C. Framing Systems and accessories.

1.2 RELATED SECTIONS

A. Section 07 92 00 – Joint Sealants.

B. Section 08 41 13 – Aluminum Framed Entrances and Storefronts.

C. Section 08 83 00 - Mirrors.

1.3 REFERENCES

A. ASTM International (ASTM): Standard Test Methods.

B. American National Standards Institute (ANSI):

C. Building Officials and Code Administrators International, Inc. (BOCA).

D. International Conference of Building Officials (ICBO).

E. International Electrotechnical Commission (IEC):

F. International Standards Organization (ISO):

G. Underwriters Laboratories (UL).

1.4 SUBMITTALS

A. Submit under provisions of Section 01 31 00 – Project Management and Coordination.

B. Product Data:
   1. Manufacturer's data sheets on each product to be used.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Typical installation methods.

C. Verification Samples: Two representative units of each type, size, pattern and color.

D. Shop Drawings: Include details of materials, construction and finish. Include relationship with adjacent construction.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.

B. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.

C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

D. Mock-Up: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Locate mock-up as acceptable to Architect and provide temporary foundations and support.
   1. Intent of mock-up is to demonstrate quality of workmanship and visual appearance.
   2. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
   3. Retain mock-up during construction as a standard for comparison with completed work.
   4. Do not alter or remove mock-up until work is completed or removal is authorized.

1.6 PRE-INSTALLATION CONFERENCE

A. Convene conference two weeks before scheduled commencement of Work. Attendees to include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store and handle in compliance with manufacturer's instructions and recommendations.

B. Protect from damage due to weather, excessive temperature, and construction operations.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: A&C Plastics, Inc., which is located at: 6135 Northdale; Houston, TX 77087; Toll Free Tel: 888-702-6028; Email:arcat@acplastics.com; Web:https://www.acplasticsinc.com

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 ACRYLIC SHEETS

A. Basis or Design: Acrylic Sheets: UV stable and suitable for interior and exterior applications.
   1. FDA Approval: FDA 21 CFR Part 177.1010. Can be in contact with food products.
   2. General Properties:
      a. ROHS Compliant.
      b. Relative Density per ISO 1183: 1.19.
      c. Water Absorption, ASTM D570-63: 0.3 percent.
      d. Soluble Matter Lost after Immersion: None.
   3. Mechanical Properties:
      a. Tensile Strength, ASTM D638-61 T.
         1) Rupture: 10781.3 psi.
         2) Modulus of Elasticity: 426700.8 psi.
         3) Elongation at Rupture: 4.5 percent.
      b. Flexural Strength, D790-63.
         1) Rupture: 17992.5 psi.
         2) Modulus of Elasticity: 426700.8 psi.
      c. Impact Strength, ASTM D256-56.

1) Falling Ball Impact: 11.4 psi.
2) Falling Dart Impact per ANZI/SAE Z26.1 Dart; Single Impact Vertical Drop, 196 grams at 6 feet: Passed. No visible damage.

d. Rockwell Hardness, ASTM D785-62: M 100.
e. Compressive Strength, ASTM D695-63T:
1) Yield: 17921.4 psi.
2) Modulus of Elasticity: 426700.8 psi.
f. Shear Strength, ASTM D732-46: 8889.6 psi).
g. Specific Gravity, ASTM 792-60 T:
1) Clear: 0.043 lbs per cu inch.
2) Colored: 0.069 lbs per cu inch.

4. Thermal Properties:
a. Hot Forming Temperature: 284 to 356 degrees F.
b. Heat Distortion, ASTM D648 at Temperature 35.6 degrees F and 264 psi: 212 degrees F.
c. Coefficient of Thermal Expansion, ASTM D696-44: 0.0000389 in/in/F.
d. Burning Rate, ASTM D635: 1.3 inches per min.
e. Specific Heat: 0.35 BTU / lbs / degrees F.
5. Optical Properties: UV stable.
a. Light Transmission, ASTM D1003-61: Parallel: 92 percent. Total: 93 percent. Haze: 1 percent.
b. Refractive Index, ASTM 542-50: 1.49.
6. Electrical Properties:
a. Surface Resistivity at 82.4 degrees F and 75 percent Relative Humidity, ASTM D257: Less than 10E16 ohms.
b. Volume Resistivity Dielectric Strength, D257: 15E15 Ohm cm.
7. Short Time Test, ASTM D149-64: 20 kV/mm.
8. Arc Resistance, D495-61: No Track.
9. Sheet Thickness: 0.060 inch. Color: Clear.
a. Dimensions (W x L): 48 x 96 inches.

2.3 POLYCARBONATE SHEETS:

A. Tuffak Polycarbonate, Tuffak AR. Abrasion and UV resistant sheet with glass-like surface and high impact strength. Resistant to yellowing and hazing.
1. Standards Compliance: CID A-A-59502. Type III; Marr Resistant, UV Stabilized Sheet, Class 1, Grade A, High abrasion.
2. Physical and Mechanical Properties:
a. Specific Gravity, ASTM D792: 1.2
b. Light Transmission, ASTM D1003: Clear 1/8 inch thick; 86 percent.
c. Light Transmission, ASTM D1003: Gray or Bronze; 50 percent.
d. Chemical Resistance, ANSI Z26.1: Pass.
e. Taber Abrasion, 100 Cycles CS10, ASTM D1044: 1 to 2 percent.
f. Tensile Strength, Ultimate, ASTM D638: 9,500 psi.
g. Flexural Strength, ASTM D790: 13,500 psi.
h. Compressive Strength, ASTM D695: 12,500 psi.
i. Modulus of Elasticity, ASTM D638: 340,000 psi.
j. Poisson's Ratio: 0.38.
k. Izod Impact Strength, ASTM D256 at 1/8 inch:
1) Notched: 12 to 16 Ft-lbs/in.
2) Unnotched: 60 Ft-lbs/in No failure.
l. Instrumented Impact, ASTM D3763, 1/8 inch: 45 ft-lbs.
3. Thermal Properties:
a. Coefficient of Thermal Expansion, ASTM D696: 0.0000375 in/in/F.
b. Heat Deflection Temperature, ASTM D648, at 264 psi: 270 degrees F.
c. Heat Deflection Temperature, ASTM D648, at 66 psi: 280 degrees F.
4. Electrical Properties:

a. Dielectric Constant, ASTM D150 at 10 Hz: 2.96.
b. Dielectric Constant, ASTM D150 at 60 Hz: 3.17.
c. Volume Resistivity, ASTM D257: 8.2 x 10E16 Ohm-cm.
d. Dissipation Factor, ASTM D150 at 60 Hz: 0.0009.
e. Dissipation Factor, ASTM D150 at 1 MHz: 0.01.
f. Arc Resistance, ASTM D495:
1) Stainless Steel Strip Electrode: 10 to 11 seconds.
2) Tungsten Electrodes: 120 seconds.
g. Dielectric Strength, ASTM D149: In air, 125 mils: 380 V/mil.

5. Flammability:
a. Horizontal Burn, AEB, ASTM D635: Less than 1 inch.
b. Ignition Temperature, ASTM D1929:
1) Self: 1070 degrees F.
2) Flash: 870 degrees F.
c. Flame Class, Ul 94 at 0.060 inch and 0.236 inch: HB.

B. Framing Systems:
1. Basis of Design: Poli-Lok Aluminum Framing System. High quality weather resistant aluminum extrusion with seamless finish and concealed screw covers.
a. Electrical Properties:
1) Volume Electrical Resistivity IEC 60093: 2x10E17 Ohm cm.
2) Dielectric Strength, IEC 60243-1 430 V per mil: 17 kV per mil.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly constructed and prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions approved submittals and in proper relationship with adjacent construction.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

3.5 CLEANING AND PROTECTION

A. Clean products in accordance with the manufacturer’s recommendations. Replace damaged products before Substantial Completion.

END OF SECTION 08 84 00

SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Non-load-bearing steel framing systems for interior partitions.
2. Suspension systems for interior ceilings and soffits.
3. Grid suspension systems for gypsum board ceilings.

B. Related Requirements:
1. Section 05 40 00 "Cold-Formed Metal Framing" for exterior and interior load-bearing and exterior non-load-bearing wall studs; floor joists; roof rafters and ceiling joists; and roof trusses.
2. Division 9 Section "Gypsum Board" for framing, gypsum panels, and other components of gypsum board wall assemblies.

1.3 DEFINITIONS

A. Gypsum Board Terminology: Refer to ASTM C 11 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

B. International Code Council Evaluation Service, Inc. (ICC-ES).

C. Pony wall: A partial height wall; a “dwarf” wall (not a “knee” wall, which is used in an attic under rafters).

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show locations, fabrication, and installation of studs and accessories including plans, elevations, sections, details of components, and attachments to other units of Work: for walls above allowable heights in accordance with Steel Stud Manufacturers Association, provide design and show installation details of bracing of walls to structure above; and show top-of-wall conditions of walls to deck.

C. Shop Drawings for Embossed Studs (additional to requirements for standard studs indicated above): Plan showing locations for embossed steel studs and tracks indicating proposed stud size (thickness) and stud spacing necessary for spans found on job.

1.5 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of code-compliance certification for studs and tracks.

B. Evaluation Reports: For embossed steel studs and tracks, firestop tracks, post-installed anchors, and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

1.6 QUALITY ASSURANCE

A. Code-Compliance Certification of Studs and Tracks: Provide documentation from one of the following three organizations that framing members are certified according to the product-certification program of the Certified Steel Stud Association, the Steel Framing Industry Association or the Steel Stud Manufacturers Association.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.

C. Protect steel framing from corrosion, deformation, and other damage during delivery, storage, and handling as required by AISI's "Code of Standard Practice".

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load- bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

C. Horizontal Deflection for embossed steel studs: For wall assemblies, limited to 1/240 of the wall height based on horizontal loading of 5 lbf/sq. ft.

2.2 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
   1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
   2. Protective Coating: Coating with equivalent corrosion resistance of ASTM A 653/A 653M, G40 (Z120), hot dip galvanized unless otherwise indicated. A40 galvannealed products are not acceptable.

B. Studs and Tracks: ASTM C 645. Use either steel studs and tracks or embossed steel studs and tracks.
   1. Steel Studs and Tracks:
      a. Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:
         1. CEMCO 800-775-2362 www.cemcosteel.com/ Fort Worth
         2. ClarkDietrich Building Systems 800-543-7140 www.clarkdietrich.com less than 500 miles
         3. Marino\Ware 800-627-4661 www.marinoware.com less than 500 miles
         4. The Steel Network, Inc. 888-474-4876 www.steelnetwork.com

b. Minimum Base-Metal Thickness: As required by performance requirements for horizontal deflection, but not less than 0.0209 inch, unless otherwise indicated.
c. Depth: As indicated on Drawings, but not less than 3-5/8 inchesfor walls.

2. Embossed Steel Studs and Tracks: Roll-formed and embossed with surface deformations to stiffen the framing members so that they are structurally equivalent to conventional ASTM C 645 steel studs and tracks. Basis-of-Design: ClarkDietrich Building Systems ProSTUD Series Studs: ProSTUD 25 (15.8 mil thick, 50 KSI steel),
   a. Manufacturers: Provide studs manufactured by ClarkDietrich or approved equivalent by specified manufacturers. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:
      1. CEMCO 800-775-2362 www.cemcosteel.com/ Fort Worth
      2. ClarkDietrich Building Systems 800-543-7140 www.clarkdietrich.com less than 500 miles
      3. Marino\Ware 800-627-4661 www.marinoware.com less than 500 miles
      4. The Steel Network, Inc. 888-474-4876 www.steelnetwork.com
   b. Minimum Base-Metal Thickness: As required by horizontal deflection performance requirements, but not less than 0.0147 inch.
   c. Depth: 3-5/8 inches, same as conventional studs.
   d. Flange Width: 1-1/4 inch.

C. Slip-Type Head Joints: Where indicated, provide one of the following:
1. Clip System: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to tracks while allowing 1-1/2-inch minimum vertical movement.
2. Single Long-Leg Track System: ASTM C 645 top track with 2-inch-deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
3. Double-Track System: ASTM C 645 top outer tracks, inside track with 2-inch-deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction-fit over inner track.
4. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
   a. Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
      1) Flex Track System (SFT), Delta Star, Inc.; Superior Metal Trim 800-368-3017 www.superiormetaltrim.com
      2) Slotted Track, Metal-Lite, Inc. 800-236-0302 www.metal-lite.net
      3) VertiClip SLD, The Steel Network, Inc. 888-474-4876 www.steelnetwork.com
      4) VertiTrack VTD, The Steel Network, Inc. 888-474-4876 www.steelnetwork.com

D. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
1. Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
   a. Fire Trak attached to studs with Fire Trak Slip Clip, Fire Trak Corporation 800-394-9875 www.firetrak.com
   b. The System, Metal-Lite, Inc. 800-236-0302 www.metal-lite.net

c. VertiClip SLD, The Steel Network, Inc. 888-474-4876 www.steelnetwork.com
d. VertiTrack VTD, The Steel Network, Inc. 888-474-4876 www.steelnetwork.com

E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in necessary length and width coordinated with stud location and items to be supported.
1. Minimum Base-Metal Thickness: 0.0296 inch unless otherwise indicated.

F. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-metal thickness, with minimum 1/2-inch-wide flanges.
1. Manufacturer: Match the studs, or as recommended by the stud manufacturer.
2. Depth: 1-1/2 inches unless otherwise indicated.
3. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch-thick, galvanized steel.

G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
1. Manufacturer: Match the studs, or as recommended by the stud manufacturer.
2. Minimum Base-Metal Thickness: 0.0179 inch.
3. Depth: As indicated on Drawings.

H. Resilient Furring Channels: 1/2-inch-deep, steel sheet members designed to reduce sound transmission.
1. Manufacturer: Match the studs, or as recommended by the stud manufacturer.
2. Configuration: Asymmetrical.

I. Z-Shaped Furring: With slotted or non-slotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum uncoated-metal thickness of 0.0179 inch, and depth required to fit insulation thickness indicated.
1. Manufacturer: Match the studs, or as recommended by the stud manufacturer.

2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.

B. Hanger Attachments to Concrete:
1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC308 as appropriate for the substrate.
a. Uses: Securing hangers to structure.
b. Type: torque-controlled, adhesive anchor.
c. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.
2. Power-Actuated Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.

D. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2-inch-wide flanges.
1. Depth: 1-1/2 inches or as otherwise indicated on Drawings.

E. Furring Channels (Furring Members):
1. Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2- inch-wide flanges, 3/4 inch deep.
2. Steel Studs and Tracks: ASTM C 645.

a. Minimum Base-Metal Thickness: 0.0179 inch.
b. Depth: As indicated on Drawings.

3. Embossed Steel Studs and Tracks: ASTM C 645.
   a. Minimum Base-Metal Thickness: 0.0147 inch.
   b. Depth: As indicated on Drawings.
4. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
   a. Minimum Base-Metal Thickness: 0.0179 inch.
5. Resilient Furring Channels: 1/2-inch-deep members designed to reduce sound transmission.
   a. Configuration: Asymmetrical.

F. Gypsum Board Hanging and Framing Systems: In lieu of suspended stud systems at ceilings, and subject to compliance with requirements, Engineered Systems which may be incorporated in the Work include, but are not limited to the following:
1. Drywall Grid Systems, Armstrong World Industries, Inc. 877-276-7876 www.armstrong.com
2. ShortSpan Drywall Framing System, Armstrong World Industries, Inc. 877-276-7876 www.armstrong.com
3. Furring Systems/Drywall, Armstrong World Industries, Inc. 877-276-7876 www.armstrong.com
4. Comparable systems by ChicagoMetallic/Rockfon 800-323-7164 www.rockfon.com/
5. Drywall Suspension System, USG Corporation 800-950-3839 www.usg.com

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.
1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls: Provide the following:
1. Asphalt-Saturated Organic Felt: ASTM D 226/D 226M, Type I (No. 15 asphalt felt), nonperforated.

C. Pony-Wall Bracing (Provide at partial height walls cantilevered up from the floor or other surfaces/substrates)
1. 2 inch x 2 inch x 1/8 inch wall steel tube fully-welded to 3-1/2 inch x 5 inch deep x ¼ inch thick steel base plate with (4) pre-punched mounting holes.
2. Product: *SKB Knee Brace Kit* as manufactured by Softforms, www.kneewall.com or approved equivalent.
3. Fasteners: 3/8 inch x 3-1/2 inch long expansion bolts as recommended by the manufacturer. Use (4) bolts per mounting plate.
4. Height: Fabricate or job-cut height of brace tube to be no lower than 2 inch below knee- wall height.
5. Spacing: At ends of low stud walls which are part of island or peninsula configurations with countertops, provide braces at 32 inch maximum within the low stud island and peninsula walls. Where low walls without countertops are located between full height walls provide braces at 48 inch on center maximum. Where low walls with countertops are located between full height walls provide braces at 32 inch on center maximum. Provide and fasten one metal stud on each side of each brace using self-tapping screws at nominal 6 inch centers vertically.

D. Countertop Brackets
1. Cantilevered from a Wall: Provide brackets at countertops cantilevered out from walls. Supports shall be made of 2 inch wide, minimum x 0.25 inch thick, minimum x legs of steel sized to support counters sizes indicated. Brackets shall not have diagonal braces

as part of their design – the design of the braces will be “angle” or “L” shaped. The brackets shall be sized to extend closer than 6 inches to edge of the counter supported, but no closer than 1 inch to the outer edge of the counter.

a. Spacing: As indicated, but no more than 32 inch on center and attached to studs or Concrete Masonry Units.

b. For countertops cantilevered out from full height walls, provide one of the following or a comparable product:

1) Front Mounting Countertop Support Bracket by Centerline Brackets 888-960- 3854 www.countertopbracket.com/

2) Hamilton Bracket available through the Architectural Depot 888-573-3768 www.architecturaldepot.com/

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

B. Coordination with Sprayed Fire-Resistive Materials:

1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling tracks to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.
2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that are required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

A. Confirm requirements of fire and acoustically rated systems. Coordinate the gypsum board products, accessories, and the framing where an assembly’s components are required to be made by the same manufacturer.

B. Installation Standard: ASTM C 754.

1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C 841 that apply to framing installation.
2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
3. Gypsum Veneer Plaster Assemblies: Also comply with requirements in ASTM C 844 that apply to framing installation.
4. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that

apply to framing installation.

C. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

D. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

E. Install wall knee wall supports in low walls which are not braced at their tops.

F. Install bracing at terminations in assemblies.

G. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

H. Isolate partition framing and wall furring where it abuts structure, except at floor. Install slip-type joints at head of assemblies that avoid axial loading of assembly and laterally support assembly. Lateral support of walls may be provided by bridging through studs or by attachment of fastener to studs through slots in runner tracks. Subject to acceptance by the Architect, other methods of lateral support may be allowed if, in the sole opinion of the Architect, they work, and if they are clearly presented in the submittal data. Gypsum board is not be acceptable product to use to laterally brace wall flanges.

3.4 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
   1. Single-Layer Application: 16 inches o.c. unless otherwise indicated.
   2. Multilayer Application: 16 inches o.c. unless otherwise indicated.
   3. Tile Backing Panels: As required by horizontal deflection performance requirements, but not more than 16 inches o.c.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
   1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
   2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
      a. Install two studs at each jamb unless otherwise indicated.
      b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
      c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
   3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
    a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

E. Direct Furring:
1. Screw to framing.
2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.

F. Z-Shaped Furring Members:
1. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
2. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.

G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.5 INSTALLING CEILING SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
1. Hangers: 48 inches o.c.
2. Carrying Channels (Main Runners): 48 inches o.c.
3. Furring Channels (Furring Members): 16 inches o.c.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
    a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counter splaying, or other equally effective means.
2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
    a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards but with a deflection limit not exceed 1/360.
3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for
structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.

5. Do not attach hangers to steel roof deck.
6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports, or otherwise attach as required to comply with requirements for assemblies indicated.

E. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 09 22 16

SECTION 09 24 00 - CEMENT PLASTERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Exterior vertical plasterwork (stucco).

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Initial Selection: For each type of factory-prepared finish coat and for each texture specified.

C. Samples for Verification: For each type of factory-prepared finish coat and for texture specified, 12 by 12 inches, and prepared on rigid backing.

1.4 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
   1. Build mockups for each substrate and finish texture indicated for cement plastering, including accessories.
      a. Size: 100 sq. ft. in surface area.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials inside under cover and keep them dry and protected against damage from weather, moisture, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.6 FIELD CONDITIONS

A. Comply with ASTM C 926 requirements.

B. Exterior Plasterwork:
   1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
   2. Apply plaster when ambient temperature is greater than 40 deg F.
   3. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred.

PART 2 - PRODUCTS

2.1 ACCESSORIES

A. General: Comply with ASTM C 1063, and coordinate depth of trim and accessories with thicknesses and number of plaster coats required. B. Metal Accessories:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Alabama Metal Industries Company; a Gibraltar Industries company.
      b. Brand X Metals, Inc.
      c. CEMCO; California Expanded Metal Products Co.
      d. ClarkDietrich.
      e. MarinoWARE.
      f. Phillips Manufacturing Co.
   2. Foundation Weep Screed: Fabricated from hot-dip galvanized-steel sheet, ASTM A 653/A 653M, G60 zinc coating.
   3. Casing Beads: Fabricated from zinc-coated (galvanized) steel; square-edged style; with expanded flanges.
   4. Control Joints: Fabricated from zinc-coated (galvanized) steel; one-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
   5. Expansion Joints: Fabricated from zinc-coated (galvanized) steel; folded pair of unperforated screeds in M-shaped configuration; with expanded flanges.

2.2 MISCELLANEOUS MATERIALS

A. Water for Mixing and Finishing Plaster: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.

B. Fiber for Base Coat: Alkaline-resistant glass or polypropylene fibers, 1/2 inch long, free of contaminants, manufactured for use in cement plaster. C. Bonding Compound: ASTM C 932.

2.3 PLASTER MATERIALS

A. Portland Cement: ASTM C 150/C 150M, Type I.
   1. Color for Finish Coats: Gray.
B. Sand Aggregate: ASTM C 897.
C. Ready-Mixed Finish-Coat Plaster: Mill-mixed Portland cement, aggregates, coloring agents, and proprietary ingredients.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. California Stucco Products Corp.
      b. El Rey Stucco Solutions; a Parex USA, Inc. brand.
      c. Florida Stucco.
      d. LaHabra Stucco Solutions; Parex USA.
      e. Omega Products International, Inc.
      f. QUIKRETE.
      g. Shamrock Stucco LLC.
      h. Sono Wall, BASF Corp.

2.4 PLASTER MIXES

A. General: Comply with ASTM C 926 for applications indicated.

1. Fiber Content: Add fiber to base-coat mixes after ingredients have mixed at least two minutes. Comply with fiber manufacturer's written instructions for fiber quantities in mixes, but do not exceed 1 lb. of fiber/cu. yd. of cementitious materials.

B. Base-Coat Mixes for Use over Unit Masonry: Single base (scratch) coat for two-coat plasterwork on high-absorption plaster bases as follows:
1. Portland Cement Mix: For cementitious material, mix 1-part portland cement and 3/4 to 1-1/2 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.

C. Factory-Prepared Finish-Coat Mixes: For ready-mixed finish-coat plasters, comply with manufacturer's written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.

B. Prepare smooth, solid substrates for plaster according to ASTM C 926.

3.3 INSTALLING ACCESSORIES

A. Install according to ASTM C 1063.

B. Control Joints: Locate as approved by Architect for visual effect and as follows:
1. As required to delineate plasterwork into areas (panels) of the following maximum sizes:
a. Vertical Surfaces: 144 sq. ft.
2. At distances between control joints of not greater than 18 feet o.c.
3. As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1.
4. Where control joints occur in surface of construction directly behind plaster.

3.4 PLASTER APPLICATION

A. General: Comply with ASTM C 926.
1. Do not deviate more than plus or minus 1/4 inch in 10 feet from a true plane in finished plaster surfaces when measured by a 10-foot straightedge placed on surface.
2. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
3. Provide plaster surfaces that are ready to receive field-applied finishes indicated.

B. Bonding Compound: Apply on unit masonry substrates for direct application of plaster.

C. Walls; Base-Coat Mix: For base (scratch) coat, for two-coat plasterwork and having 3/8-inch thickness on masonry, as follows:
   1. Portland cement mix.

D. Plaster Finish Coats: Apply to provide float finish to match existing, adjacent concrete walls.

3.5 PLASTER REPAIRS

A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

3.6 CLEANING AND PROTECTION

A. Remove temporary protection and enclosure of other work after plastering is complete. Promptly remove plaster from door frames, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

END OF SECTION 09 24 00

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Interior gypsum board.
   2. Texture finishes.

B. Related Requirements:
   1. Section 06 16 00 " Structural Sheathing Weather Barriers" for gypsum sheathing for exterior walls.
   2. Section 09 22 16 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.
   3. Section 09 30 13 "Ceramic Tiling" for cementitious backer units installed as substrates for ceramic tile.

1.3 DEFINITIONS

A. TX-CHPS (CHPS for short, within the context of this project): TEXAS - COLLABORATIVE FOR HIGH PERFORMANCE.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. CHPS Submittal:
   1. Product Data for Credit EQ5.2.2 “Moisture Management” drawing showing how the bottom 12 inches of the interior walls will be built.
   2. Product Data for CHPS Credits EQ7.1.1 “Adhesives and Sealants” for gypsum board adhesives. All adhesives and sealants used on the project in quantities of 2.5 gal or more and totaling 90% or more of the total volumes of such products applied onsite in the project's interior shall meet the VOC content requirements in the applicable category of South Coast Air Quality Management District (SCAQMD) Rule 1168, Adhesive and Sealant Applications, amended January 2005. Compliance shall be documented by product data sheets, or equivalent. Additionally, adhesives must comply with California Department of Public Heath (CDPH / EHLB) Standard Method V1.1, 2010 and shall be compliant with the Standard Method when modelled to the school classroom scenario.
   3. Product Data for Credit EQ7.1.6 “Additional Low-Emitting Materials” Ceiling & Wall Systems. For ceiling and wall systems including but not limited to ceiling insulation installed within the structural envelop, wall insulation, acoustical ceiling panels, gypsum board wall panels, tackable wall panels, and wall coverings used inside the weatherproofing system, include printed statement of VOC content in submittals. Refer to Division 1 section “CHPS REQUIREMENTS” for full requirements. Statements of VOC content must show that product was measured (units shall match) and tested to be in compliance with (meet or exceed) the testing and VOC emission requirements of the California Department of Public Health’s (CDPH) Standard Method V1.1, 2010 (CDPH Standard Method). The test results shall be compliant with the Standard Method when modeled to the school classroom scenario using the classroom ceiling area and/or wall area as appropriate.

4. Product Data for Credit MW3.1 “Single Attribute – Recycled Content”: Submittals shall document compliance with requirements for recycled content, indicating postconsumer and pre-consumer recycled content and cost. Provide 10 percent minimum recycled content, 0% as post-consumer content.
5. Refer to Division 1 section “CHPS REQUIREMENTS” for full requirements.

C. Samples: For the following products:
1. Trim Accessories: Full-size Sample in 12-inch-long length for each trim accessory indicated.
2. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.

D. Samples for Verification: For the following products:
1. Trim Accessories: Full-size Sample in 12-inch-long length for each trim accessory indicated.
2. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.

E. Marking of Fire Rated and Smoke Rated Walls Plan: Submit a plan based on rated walls indicated on the Code Review. Submit as a part of the Gypsum Board submittal, and at the same time as other Gypsum Board related submittals.

1.5 QUALITY ASSURANCE

A. Mockups: Build mockups of at least 100 sq. ft. in surface area or Submit Sample to demonstrate aesthetic effects and to set quality standards for materials and execution.
1. Build mockups for the following:
a. Each level of gypsum board finish indicated for use in exposed locations.
b. Each texture finish type indicated.
2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion and allowed by and coordinated with the Architect in the field.

1.6 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

B. CHPS Requirements
1. Mold Prevention (EQ5.2) - Building materials, especially gypsum wallboard, wood, porous insulation, paper, and fabric, should be kept dry to prevent the growth of mold and bacteria. Cover these materials to prevent rain damage, and if resting on the ground, use spacers to allow air to circulate between the ground and the materials. Water damaged materials shall be dried within 24 hours. Due to the possibility of mold and bacterial growth, materials susceptible to moisture that are damp or wet for more than 24 hours must be discarded. Immediately remove materials showing signs of mold and mildew, including any with moisture stains, from the site and properly dispose of them. Replace moldy materials with new, undamaged materials.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, and mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

C. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.2 INTERIOR GYPSUM BOARD

A. Gypsum Board, Type X: ASTM C 1396/C 1396M.
   1. Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:
      a. American Gypsum Co. 866-439-5800 www.americangypsum.com
      b. CertainTeed Corporation 800-233-8990 www.certainteed.com
      c. Georgia-Pacific 800-225-6119 www.gp.com
      d. National Gypsum Company 704-365-7300 www.nationalgypsum.com Westwego FGD
      e. USG Corporation 800-950-3839 www.usg.com Galena Park FGD
   2. Thickness: 5/8 inch.
   3. Long Edges: Tapered.
   4. CHPS prerequisite requirement: The lowest 1’-0” of the wall must not be a paper-based product. If a paper faced product is installed with its lowest edge 1’-0” above the finished floor, then a different, paperless product must be installed as the lower panel, from the floor to 1’-0” above the finish floor. The 1’-0” dimension is a minimum – more than 1’-0” is allowed. Cementitious boards will not be allowed as the lower panel. Do not relocate the joint away from 1’-0” above the finished floor, between the upper and lower products to cause them to touch junction boxes or other items. Two acceptable products and characteristics are as follows – Comparable products from other listed manufacturers are acceptable:
      a. “DensArmor Plus Impact-Resistant Panels”; Georgia Pacific Gypsum Corp. 800-284-5347 www.gp.com np lvoc
      b. “Fiberock VHI” Abuse-Resistant Gypsum Fiber Panels; USG Interiors, Inc. 800-874- 4968 **ww.usg.com** np voc
      c. Core: Type X, Type C.
      d. Thickness: 1/2 inch or 5/8 inch as indicated.
      e. Long Edges: Tapered.
      f. Location: As indicated.

B. Gypsum Ceiling Board: ASTM C 1396/C 1396M.

1. Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:
   a. American Gypsum Co. 866-439-5800 www.americangypsum.com
   b. Georgia-Pacific 800-225-6119 www.gp.com
   c. National Gypsum Company 704-365-7300 www.nationalgypsum.com Westwego FGD
   d. USG Corporation 800-950-3839 www.usg.com Galena Park FGD
2. Thickness: 5/8 inch.
3. Long Edges: Tapered.

2.3 SPECIALTY GYPSUM BOARD

A. Glass-Mat Interior Gypsum Board (where indicated, if indicated): ASTM C 1658/C 1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use.
   1. Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:
      a. American Gypsum Co. 866-439-5800 www.americangypsum.com
      b. CertainTeed Corporation 800-233-8990 www.certainteed.com
      c. Georgia-Pacific 800-225-6119 www.gp.com
      d. National Gypsum Company 704-365-7300 www.nationalgypsum.com Westwego FGD
      e. USG Corporation 800-950-3839 www.usg.com Galena Park FGD
   2. Core: 5/8 inch, Type X.
   3. Long Edges: Tapered.
   4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

B. Cementitious Backer Units (for bottom 12 inches of interior partitions, and additionally as indicated – CHPS point requirement): ANSI A118.9 and ASTM C 1288 or ASTM C 1325, with manufacturer's standard edges.
   1. Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
      a. Util-A-Crete Concrete Backer Board, Fin Pan, Inc. 800-833-6444 www.finpan.net
      b. PermaBase Cement Board, National Gypsum Company 704-365-7300 www.nationalgypsum.com
      c. DUROCK Cement Board, USG Corporation 800-950-3839 www.usg.com
   2. Thickness: 5/8 inch.
   3. Width: Manufacturer’s standard width but not less than 32 inches.
   4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
   5. Regular, and Type X or Type C – Use Type X or better at rated walls. Use regular boards at unrated walls.

2.4 TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or ASTM C 1325, with manufacturer's standard edges.
   1. Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
      a. Util-A-Crete Concrete Backer Board, Fin Pan, Inc. 800-833-6444 www.finpan.net
      b. PermaBase Cement Board, National Gypsum Company 704-365-7300 www.nationalgypsum.com
      c. DUROCK Cement Board, USG Corporation 800-950-3839 www.usg.com
   2. Thickness: 5/8 inch.
   3. Width: Manufacturer’s standard width but not less than 32 inches.
   4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.5 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.
   1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
   2. Shapes:
      a. Cornerbead.
      b. Bullnose bead.
      c. LC-Bead: J-shaped; exposed long flange receives joint compound.
      d. L-Bead: L-shaped; exposed long flange receives joint compound.
      e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
      f. Expansion (control) joint.
      g. Curved-Edge Cornerbead: With notched or flexible flanges.

B. Exterior Trim: ASTM C 1047.
   1. Material: Hot-dip galvanized-steel sheet, plastic, or rolled zinc.
   2. Shapes:
      a. Cornerbead.
      b. LC-Bead: J-shaped; exposed long flange receives joint compound.
      c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.

2.6 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:
   1. Interior Gypsum Board: Paper Tape.
   2. Exterior Gypsum Soffit Board: Paper Tape.
   3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
   4. Tile Backing Panels: Fiberglass Alkali Resistant Tape or as otherwise recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
   1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
   2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
      a. Use setting-type compound for installing paper-faced metal trim accessories.
   3. Fill Coat: For second coat, use setting-type, sandable topping compound.
   4. Finish Coat: For third coat, use drying-type, all-purpose compound.
   5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.

D. Joint Compound for Exterior Applications:
   1. Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable topping compound.
   2. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.

E. Joint Compound for Tile Backing Panels:
   1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
   2. Cementitious Backer Units: As recommended by backer unit manufacturer.
   3. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting- type, sandable topping compound.

2.7 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
   1. Use screws complying with ASTM C 954 for fastening panels to steel members (CFMF specified in Section 05 40 00) from 0.033 to 0.112 inch thick.
   2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
   1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
   2. Size: For 3-5/8 inch studs, provide 3.5 inch thick blankets.

E. Acoustical Sealant: As specified in Section 07 92 19 "Acoustical Joint Sealants."

F. Thermal Insulation: As specified in Section 07 21 00 "Thermal Insulation."

G. Gypsum Board Cants:
   1. Use at elevator shafts above projections into shafts, should they be required. Projections into elevator shafts are greater than 4 inches are not permitted to be flat and horizontal, parallel to the floor surface, per the Elevator Code (ASME A17.1).
   2. Gypsum Board Panels: Type X, 1/2- or 5/8-inch panels.
   3. Surfaces shall slope at 75 degrees or greater as measured from the horizontal.
   4. Adhesive: Laminating adhesive.
   5. Non-Load-Bearing Steel Framing: As specified in Section 09 22 16 "Non-Structural Metal Framing."

2.8 TEXTURE FINISHES

A. Primer: As recommended by textured finish manufacturer.

B. Non-Asbestos, Non-Aggregate Finish: Premixed, vinyl texture finish for spray application. Manufacturer's standard proprietary product formulated with non-asbestos powder for spray application, with surface burning characteristics of 25 per ASTM E 84, and in texture indicated.
   1. Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
      a. Sheetrock Wall and Ceiling Spray Texture- Orange Peel Finish, USG Corporation 800- 950-3839 www.usg.com
      b. ProForm Perfect Spray EM/HF Texture – Orange Peel Finish, National Gypsum Company 704-365-7300 www.nationalgypsum.com
      c. CertainTeed Wall and Ceiling Spray Texture – Orange Peel Finish, CertainTeed Corporation 800-233-8990 www.certainteed.com/
   2. Texture: Orange peel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing,

with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Do not apply gypsum panels until all debris and dust have been respectively removed and vacuumed from inside runner tracks and walls. Under no conditions shall debris of any kind be allowed to remain in the runner tracks and between studs after the panels are in-place. Take corrective actions to remove accidental spills and debris from wall cavities, up to, and including removing panels and reinstalling panels, if necessary to access spills and debris.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. CHPS prerequisite requirement: The lowest 1'-0" of the wall must not be a paper-based product. If a paper faced product is installed with its lowest edge 1'-0" above the finished floor, then a different, paperless product must be installed as the lower panel, from the floor to 1'-0" above the finish floor. The 1'-0" dimension is a minimum – more than 1'-0" is allowed. Cementitious boards will not be allowed as the lower panel. Do not relocate the joint away from 1'-0" above the finished floor, between the upper and lower products to cause them to touch junction boxes or other items.

C. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

D. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

E. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

F. Form control and expansion joints with space between edges of adjoining gypsum panels.

G. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
   1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
   2. Fit gypsum panels around ducts, pipes, and conduits.
   3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.

H. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

I. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

J. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at

openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

K. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:
   1. Type X: Vertical surfaces unless otherwise indicated.
   2. Ceiling Type: Ceiling surfaces and as indicated on drawings.
   3. Glass-Mat Interior Type: As indicated on Drawings.

B. Single-Layer Application:
   1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
   2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
      a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
      b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
   3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
   4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:
   1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
   2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
   3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
   4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions, and temporarily brace or fasten gypsum panels until fastening adhesive has set.

E. Curved Surfaces:

   1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch-long straight sections at ends of curves and tangent

to them.

2. For double-layer construction, fasten base layer to studs with screws 16 inches o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches o.c.

3.4 APPLYING EXTERIOR GYPSUM PANELS FOR CEILINGS AND SOFFITS

A. Apply panels perpendicular to supports, with end joints staggered and located over supports.
   1. Install with 1/4-inch open space where panels abut other construction or structural penetrations. Seal joints between edges and abutting surfaces with sealant.
   2. Fasten with corrosion-resistant screws.

3.5 APPLYING TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A108.11, at all walls of showers and tubs, at back and side walls (wet walls) where lavatories, water closets and urinals are installed, and at other locations indicated.

B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.6 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints at locations indicated on Drawings and according to ASTM C 840 and in specific locations approved by Architect for visual effect. In no instance, for walls and ceilings, shall the maximum spacing between control joints exceed 30 feet on center.

C. Interior Trim: Install in the following locations:

   1. Cornerbead: Use at outside corners unless otherwise indicated.
   2. Bullnose Bead: Use where indicated.
   3. LC-Bead (J-Bead): Use at exposed panel edges.
   4. L-Bead: Use where indicated.
   5. U-Bead: Use where indicated.
   6. Curved-Edge Cornerbead: Use at curved openings.

D. Exterior Trim: Install in the following locations:

   1. Cornerbead: Use at outside corners.
   2. LC-Bead: Use at exposed panel edges.

E. Aluminum Trim (if any indicated): Install in locations indicated on Drawings.

3.7 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
   1. Level 1: Ceiling plenum areas, concealed areas, on portions of walls above ceilings between the ceilings and the tops of walls, and where indicated.
   2. Level 2: Panels that are substrate for tile at non-public service areas (such as janitor closets).
   3. Level 3: Is suitable for surfaces receiving medium- or heavy-textured finishes before painting or heavy wallcoverings where lighting conditions are not critical. Embed tape and apply separate first and fill coats of joint compound to tape, fasteners, and trim flanges where panels are substrate for medium or heavy textures or heavy- grade wallcoverings.
   4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated. Is suitable for surfaces receiving light-textured finish wallcoverings and flat paints and is the standard exposed finish level. Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges where panels are substrate for light textures, flat paints, or wallcoverings, substrates for ceramic tile in public areas and in private, non-service areas.
      a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."
   5. Level 5: Is suitable for surfaces receiving gloss and semigloss enamels and surfaces subject to severe lighting, including curved wall and curved ceiling surfaces. Embed tape and apply separate first and fill coats, and finish coats of joint compound to tape, fasteners, and trim flanges, and apply skim coat of joint compound over entire surface where panels are substrate for gloss, semi- gloss, or enamel paints; non- textured flat paints; or where severe lighting conditions occur. Fiberglass reinforced gypsum board products, including abuse and impact resistant products shall receive a Level 5 finish. Surfaces to receive write-on finishes, i.e. liquid marker surfaces, shall receive a Level 5 finish.
      a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."

E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.

F. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

G. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.8 APPLYING TEXTURE FINISHES

A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.

B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.

C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written instructions.

3.9 MARKING OF FIRE RATED AND SMOKE RATED WALLS

A. All rated walls including, but not limited to corridor partitions, smoke stop partitions, horizontal exit enclosures, and fire walls must be permanently marked above ceilings as follows: "RATED “FIRE BARRIER” WALL – 1-HR - PROTECT ALL OPENINGS” and RATED

"SHAFT ENCLOSURE" WALL– 1-HR - PROTECT ALL OPENINGS AGAINST SMOKE AND FIRE". Refer to code review sheet for wall locations and hourly ratings. Letters shall be minimum 2 1/2" in height and painted red. Provide one time per structural bay, or for walls which do not extend for a full bay, at least once.

3.10 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 29 00

SECTION 09 30 13 - CERAMIC TILE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Quarry tile.
   2. Paver tile.
   3. Wall tile.

B. Related Sections include the following:
   1. Division 2 Section "Selective Demolition" for removing existing tile.
   2. Division 3 Section "Cast-In-Place Concrete" for monolithic slab finishes specified for tile substrates.
   3. Division 7 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
   4. Division 9 Section "Gypsum Board" for cementitious backer units installed in gypsum wallboard assemblies.

1.3 DEFINITIONS

A. Module Size as it relates to the combined size of one tile and one joint, together: Actual tile size (minor facial dimension as measured per ASTM C 499) plus joint width indicated, or if not indicated, joint width shall be based on the difference between the actual tile size and the modular tile size indicated. **Th**ere is no instance where joint widths shall be allowed to be greater than 1/8-inch unless the drawings so indicate. Joint widths shall be one consistent size unless otherwise indicated. Joints shall be of un-sanded grout unless they are greater than 1/8-inch.

B. Facial Dimension: Nominal tile size as defined in ANSI A137.1.

C. Crack Isolation Membrane (or Anti-Fracture Membrane): A material used between the mortar bed (usually thin set) and the substrate. This membrane is for isolating tile from shrinkage cracks, and when used under all areas of a tile installation, protecting the entire ceramic tile floor from potential crack telegraphing from the concrete below.

D. TX-CHPS (CHPS for short, within the context of this project): TEXAS - COLLABORATIVE FOR HIGH PERFORMANCE SCHOOLS - 2015.

1.4 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
   1. Level Surfaces: Minimum 0.6.
   2. Step Treads: Minimum 0.6.
   3. Ramp Surfaces: Minimum 0.8.

B. Load-Bearing Performance: For ceramic tile installed on walkway surfaces, provide installations rated for the following load-bearing performance level based on testing assemblies

according to ASTM C 627 that are representative of those indicated for this Project:
1. Moderate: Passes cycles 1 through 10.

1.5 SUBMITTALS

A. Product Data: For each type of tile, mortar, grout, and other products specified.

B. CHPS submittals:
1. Product Data for CHPS Credits EQ7.1.1 “Additional Low Emitting Materials” for Adhesives and Sealants associated with the floor installation. All adhesives and sealants used on the project in quantities of 2.5 gal or more and totaling 90% or more of the total volumes of such products applied onsite in the project's interior shall meet the VOC content requirements in the applicable category of South Coast Air Quality Management District (SCAQMD) Rule 1168, Adhesive and Sealant Applications, amended January 2005. Compliance shall be documented by product data sheets, or equivalent. Additionally, adhesives must comply with California Department of Public Heath (CDPH / EHLB) Standard Method V1.1, 2010 and shall be compliant with the Standard Method when modelled to the school classroom scenario.
2. Refer to Division 1 section “CHPS REQUIREMENTS” for full requirements.

C. Shop Drawings: For the following:
1. Tile patterns and locations.
2. Widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

D. Samples for Verification: Of each item listed below, prepared on Samples of size and construction indicated. Where products involve normal color and texture variations, include Sample sets showing the full range of variations expected.
1. Each type and composition of tile and for each color and texture required, at least 12 inches square, mounted on braced cementitious backer units, and with grouted joints using product complying with specified requirements and approved for completed work in color or colors selected by Architect.
2. Full-size units of each type of trim and accessory for each color required.
3. Metal edge strips in 6-inch lengths.

E. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.

F. Product Certificates: Signed by manufacturers certifying that the products furnished comply with requirements.

G. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names of architects and owners, and other information specified.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed tile installations similar in material, design, and extent to that indicated for this Project and with a record of successful in- service performance.

B. Source Limitations for Tile: Obtain each color, grade, finish, type, composition, and variety of tile from one source with resources to provide products from the same production run for each contiguous area of consistent quality in appearance and physical properties without delaying the Work.

C. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.

D. Source Limitations for Other Products: Obtain each of the following products specified in this Section from one source and by a single manufacturer for each product:
   1. Joint sealants.

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

F. All tile to have a minimum “Group IV” PEI rating for surface wear and a “Vitreous” ANSI rating for water penetration.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement of ANSI A137.1 for labeling sealed tile packages.

B. Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.

C. Handle tile with temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is completed and ambient temperature and humidity conditions are being maintained to comply with referenced standards and manufacturer's written instructions.

1.9 EXTRA MATERIALS

A. Deliver extra materials to Owner. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.
   1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern, and size indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Tile Manufacturers: Refer to specific manufacturers and products indicated in the Drawings to determine the Project requirements. Subject to compliance with requirements, provide products listed in the drawings or equal product by one of the following manufacturers. Acceptance of products other than those listed on the drawings is contingent upon submittal of proposed alternate products to the Architect. Submittal of proposed alternate products must occur prior to bidding as described in Division One specification section “Product Substitutions”. Submittals must demonstrate to the Architect that the proposed alternate product line has colors that match the “Design Basis” listed in the drawings. The Architect may reject the proposed product for technical non-compliance or, at his/her discretion, on the basis of the color match alone.

1. Tile Products: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include the following:
    a. American Marazzi Tile, Inc. 877-832-8324 www.marzzitile.com
    b. American Olean, a Division of Dal-Tile Corporation 214-398-1411 www.americanolean.com
    c. Daltile, a Division of Dal-Tile Corporation 214-398-1411 www.dal-tile.com
    d. Florida Tile Inc. 800-352-8453 www.floridatile.com in DFW, HTN
    e. GranitiFiandre.
    f. Interceramic Inc. www.interceramic.com
    g. Lone Star Ceramics Company 800-256-5248
    h. Quarry Tile Company 509-536-2812 www.quarrytile.com
    i. United States Ceramic Tile Company 800-321-0684

2.2 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.
    1. Provide tile complying with Standard Grade requirements, unless otherwise indicated.
    2. For facial dimensions of tile, comply with requirements relating to tile sizes specified in Part 1 "Definitions" Article.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting Materials" and "Grouting Materials" articles.

C. ISO Standards: Not less than the following provisions shall be applicable to the project: ISO 13007 Ceramic tiles; Grouts and Adhesives (Parts 1, 2, 3, 4), latest edition at time of bidding.

D. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:
    1. Match colors, textures, and patterns indicated by referencing manufacturer's standard designations for these characteristics.
    2. Provide tile trim and accessories that match color and finish of adjoining flat tile.

E. Factory Blending: For tile exhibiting color variations within the ranges selected during Sample submittals, blend tile in the factory and package so tile units taken from one package show the same range in colors as those taken from other packages and match approved Samples.

F. Mounting: Where factory-mounted tile is required, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless another mounting method is indicated.
    1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for these kinds of installations and has a record of successful in-service performance.

G. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating them with a continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.3 TILE PRODUCTS

A. Floor and wall tiles of the same design (designation) shall be from the same size caliber. Do not install what is essentially the same tile design for a floor and an adjacent wall, but with slightly different tile sizes. Tile joints shall align face-to-face and joint-to-joint, with tiles and

joints being the same size from floor to wall, unless otherwise indicated. Such adjacent floor and wall tiles, if determined to be of different size or installed alignment, shall be rejected and the installation redone.

B. Unglazed Quarry Tile CT-1: Provide square-edged flat tile complying with the following requirements:
   1. Facial Dimensions: a s indicated.
   2. Thickness: 3/8 inch.

C. Paver Tile: Provide flat tile complying with the following requirements: (Color as indicated)
   1. Composition: Porcelain.
   2. Module Size: As indicated.
   3. Thickness: 1/4 inch minimum.
   4. Face: Pattern of design indicated, with square or cushion edges.
   5. For latex-Portland cement mortared and grouted paver tile, precoat with temporary protective coating.

D. Wall Tile CTW-1 & CTW-2: Provide flat tile complying with the following requirements: (Color as indicated on Color Board)
   1. Module Size: As indicated.
   2. Thickness: ¼-inch minimum.
   3. Face: Plain with cushion edges.

2.4 SETTING AND ADHESIVE MATERIALS AND ACCESSORIES

A. Manufacturers and Suppliers: Subject to compliance with requirements, provide a product by the Tile Manufacturer who supplies tile for the project or by a Manufacturer listed below acceptable to the tile Manufacturer. The products may be pre-packaged (bagged product) or job-site-mixed. Adhesive and Setting Products designed for Larger Format Tiles (larger than 8-inches (nominal) for any tile face dimension) may be used if recommended by the tile Manufacturer, applicable ANSI standards, TCNA or applicable ISO standards. Materials and Products shall meet or exceed requirements of ANSI A118.4 and ISO 13007 (ISO minimum mortar and adhesive requirements: floors - C2E; walls - C2TE; designations corresponding to C2=Improved bond adhesive, E=Extended open time, T=slip-resistant).
   1. Bostik, Inc. 800-726-7845 www.bostik-us.com
   2. Custom Building Products 800-272-8786 www.custombuildingproducts.com
   3. DalTile Corporation 214-398-1411 www.daltile.com
   4. DAP Products Inc. 800-543-3840 www.dap.com
   5. TEC from H.B. Fuller Construction Products Inc 800-552-6225 www.tecspecialty.com/
   6. LATICRETE International, Inc. 800-243-4788 www.laticrete.com

B. Portland Cement Mortar Installation Materials: Provide materials complying with ANSI A108.1A and as specified below.
   1. Crack Isolation Membrane:
      a. Manufacturers and Suppliers: Provide materials complying with ANSI A118.12. Subject to compliance with requirements, Manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following Basis-of-Design Products and Manufacturers listed below. Manufacturers offering products with comparable performance, by one of the Setting and Adhesive Material Manufacturers listed in paragraph 2.4.A, acceptable to the tile Manufacturer, will be allowed.
         1) “Mapelastic CI” or **“**Mapeguard 2” by MAPEI Corporation 800-426-2734 www.mapei.us
         2) “Fracture Guard” or “Fracture Guard Fast Drying” by Mer-Krete Tile & Stone Installation Systems, Parex USA, Inc. 800-851-6303 www.merkrete.com
   2. Mortar Color: Provide mortar in white where installed behind glass units, unless otherwise

indicated.

3. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 by 2 inches by 0.062-inch diameter; comply with ASTM A 185 and ASTM A 82, except for minimum wire size.
4. Latex additive (water emulsion) described below, serving as replacement for part or all of gaging water, of type specifically recommended by latex additive manufacturer for use with job-mixed portland cement and aggregate mortar bed.
    a. Latex Additive: Acrylic resin.

C. Latex-Portland Cement Mortar: ANSI A118.4, composed as follows.
1. Mixture of Dry-Mortar Mix and Latex Additive: Mixture of prepackaged dry-mortar mix and liquid-latex additive complying with the following requirements:
    a. Latex Additive: Acrylic resin.
    b. For wall applications, provide non-sagging, latex-Portland cement mortar complying with ANSI A118.4 for mortar of this type defined in Section F-2.1.2.
2. Mortar Color: Provide mortar in white where installed behind glass units, unless otherwise indicated.

D. Chemical-Resistant, Water-Cleanable, Tile-Setting and -Grouting Epoxy: ANSI A118.3, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
1. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 deg F and 212 deg F, respectively, and certified by manufacturer for intended use. Use at Quarry Tile installation.

E. Water-Cleanable, Tile-Setting Epoxy Adhesive: ANSI A118.3, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24). Use for floor tile at Male Restroom installations.

F. Moisture Mitigation / Control:
    1. Liquidam by TEC from H.B. Fuller Construction Products Inc 800-552-6225 www.tecspecialty.com/
    2. “Planiseal VS”, “Planiseal VS Fast” or “Planiseal MSP” by MAPEI Corporation 800-426-2734 www.mapei.us
    3. Comparable products by one of the Setting and Adhesive Material Manufacturers listed in Part A, acceptable to the tile Manufacturer, will be allowed.

2.5 GROUTING MATERIALS

A. Manufacturers and Suppliers: Subject to compliance with requirements, provide a product by the Tile Manufacturer who supplies tile for the project or by a Manufacturer listed below acceptable to the tile Manufacturer. The products may be pre-packaged (bagged product) or job-site-mixed.
1. Ardex Americas. 724-203-5500 www.ardexamericas.com
2. Atlas Minerals & Chemicals, Inc. 800-523-8269 www.atlasminerals.com
3. Boiardi Products Corporation 973-256-1100 www.boiardiproducts.com
4. Custom Building Products 800-272-8786 www.custombuildingproducts.com
5. DalTile Corporation 214-398-1411 www.daltile.com
6. DAP Products Inc. 800-543-3840 www.dap.com
7. Summitville Tiles, Inc. 330-223-1511 www.summitville.com
8. TEC from H.B. Fuller Construction Products Inc 800-552-6225 www.tecspecialty.com/

B. Latex-Portland Cement Grout: ANSI A118.6 for materials described in Section H-2.4, composed as follows.
1. Mixture of Dry-Grout Mix and Latex Additive: Mixture of factory-prepared, dry-grout mix and latex additive complying with the following requirements:

a. Dry-Grout Mix: Dry-set grout complying with ANSI A118.6.
   1) Unsanded grout mixture for joints 1/8 inch and narrower, at all tile.
   2) Sanded grout mixture is only for joints designated by Architect to be 1/8 inch and wider. No joints are designated to be greater than 1/8 inch – discuss with Architect any plans to use sanded grout, prior to purchase of grout materials and prior to any tile installation, for Architect's approval before proceeding.
b. Latex Additive: Acrylic resin.

C. Latex-Modified Stain and Moisture resistant Cement Grout. The Basis-of-Design product is listed below. Comparable products by one of the Grouting Material Manufacturers listed in paragraph A, acceptable to the tile Manufacturer, will be allowed.
   a. Ardex Americas, FL GROUT. 724-203-5500
      http://www.ardexamericas.com/en-us/Products/tilestone/Pages/FL.aspx/

D. Chemical-Resistant Epoxy Grout: ANSI A118.3, 100% Solids Epoxy grout - modified emulsion epoxy grout shall not be used. Color shall be as indicated.
   1. Provide product capable of resisting continuous and intermittent exposure to temperatures of up to 140 deg F and 212 deg F, respectively, as certified by mortar manufacturer for intended use.

2.6 ELASTOMERIC SEALANTS

A. General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements of Division 7 Section "Joint Sealants."

B. Chemical-Resistant Sealants: For chemical-resistant floors, provide sealants compatible with chemical-resistant mortars and grouts, approved for use indicated by manufacturers of both mortar/grout and sealant and with chemical-resistance properties equivalent to mortar/grout.

C. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints, unless otherwise indicated.

D. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and temperature extremes.

E. Multipart, Pourable Urethane Sealant for Use T: ASTM C 920; Type M; Grade P; Class 25; Uses T, M, A, and, as applicable to joint substrates indicated, O.

F. Manufacturers and Suppliers: Provide the indicated product below, or subject to compliance with requirements, provide a comparable product by one of the Grouting Material Manufacturers listed in above, acceptable to the tile Manufacturer.

G. Products: Subject to compliance with requirements, products which may be incorporated in the Work include the following:
   1. One-Part, Mildew-Resistant Silicone Sealants:
      a. 786, Dow Corning Corporation 800-248-2481 www.dowcorning.com
      b. Ardex SX 100% Silicone Sealant www.ardexamericas.com
      c. Sanitary 1700, GE 877-943-7325 www.siliconeforbuilding.com
      d. Mapesil T, MAPEI Corporation 800-426-2734 www.mapei.us
      e. Pecora 898 Sanitary Silicone Sealant, Pecora Corporation 800-523-6688 www.pecora.com

f. Rhodorsil 6B White; Rhone-Poulenc, Inc.
g. Tremsil 600 White, Tremco, Incorporated 800-852-9068 www.tremco.com

2. Multipart, Pourable Urethane Sealants:
   a. Chem-Calk 550, Bostik, Inc. 800-726-7845 www.bostik-us.com
   b. Vulkem 245, Mameco International, Inc. 800-321-6412
   c. Mapeflex P1 SL, MAPEI Corporation 800-426-2734 www.mapei.us
   d. NR-200 Urexpan, Pecora Corporation 800-523-6688 www.pecora.com
   e. THC-900, Tremco, Incorporated 800-852-9068 www.tremco.com

2.7 MISCELLANEOUS MATERIALS

A. Trowelable Underlayment's and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Metal Edge Strips: White-zinc-alloy terrazzo strips, 1/8 inch wide at top edge with integral provision for anchorage to mortar bed or substrate, unless otherwise indicated.

C. Metal Floor Transition Strips: Provide brushed stainless steel transition strips designed to be used for transition of ceramic tile to other floor finishes, unless otherwise indicated. Transition strips shall be designed with integral provision for anchorage to mortar bed or substrate. Provide Brushed stainless steel transition pieces for Ceramic Tile to other flooring material transitions, manufactured by Schluter Systems www.schluter.com/, or subject to compliance with requirements, comparable products by other manufacturers. Minimum Basis of Design: Schluter-"Schiene".

D. Metal Wall Corner Strips: Provide brushed anodized aluminum corner strips, nickel color, designed to be used at ceramic tile outside corners, unless otherwise indicated. Corner strips shall be designed with integral provision for anchorage to mortar bed or substrate. Provide stainless steel strips where rooms may be expected to be wet, unless otherwise indicated. Provide corner strip products manufactured by Schluter Systems www.schluter.com/, or subject to compliance with requirements, comparable products by other manufacturers. Minimum Basis of Design: Schluter- "Jolly".

E. Temporary Protective Coating: Provide product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; is compatible with tile, mortar, and grout products; and is easily removable after grouting is completed without damaging grout or tile.
   1. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F per ASTM D 87.

F. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

G. Grout Sealer: Manufacturer's standard product for sealing grout joints that does not change color or appearance of grout.
   1. Products: Subject to compliance with requirements, products which may be incorporated in the Work include the following:
      a. Grout Sealer, Bonsal American, Inc. 800-738-1621 www.bonsal.com
      b. CeramaSeal Grout Sealer, Bostik, Inc. 800-726-7845 www.bostik-us.com
      c. Penetrating Sealer 978, C-Cure Corporation 800-895-2874 www.c-cure.com
      d. Surface Gard Grout and Tile Sealer, Custom Building Products 800-272-8786 www.custombuildingproducts.com
      e. Penetrating Sealer, JAMO Inc. 800-826-6852 www.jamoinc.com

f. UltraCare Grout Sealer, MAPEI Corporation 800-426-2734 www.mapei.us
g. Silicone Grout Sealer, SGM 800-641-9247 www.sgm.cc
h. SL-15, Invisible Seal Penetrating Grout and Tile Sealer, Summitville Tiles, Inc. 330-223-1511 www.summitville.com
i. Comparable products by one of the Grouting Material Manufacturers listed in above, acceptable to the tile Manufacturer.

2.8 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
1. Verify that substrates for setting tile are firm; dry; clean; free from oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 series of tile installation standards for installations indicated.
2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust latter in consultation with Architect.

B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove coatings, including curing compounds, and other substances that contain soap, wax, oil, or silicone and are incompatible with tile-setting materials by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.

B. Provide concrete substrates for tile floors installed with latex-Portland cement mortars that comply with flatness tolerances specified in referenced ANSI A108 series of tile installation standards for installations indicated.
1. Use trowelable leveling and patching compounds per tile-setting material manufacturer's written instructions to fill cracks, holes, and depressions.
2. Remove protrusions, bumps, and ridges by sanding or grinding.
3. Provide Crack Isolation Membranes at all cracks in tile substrates. Coordinate membrane locations, prior to installation, with Architect in the field.

C. Where wall tiles with a dimension greater than an 8-inches are to be installed, take necessary precautions and actions to ensure that that the wall is flat behind the adhesive, and that the adhesive layer is uniform and flat as applied over the substrate. As indicated in the TCNA

Handbook, for organic adhesives and epoxy bond coats, wall substrates may require flattening.

D. Blending: For tile exhibiting color variations within the ranges selected during Sample submittals, verify that tile has been blended in the factory and packaged so tile units taken from one package show the same range in colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

E. Field-Applied Temporary Protective Coating: Where indicated under tile type or needed to prevent adhesion or staining of exposed tile surfaces by grout, protect exposed surfaces of tile against adherence of mortar and grout by precoating them with a continuous film of temporary protective coating indicated below, taking care not to coat unexposed tile surfaces:
   1. Petroleum paraffin wax applied hot.

3.3 INSTALLATION, GENERAL

A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 series of tile installation standards in "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.

B. TCNA Installation Guidelines: Latest edition of the TCNA's Handbook for Ceramic Tile Installation. Comply with TCNA installation methods indicated in ceramic tile installation schedules.

C. For Instances where a floor scheduled to receive a tile finish is to slope to a floor drain, or a similar sloping floor, and there is a depression in the foundation, fill the depression with mortar material to the required slope and then thin set the tile onto the sloping floor. Where there is a membrane required, like at a shower, embed the shower pan into the mortar material as necessary to create a complete, watertight installation.

D. Sequencing: Install wall base after floor below the base has been installed, so that wall base obscures and covers any gap between the floor edge and the face of the adjacent wall. Deviation from this requirement may result in rework being required until the Architect in the field is satisfied with the resulting appearance.

E. Install tile with joint spacers.

F. Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

G. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, & other penetrations so plates, collars, or covers overlap tile.

H. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are the same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
   1. For tile mounted in sheets, make joints between tile sheets the same width as joints within tile sheets so joints between sheets are not apparent in finished work.

I. Lay out tile wainscots to next full tile beyond dimensions indicated.

J. Provide sealant at interior corners of floor-to-wall, wall-to-wall, and wall-to-ceiling joints.

K. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated, during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

L. Locate joints in tile surfaces directly above joints in concrete substrates; where substrate materials change; and where floor tile abuts restraining surfaces such as perimeter walls, curbs and columns. Locate joints in field tile at maximum 24'-0" O.C. each way. Install control joints in accordance with current TCNA Method EJ171. Provide bullnosed or eased- edge tiles at expansion joints, control joints, and other sealant- filled joints, and where otherwise indicated.
   1. Prepare joints and apply sealants to comply with requirements of Division 7 Section "Joint Sealants."
   2. Apply sealant to all inside corners of tile-to-tile conditions. Sealant shall match grout color.

M. Grout tile to comply with the requirements of the following tile installation standards:
   1. For ceramic tile grouts (sand-Portland cement - only used where joints are greater than 1/8- inch wide, dry-set, commercial Portland cement, and latex-Portland cement grouts), comply with ANSI A108.10.
   2. For chemical-resistant epoxy grouts, comply with ANSI A108.6.

N. Transitions between different fields of tile: Provide smooth transitions between fields of tile where no transition pieces are indicated. Where tiles are of different thicknesses, adjust setting bed thicknesses of the thinner/lower tile to allow for flush, smooth transitions, and joints between the different fields of tile. Start transitions at least two feet out from the nearby joint to make transitions inconspicuous. Transition shall be over a minimum of two tiles for large tiles; for tiles over two feet in dimension, transitions may need to start up to four feet from the nearby joint.

O. Where a floor transition piece is installed, size the height of the transition piece so that the top is flush with the face surface of the tile. The bottom edge of the transition piece, adjacent to the floor substrate, shall be flush with the floor substrate with no or very little adhesive visible. Maximum adhesive joint visible: 1/64-inch.

3.4 FLOOR TILE INSTALLATION METHODS

A. Quarry Tile: Install tile to comply with requirements indicated below for setting-bed method, TCNA installation method related to type of subfloor construction, and grout type:
   1. Chemical-Resistant, Water-Cleanable, Tile-Setting and -Grouting Epoxy Mortar: ANSI A108.4.
      a. Concrete Subfloors, Thin-set Interior: TCNA F113.
   2. Grout: Chemical-resistant epoxy unless otherwise indicated.

B. Paver Tile: Install tile to comply with requirements indicated below for setting-bed method, TCNA installation method related to types of subfloor construction, and grout types:
   1. Latex-Portland Cement Mortar: ANSI A108.5 at floors scheduled to receive Latex grout.
      a. Concrete Subfloors, Thin-set Interior: TCNA F113.
   2. Water-Cleanable, Tile-Setting Epoxy Adhesive at floors scheduled to receive Epoxy grout.
      a. Concrete Subfloors, Thin-set Interior: TCNA F113.
   3. Grout: Chemical-resistant epoxy at all restrooms.
   4. Grout: Latex-Portland cement or Latex-modified stain and moisture resistant cement unless otherwise indicated at all rooms except restrooms.

C. Metal Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets

carpet, wood, or other flooring that finishes flush with top of tile.

D. Grout Sealer: Apply grout sealer to grout joints at latex-Portland cement grout according to grout- sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer that has gotten on tile faces by wiping with soft cloth. Use at all rooms where Latex grouts are used.

3.5 WALL TILE INSTALLATION METHODS

A. Install types of tile designated for wall application to comply with requirements indicated below for setting-bed methods, TCNA installation methods related to subsurface wall conditions, and grout types:
   1. Latex-Portland Cement Mortar: ANSI A108.5.
      a. Metal Studs, Interior: TCNA W243 (at dry conditions only).
      b. Metal Studs, Interior: TCNA B412 (at wet conditions, over cementitious backer).
      c. Metal Studs, Interior: TCNA B413 (at wet conditions, over water resistant gypsum board).
      d. Concrete Masonry Units, Interior: TCNA W202.
   2. Grout: Chemical-resistant epoxy at all restrooms.
   3. Grout: Latex-Portland cement or Latex-modified stain and moisture resistant cement unless otherwise indicated at all rooms except restrooms.

3.6 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
   1. Remove grout residue from tile as soon as possible.
   2. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.
   3. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.

B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.

C. Provide final protection and maintain conditions, in a manner acceptable to the Manufacturer and the Installer, that ensure tile is without damage or deterioration at the time of Substantial Completion.
   1. When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
   2. Prohibit foot and wheel traffic from tiled floors for at least 7 days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION 09 30 13

SECTION 09 51 13 - ACOUSTICAL PANEL CEILINGS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes ceilings consisting of acoustical panels and exposed suspension systems.

1.3 SUBMITTALS

A. Product Data: For each type of product specified.

B. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:
   1. Ceiling suspension system members.
   2. Method of attaching suspension system hangers to building structure.
   3. Ceiling-mounted items including light fixtures; air outlets and inlets; speakers; sprinklers; and special moldings at walls, column penetrations, and other junctures of acoustical ceilings with adjoining construction.
   4. Minimum Drawing Scale: 1/8 inch = 1 foot (1:96).

C. Samples for Verification: Full-size units of each type of ceiling assembly indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics.
   1. 6 inch square samples of each acoustical panel type, pattern, and color.
   2. Set of 12 inch long samples of exposed suspension system members, including moldings, for each color and system type required.

D. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names, and addresses of architects and owners, and other information specified.

E. Product Test Reports: Indicate compliance of acoustical panel ceilings and components with requirements based on comprehensive testing of current products.

F. Research/Evaluation Reports: Evidence of acoustical panel ceiling's and components' compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

G. Certification: Provide certification from manufacturer of products that all materials used in food preparation and food serving areas have USDA approval for use in food preparation and food serving areas.

H. CHPS Submittal:
   1. Product Data for Credit EQ7.0 “Low Emitting Materials” for Paints and Coatings and Credit EQ7.1.5 “Additional Low Emitting Materials” for Paints and Coatings. Submittals shall document compliance with requirements for Texas CHPS – refer to Section 09 91 00 “Paintings and Coatings”.
   2. Product Data for Credit EQ7.1.6 “Additional Low-Emitting Materials” Ceiling & Wall

Systems. For ceiling and wall systems including but not limited to ceiling insulation installed within the structural envelop, wall insulation, acoustical ceiling panels, gypsum board wall panels, tackable wall panels, and wall coverings used inside the weatherproofing system, include printed statement of VOC content in submittals. Statements of VOC content must show that product was measured (units shall match) and tested to be in compliance with (meet or exceed) the testing and VOC emission requirements of the California Department of Public Health's (CDPH) Standard Method V1.1, 2010 (CDPH Standard Method). The test results shall be compliant with the Standard Method when modeled to the school classroom scenario using the classroom ceiling area and/or wall area as appropriate.

3. Product Data for Credit MW3.1 "Single Attribute – Recycled Content": Submittals shall document compliance with requirements for recycled content, indicating postconsumer and pre-consumer recycled content and cost. 30 percent minimum recycled content, 0% as post- consumer content is the CHPS requirement for ceilings.
4. Refer to Division 1 section "CHPS REQUIREMENTS" for full requirements.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed acoustical panel ceilings similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Source Limitations for Ceiling Units: Obtain each acoustical ceiling panel from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

C. Source Limitations for Suspension System: Obtain each suspension system from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

D. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:
   1. Fire-response tests were performed by UL, ITS/Warnock Hersey, or another independent testing and inspecting agency that is acceptable to authorities having jurisdiction and that performs testing and follow-up services.
   2. Surface-burning characteristics of acoustical panels comply with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84.

E. Certify all materials used in food preparation and food serving areas have USDA approval for use in food serving and food preparation areas.

F. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver acoustical panels and suspension system components to Project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. It is important that plenums have proper ventilation, especially in high moisture areas. There shall be no excessive build-up of heat in the ceiling areas.

C. Mechanical, electrical, and other utility service installations above the ceiling plane shall have been completed. No materials should rest against, or wrap around, the ceiling suspension components or connecting hangers.

1.7 COORDINATION

A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.
   1. Acoustical Ceiling Units: Full-size units equal to 2.0 percent of amount installed.
   2. Suspension System Components: Quantity of each exposed component equal to 2.0 percent of amount installed.

PART 2 – PRODUCTS

2.1 ACOUSTICAL PANELS, GENERAL

A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.
   1. Mounting Method for Measuring Noise Reduction Coefficient: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches away from test surface per ASTM E 795.

B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
   1. Where appearance characteristics of acoustical panels are indicated by referencing ASTM E 1264 pattern designations and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range of products that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

C. Products: Subject to compliance with requirements, provide one of the named products that follow, in each designation:

2.2 MINERAL-BASE PANELS - WATER FELTED (ACT-1)

A. Description: Mineral-base panels, water felted, with painted finish and perforated and fissured pattern, non-directional, non-fire-resistance rated.

B. Type, Form, and Finish: Type III, Form 2 units per ASTM E 1264 with painted finish that comply with pattern and other requirements indicated.

C. Perforated and Fissured Pattern: Units matching pattern indicated by reference to manufacturers' standard pattern designations, with other characteristics as follows:
   1. Color/Light Reflectance Coefficient: White/LR 0.80.
   2. Noise Reduction Coefficient: NRC 0.55.
   3. Edge Detail: Square.
   4. Size: 24 inches by 24 inches by 5/8 inch.

D. Products:
   1. Fine Fissured Humiguard Plus, Armstrong World Industries, Inc. 877-276-7876 www.armstrong.com
   2. Fine Fissured, CertainTeed Corporation 800-233-8990 www.certainteed.com
   3. Radar ClimaPlus, USG Corporation 800-950-3839 www.usg.com

2.3 MINERAL-BASE PANELS - WATER FELTED (ACT-2)

A. Description: Mineral-base panels, water felted, with painted finish and perforated and fissured pattern, non-directional, non-fire-resistance rated.

B. Type, Form, and Finish: Type III, Form 2 units per ASTM E 1264 with painted finish that comply with pattern and other requirements indicated.

C. Perforated and Fissured Pattern: Units matching pattern indicated by reference to manufacturers' standard pattern designations, with other characteristics as follows:
   1. Color/Light Reflectance Coefficient: White/LR 0.80.
   2. Noise Reduction Coefficient: NRC 0.70.
   3. Edge Detail: Square.
   4. Size: 24 inches by 24 inches by 3/4 inch.

D. Products:
   1. Fine Fissured Humiguard Plus, Armstrong World Industries, Inc. 877-276-7876 www.armstrong.com
   2. Fine Fissured, CertainTeed Corporation 800-233-8990 www.certainteed.com
   3. Radar ClimaPlus, USG Corporation 800-950-3839 www.usg.com

2.4 METAL SUSPENSION SYSTEMS, GENERAL

A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C 635 requirements.

B. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.

C. Grid Members:
   1. Minimum 0.015-inch bare metal thickness.
   2. Minimum 300 lb. tension/ compression connection value.
   3. UL-certified for load compliance as required by ASTM C635.

D. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.
   1. Post-installed Powder-Actuated Fasteners in Concrete: Fastener system of type suitable

for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency.

E. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
   1. Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
   2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than yield stress of wire but provide not less than 0.106 inch diameter wire.

F. Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from extruded aluminum, or sheet metal of same material and finish as that used for exposed flanges of suspension system runners.
   1. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
   2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
   3. For narrow-face suspension systems, provide suspension system and manufacturer's standard edge moldings that match width and configuration of exposed runners.

2.5 NON-FIRE-RESISTANCE-RATED DIRECT-HUNG SUSPENSION SYSTEMS

A. Wide-Face Double-Web Steel Suspension System: Main and cross-runners roll-formed from pre-painted or electrolytic zinc-coated cold-rolled steel sheet, with pre-painted 15/16-inch-wide flanges; other characteristics as follows:
   1. Structural Classification: Intermediate-Duty System.
   2. End Condition of Cross Runners: Butt-edge type.
   3. Face Design: Flat, flush.
   4. Cap Material: Steel or aluminum cold-rolled sheet.
   5. Cap Finish: Painted white.

B. Manufacturers of acceptable Products:
   1. Armstrong World Industries, Inc. 877-276-7876 www.armstrong.com
   2. Chicago Metallic Corporation 800-323-7164 www.chicagometallic.com
   3. USG Corporation 800-950-3839 www.usg.com

2.6 EDGE MOLDINGS

A. Products:
   1. Armstrong World Industries, Inc. 877-276-7876 www.armstrong.com
   2. CertainTeed Corporation 800-233-8990 www.certainteed.com
   3. Chicago Metallic Corporation 800-323-7164 www.chicagometallic.com
   4. Fry Reglet Corp. 800-237-9773 www.fryreglet.com
   5. National Rolling Mills, Inc.
   6. USG Corporation 800-950-3839 www.usg.com

2.7 ACOUSTICAL SEALANT

A. Acoustical Sealant for Concealed Joints: Manufacturer's standard nondrying, nonhardening, non-skinning, non-staining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates and structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage, and other conditions affecting performance of acoustical panel ceilings.
   1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other ceiling anchors whose installation is specified in other Sections.

B. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

A. General: Install acoustical panel ceilings to comply with publications referenced below per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
   1. Standard for Ceiling Suspension System Installations: Comply with ASTM C 636.
   2. Standard for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM E 580.
   3. U.B.C.'s "Metal Suspension Systems for Acoustical Tile and for Lay-in Panel Ceilings": U.B.C. Standard 25-2.

B. Suspend ceiling hangers from building's structural members and as follows:
   1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
   2. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, counter splaying, or other equally effective means.
   3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
   4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other
      devices that are secure; that are appropriate for substrate; and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
   5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, powder-actuated fasteners, or drilled-in anchors that extend through forms into concrete.
   6. Do not attach hangers to steel deck tabs.
   7. Do not attach hangers to steel roof deck. Attach hangers to structural members.
   8. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than 8 inches from ends of each member.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or post-installed anchors.

D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
   1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
   2. Screw attaches moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
   3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

E. Install suspension system runners, including perimeter trim, so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Install acoustical panels with undamaged edges and fitted accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
   1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
   2. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
   3. For reveal-edged panels on suspension system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension system surfaces and panel faces flush with bottom face of runners.
   4. Paint cut panel edges remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
   5. Install hold-down clips in areas indicated, in areas required by authorities having jurisdiction, and for fire-resistance ratings; space as recommended by panel manufacturer's written instructions, unless otherwise indicated or required.
   6. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance- rated assembly.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing agency to perform field quality-control testing.

B. Extent and Testing Frequency: Testing will take place in successive stages in areas described below. Proceed with installation of acoustical panel ceilings only after test results for previously installed hangers comply with requirements.
   1. Extent of Each Test Area: When installation of ceiling suspension systems on each floor has reached 20 percent completion but no panels have been installed.
   2. Within each test area, testing agency will select one of every 10 powder-actuated fasteners and post-installed anchors used to attach hangers to concrete and will test them for 200 lbf of tension; it will also select one of every two post-installed anchors used to attach bracing wires to concrete and will test them for 440 lb. of tension.
   3. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 consecutively pass and then will resume initial testing frequency.
   4. Testing agency will report test results promptly and in writing to Contractor and Architect.

5. Remove and replace those fasteners and anchors that test results indicate do not comply with specified requirements.

C. Additional Testing: Where fasteners and anchors are removed and replaced, additional testing will be performed to determine compliance with specified requirements.

3.5 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 13

SECTION 09 65 13 - RESILIENT WALL BASE AND ACCESSORIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Resilient wall base.

B. Related Sections include the following:
   1. Division 9 Section 09 30 13 "Ceramic Tiling."

1.3 SUBMITTALS

A. Product Data: For each type of product specified. Indicate in the submittals, the lengths of product material coils proposed for use on the project.

B. Samples for Verification: In manufacturer's standard sizes, but not less than 12 inches (300 mm) long, of each product color and pattern specified.

C. Product Certificates: Signed by manufacturers of resilient wall base and accessories certifying that each product furnished complies with requirements.

D. CHPS Submittal:
   1. Product Data for CHPS Credits EQ7.1.1 “Adhesives and Sealants” for floor adhesives. All adhesives and sealants used on the project in quantities of 2.5 gal or more and totaling 90% or more of the total volumes of such products applied onsite in the project's interior shall meet the VOC content requirements in the applicable category of South Coast Air Quality Management District (SCAQMD) Rule 1168, Adhesive and Sealant Applications, amended January 2005. Compliance shall be documented by product data sheets, or equivalent. Additionally, adhesives must comply with California Department of Public Heath (CDPH / EHLB) Standard Method V1.1, 2010 and shall be compliant with the Standard Method when modelled to the school classroom scenario.
   2. Refer to Division 1 section “CHPS REQUIREMENTS” for full requirements.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer to perform work of this Section who has specialized in installing resilient products similar to those required for this Project and with a record of successful in-service performance.

B. Source Limitations: Obtain each type and color of product specified from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

C. Fire-Test-Response Characteristics: Provide products with the following fire-test-response characteristics as determined by testing identical products per test method indicated below by a testing and inspecting agency acceptable to authorities having jurisdiction.
   1. Critical Radiant Flux: 0.45 W/sq. cm or greater when tested per ASTM E 648.
   2. Smoke Density: Maximum specific optical density of 450 or less when tested per ASTM E 662.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver products to Project site in manufacturer's original, unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.

B. Store products in dry spaces protected from the weather, with ambient temperatures maintained between 50 and 90 deg F.

C. Move products into spaces where they will be installed at least 48 hours before installation, unless longer conditioning period is recommended in writing by manufacturer.

1.6 PROJECT CONDITIONS

A. Maintain a temperature of not less than 70 deg F or more than 95 deg F in spaces to receive resilient products for at least 48 hours before installation, during installation, and for at least 48 hours after installation, unless manufacturer's written recommendations specify longer time periods. After post-installation period, maintain a temperature of not less than 55 deg F or more than 95 deg F.

B. Do not install products until they are at the same temperature as the space where they are to be installed.

C. Coordinate resilient product installation with other construction to minimize possibility of damage and soiling during remainder of construction period. Install resilient products after other finishing operations, including painting, have been completed.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Furnish not less than 10 linear feet for each 500 linear feet or fraction thereof, of each different type, color, pattern, and size of resilient product installed.

B. Deliver extra materials to Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide one of the named products as follows:

B. Rubber Wall Base: Products complying with ASTM F1861-00, Type TS, as indicated by manufacturer listed in the color schedule, and with requirements specified to follow:
1. Products: RB-1
   a. Color and Pattern: As indicated.
   b. Style: Cove.
   c. Minimum Thickness: 1/8 inch.
   d. Height: 4 inches.
   e. Lengths: Coils in lengths standard with manufacturer, but not less than 96 feet (29.26m). 4 feet sections, or other lengths shorter than 96 feet shall not be used – they will not be allowed.

f. “Type RB-1”:
1) “Coastline” by Burke Flooring 800-447-8442 www.burkeflooring.com
2) Wallflowers, FLEXCO Corporation 800-633-3151 www.flexcofloors.com
3) Infinity Roll Cove Base, Roppe Corporation, U.S.A. 800-537-9527 www.roppe.com

2. Outside Corners: Premolded or formed on job.
3. Inside Corners: Premolded or formed on job.
4. Ends: Premolded.
5. Surface: Smooth.

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland-cement-based formulation provided or approved by resilient product manufacturer for applications indicated. Comply with CHPS requirements.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated. Comply with CHPS requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where installation of resilient products will occur, with Installer present, for compliance with manufacturer's requirements, including those for maximum moisture content. Verify that substrates and conditions are satisfactory for resilient product installation and comply with requirements specified. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with manufacturer's written installation instructions for preparing substrates indicated to receive resilient products.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.

C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

D. Broom and vacuum clean substrates to be covered immediately before installing resilient products. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. General: Install resilient products according to manufacturer's written installation instructions.

B. Sequencing: Install wall base after floor, below the base, has been installed, so that wall base obscures and covers any gap between the floor edge and the face of the adjacent wall. Deviation from this requirement may result in rework being required until the Architect in the field is satisfied with the resulting appearance.

C. Apply resilient wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
   1. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
   2. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
   3. Do not stretch base during installation.
   4. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
   5. Form outside corners on job, from straight pieces of maximum lengths possible, without whitening at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.
   6. Form inside corners on job, from straight pieces of maximum lengths possible, by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.

D. Place resilient products so they are butted to adjacent materials and bond to substrates with adhesive. Install reducer strips at edges of flooring that would otherwise be exposed.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing resilient products:
   1. Remove adhesive and other surface blemishes using cleaner recommended by resilient product manufacturers.
   2. Sweep or vacuum horizontal surfaces thoroughly.
   3. Do not wash resilient products until after time period recommended by resilient product manufacture.
   4. Damp-mop or sponge resilient products to remove marks and soil.

B. Protect resilient products against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by resilient product manufacturer.
   1. Cover resilient products installed on floors with undyed, untreated building paper until inspection for Substantial Completion.

C. Clean resilient products not more than 4 days before dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean products according to manufacturer's written recommendations.

END OF SECTION 09 65 13

SECTION 09 68 13 – CARPET TILES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes modular carpet tile.

1.02 SUBMITTALS

A. Product Data: For each product indicated.

B. Shop Drawings: Show the following:
1. Carpet tile type, color, and dye lot.
2. Pattern of installation.
3. Insets and borders.
4. Edge, transition, and other accessory strips.
5. Transition details to other flooring materials.

C. Samples: For each color and texture required.
1. Carpet Tile: Full-size Sample.

D. Maintenance data.

1.03 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104, Section 5, "Storage and Handling."

1.05 PROJECT CONDITIONS

A. Comply with CRI 104, Section 7.2, "Site Conditions; Temperature and Humidity" and Section 7.12, "Ventilation."

B. Environmental Limitations: Do not install carpet tiles until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

D. Where equipment or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.06 WARRANTY

A. Special Warranty for Carpet Tiles: Manufacturer's standard form in which manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to,

more than 10 percent loss of face fiber, edge raveling, snags, runs, loss of tuft bind strength, dimensional stability, excess static discharge, and delamination.

1. Warranty Period: 10 years from date of Substantial Completion.

1.07 EXTRA MATERIALS

A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd.

PART 2 - PRODUCTS

2.01 CARPET TILE

A. Products: As indicated by manufacturer's designations in the Finish Material Schedule.

2.02 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.

B. Installation Method: As recommended in writing by carpet tile manufacturer.

C. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

D. Install pattern parallel to walls and borders.

END OF SECTION 09 68 13

SECTION 09 91 00 - PAINTS AND COATINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Exterior Painting.

B. Interior Painting.

1.2 RELATED SECTIONS

A. Section 05 12 00 - Structural Steel Framing.

1.3 SUBMITTALS

A. Submit under provisions of Section 01 31 00 – Project Management and Coordination.

B. Product Data: Manufacturer's data sheets on each paint and coating product to be used, including:
   1. Product characteristics.
   2. Preparation instructions and recommendations.
   3. Primer requirements and recommendations.
   4. Storage and handling requirements and recommendations.
   5. Application methods.

C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

D. Verification Samples: For each finish product specified, two samples, minimum size 6 inches square, representing actual product, color, and patterns.

E. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

F. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic cleaning and maintenance of painted surfaces.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

B. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Finish surfaces for verification of products, colors, and sheens.
   2. Finish area designated by Architect.
   3. Provide samples that designate primer and finish coats.
   4. Do not proceed with remaining work until the Architect approves the mock-up.
   5. Accepted mock-ups shall be comparison standard for remaining Work.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver paint materials in sealed original-labeled containers bearing manufacturer's name, type of paint, stock number, color and instructions for reducing or mixing, where applicable.

B. Store products in accordance with the manufacturer's printed recommendations and in manufacturer's unopened packaging until ready for installation.

C. Store and dispose of solvent-based materials, and materials used with solvent-based

materials, in accordance with requirements of local authorities having jurisdiction.

1.6 SEQUENCING

A. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.

B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Comply with manufacturer's recommendations as to environmental conditions under which coatings and coating systems can be applied. Do not apply paint or coatings when temperature is below 50 degrees F. Do not apply exterior paint in damp or rainy weather; ensure that the surface has dried thoroughly before proceeding. Surface temperature must be at least 5 degrees F above dew point before painting.

C. Do not apply finish in areas where dust or contaminants are being generated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Behr Paint Company, which is located at: 1801 E. St. Andrew Place; Santa Ana, CA 92705; Tel: 714-545-7101; Fax: 714-241-1002; Email:architectinfo@behr.com; Web:http://www.behr.com/architect

B. Sherwin Williams; Kelly Mores.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 PAINT SYSTEM MATERIALS

A. Provide paint materials in accordance with Schedule at the end of the Section. Catalog names and numbers refer to products as manufactured or distributed by the Behr Process Corporation, Santa Ana, California, except as otherwise specified.
   1. Products specified are as manufactured by Behr Paint Company. Other manufacturers to conform to materials listed and be approved by Architect in accordance with provisions of Section 01 60 00 - Product Requirements.
   2. Do not thin finish coats without the manufacturer's approval.
   3. Claims concerning unsuitability of any material specified or inability to satisfactorily produce the work will not be entertained, unless such claim is made in writing to Architect before work is started.
   4. Number of coats scheduled is minimum. Apply additional coats at no additional cost if necessary to completely hide base materials, produce uniform color, and provide satisfactory finish result.
   5. Paints and coatings comply with air-quality regulations and established VOC content limits of South Coast AQMD Architectural Rule 1113.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Examine surfaces scheduled to receive paint and finishes for conditions that will adversely affect execution, permanence, or quality of work.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces to receive paint thoroughly of substances, which could impair adhesion of paints, including dust, dirt, oil and grease before application of any coatings.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Surfaces to receive paint shall be clean, dry, smooth, and dust-free before application of coatings. Prepare surfaces as follows:
   1. PLASTER and STUCCO: Fill hairline cracks, small holes, and imperfections on plaster surfaces with patching plaster. Smooth off to match adjacent surfaces. Apply an alkali-resistant primer or wash with fresh water and neutralize high alkalinity surfaces where they occur.
   2. STEEL, FERROUS METAL: Remove rust, mill scale, foreign substances, and shop primer. Clean according to SSPC-SP3, "Power Tool Cleaning", or abrasive blasting cleaning according to SSPC-SP6 "Commercial Blast Cleaning" as required. Protect surface from corrosion until application of primer.
   3. GYPSUM BOARD: Remove dust and foreign matter. Fill pits flush and smooth with joint compound and where required, apply skim coat to provide the required finishing level based on GA-214-96, Recommended Levels of Gypsum Board Finish before application of decoration.

D. Surfaces, which cannot be prepared or painted as specified, shall be immediately brought to attention of Architect in writing.
   1. Starting of work without such notification will be considered acceptance by the Contractor of surfaces involved.
   2. Replace unsatisfactory work caused by improper or defective surfaces as directed by Architect at no additional cost to Owner.

3.3 INSTALLATION

A. Do not apply initial coating until moisture content of surface is within limitations recommended by paint manufacturer.

B. Application:
   1. Apply paint with suitable brushes, rollers, or spraying equipment.
   2. Apply stain in accordance with manufacturer's recommendations.
   3. Rate of application shall not exceed that as recommended by paint manufacturer for surface involved.

C. Comply with recommendations of product manufacturer for drying time between succeeding coats.

D. Leave parts of molding and ornaments clean and true to details with no undue amount of paint in corners and depressions.

E. Make edges of paint adjoining other material or color clean and sharp with no overlapping.

F. Refinish whole wall where portion of finish is not acceptable.

G. Apply materials evenly with proper film thickness and free of runs, sags, skips and other defects. Hard, glossy finishes shall be sanded lightly between coats, dusted and cleaned

before recoating.

H. Remove hardware, hardware accessories, plates, lighting fixtures and similar items in place prior to painting, and replace upon completion of each space.

I. Disconnect heating and other equipment adjacent to walls using workmen skilled in appropriate trades and move to permit wall surfaces to be painted. Following completion of painting, they shall be expertly replaced and reconnected.

J. Paint visible surfaces behind vents, registers, or grilles flat black.
   1. Wash exposed metal with solvent, then prime and paint as scheduled.
   2. Spray paint wherever practical.

K. Do not paint over Underwriters' labels, fusible links or sprinkler heads.

L. Exposed Plumbing and Mechanical Items: Items without factory finish such as conduits, pipes, access panels and items of similar nature shall be finished to match adjacent wall and ceiling surfaces unless otherwise directed.

3.4 CLEANING

A. Upon completion of work, remove equipment, excess material, and debris. Remove paint splatter and leave area in a neat and orderly condition.

3.5 PROTECTION

A. Protect work of other trades, whether to be painted or not, against damage by painting. Correct damage by cleaning, repairing, or replacing and repainting, as acceptable to Architect.

B. Provide "wet paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.

C. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 SCHEDULES

A. GENERAL
   1. Provide paint finishes of even, uniform color, free from cloudy or mottled appearance. Properly correct non-complying work to satisfaction of Owner's representative and representative of Behr Paint Company.
   2. Some colors, especially accent colors, may require multiple finish coats for adequate coverage and opacity.
   3. The specified number of primer and finish coats is minimum acceptable. If full coverage and opacity is not obtained with specified number of coats, apply additional coats as necessary to produce required finish.

B. EXTERIOR PAINT SCHEDULE:
   1. STUCCO and CEMENT PLASTER – P-2 (Kelly Moore, DISD Soft Sesame OW227-Semi – Gloss Custom Color Match)
      a. Semi-Gloss - Professional, 100% Acrylic
         1) First Coat: Multi-Surface Interior/Exterior Primer & Sealer (436)
         2) Second Coat: Pro e600 Exterior Semi-Gloss Paint (PR670)
         3) Third Coat: Pro e600 Exterior Semi-Gloss Paint (PR670)
   2. FERROUS METAL - High Performance Direct-To-Metal Coating, Industrial Maintenance (P-4)
      a. Eggshell - Light Industrial, Premium, 100% Acrylic
         1) First Coat: Interior/Exterior Metal Primer (435)
         2) Second Coat: Interior/Exterior Direct-To-Metal Eggshell Paint (7200)
         3) Third Coat: Interior/Exterior Direct-To-Metal Eggshell Paint (7200)

b. Semi-Gloss - Light Industrial, Premium, 100% Acrylic
    1) First Coat: Interior/Exterior Metal Primer (435)
    2) Second Coat: Interior/Exterior Direct-To-Metal Semi-Gloss Paint (3200)
    3) Third Coat: Interior/Exterior Direct-To-Metal Semi-Gloss Paint (3200)
c. Gloss - Light Industrial, Premium, 100% Acrylic
    1) First Coat: Interior/Exterior Metal Primer (435)
    2) Second Coat: Interior/Exterior Direct-To-Metal Semi-Gloss Paint (3200)
    3) Third Coat: Interior/Exterior Direct-To-Metal Semi-Gloss Paint (3200)

C. INTERIOR PAINT SCHEDULE:
1. GYPSUM BOARD P-1
    a. Flat - Premium, Kelly Moore, DISD Soft Sesame OW227-Semi – Gloss Custom Color Match 100% Acrylic - Low Odor/VOC
    b. Semi-Gloss - Premium, 100% Acrylic - Low Odor/VOC
        1) First Coat: Drywall Plus Interior Primer & Sealer (73)
        2) Second Coat: PREMIUM PLUS Interior Semi-Gloss Enamel (3050)
        3) Third Coat: PREMIUM PLUS Interior Semi-Gloss Enamel (3050)
2. GYPSUM BOARD – CEILINGS: PGB-1 (Kelly Moore, DISD Soft Sesame OW227-Custom Color Match)
    a. Flat - Premium, 100% Acrylic - Low VOC
        1) First Coat: Drywall Plus Interior Primer & Sealer (73)
        2) Second Coat: PREMIUM PLUS ULTRA Stain-Blocking Ceiling Paint (5558)
        3) Third Coat: PREMIUM PLUS ULTRA Stain-Blocking Ceiling Paint (5558)
3. FERROUS METAL - High Performance Coating – P-3
    a. Semi-Gloss - High Performance, Water-Based Epoxy, Low VOC Coating
        1) First Coat: Interior/Exterior Metal Primer (435)
        2) Second Coat: PRO Pre-Catalyzed Waterborne Epoxy Semi-Gloss (HP150)
        3) Third Coat: PRO Pre-Catalyzed Waterborne Epoxy Semi-Gloss (HP150)

END OF SECTION 09 91 00

SECTION 22 05 23 - GENERAL-DUTY VALVES FOR PLUMBING AND PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following general-duty valves:
1. Bronze angle valves.
2. Cast-iron angle valves.
3. Copper-alloy ball valves.
4. Ferrous-allay ball valves
5. Ferrous-alloy butterfly valves 6. High-pressure butterfly valves.
7. Bronze check valves.
8. Gray-iron swing check valves.
9. Spring-loaded, lift-disc check valves.
10. Bronze gate valves.
11. Cast-iron gate valves.
12. Bronze globe valves.
13. Cast-iron globe valves.

B. Related Sections include the following:
1. Division 2 piping Sections for general-duty and specialty valves for site construction piping.
2. Division 22 Section 22 05 54 "Identification for Plumbing, HVAC, and Fire Piping and Equipment"
3. Division 22 Section 22 05 23 "General – Duty Valves for Plumbing and Piping.

1.3 DEFINITIONS

A. The following are standard abbreviations for valves:
1. CWP: Cold working pressure.
2. EPDM: Ethylene-propylene-diene terpolymer rubber.
3. NBR: Acrylonitrile-butadiene rubber.
4. PTFE: Polytetrafluoroethylene plastic.
5. SWP: Steam working pressure.
6. TFE: Tetrafluoroethylene plastic.

1.4 SUBMITTALS

A. Product Data: For each type of valve indicated. Include body, seating, and trim materials; valve design; pressure and temperature classifications; end connections; arrangement; dimensions; and required clearances. Include list indicating valve and its application. Include rated capacities; shipping, installed, and operating weights; furnished specialties; and accessories.

1.5 QUALITY ASSURANCE

A. ASME Compliance: ASME B31.9 for building services piping valves.
1. Exceptions: Sanitary waste, and storm drainage piping valves unless referenced.

B. ASME Compliance for Ferrous Valves: ASME B16.10 and ASME B16.34 for dimension and design criteria.

C. NSF Compliance: NSF 61 for valve materials for potable-water service.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:
1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, grooves, and weld ends.
3. Set angle, gate, and globe valves closed to prevent rattling.
4. Set ball and plug valves open to minimize exposure of functional surfaces.
5. Set butterfly valves closed or slightly open.
6. Block check valves in either closed or open position.

B. Use the following precautions during storage:
1. Maintain valve end protection.
2. Store valves indoors and maintain at higher than ambient dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Crane Co.; Crane Valve Group; Crane Valves.
2. Grinnell Corporation.
3. Hammond Valve.
4. Milwaukee Valve Company.
5. NIBCO INC.
6. Red-White Valve Corp.
7. Watts Industries, Inc.; Water Products Div.

2.2 VALVES, GENERAL

A. Refer to Part 3 "Valve Applications" Article for applications of valves.

B. Bronze Valves: NPS 2 and smaller with threaded ends, unless otherwise indicated.

C. Ferrous Valves: NPS 2-1/2 and larger with flanged ends, unless otherwise indicated.

D. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

E. Valve Sizes: Same as upstream pipe, unless otherwise indicated.

F. Valve Actuators:
1. Gear Drive: For quarter-turn valves NPS 8 and larger.
2. Handwheel: For valves other than quarter-turn types.
3. Lever Handle: For quarter-turn valves NPS 6 and smaller, except plug valves.

G. Extended Valve Stems: On insulated valves.

H. Valve Flanges: ASME B16.1 for cast-iron valves, ASME B16.5 for steel valves, and ASME B16.24 for bronze valves.

I. Valve Grooved Ends: AWWA C606.
   1. Solder Joint: With sockets according to ASME Standards.
      a. Caution: Use solder with melting point below 840 deg F for angle, check, gate, and globe valves; below 421 deg F for ball valves.
   2. Threaded: With threads according to ASME Standards.

J. Valve Bypass and Drain Connections: MSS SP-45.

2.3 COPPER-ALLOY BALL VALVES

A. Copper-Alloy Ball Valves, General: MSS SP-110.

B. One-Piece, Copper-Alloy Ball Valves: Brass or bronze body with chrome-plated bronze ball, PTFE or TFE seats, and 400-psig minimum or 600-psig CWP rating.

C. Two-Piece, Copper-Alloy Ball Valves: Brass or bronze body with full-port, chrome-plated bronze ball; PTFE seats; and 600-psig minimum CWP rating and blowout-proof stem.

2.4 FERROUS-ALLOY BUTTERFLY VALVES

A. Ferrous-Alloy Butterfly Valves, General: MSS SP-67, Type I, for tight shutoff, with disc and lining suitable for potable water, unless otherwise indicated.

B. Flanged, 150-psig CWP Rating, Ferrous-Alloy Butterfly Valves: Flanged-end type with one-piece stem.

2.5 BRONZE CHECK VALVES

A. Bronze Check Valves, General: MSS SP-80.

B. Type 1, Class 150, Bronze, Horizontal Lift Check Valves: Bronze body with bronze disc and seat.

C. Type 1, Class 150, Bronze, Vertical Lift Check Valves: Bronze body with bronze disc and seat.

2.6 BRONZE GATE VALVES

A. Bronze Gate Valves, General: MSS SP-80, with ferrous-alloy handwheel.

B. Type 1, Class 125, Bronze Gate Valves: Bronze body with non-rising stem and bronze solid wedge and union-ring bonnet.

2.7 CAST-IRON GATE VALVES

A. Cast-Iron Gate Valves, General: MSS SP-70, Type I.

B. Class 125, NRS, Bronze-Mounted, Cast-Iron Gate Valves: Cast-iron body with bronze trim, non-rising stem, and solid-wedge disc.

C. Class 125, OS&Y, Bronze-Mounted, Cast-Iron Gate Valves: Cast-iron body with bronze trim, rising stem, and solid-wedge disc.

2.8 BRONZE GLOBE VALVES

A. Bronze Globe Valves, General: MSS SP-80, with ferrous-alloy handwheel.

B. Type 1, Class 125, Bronze Globe Valves: Bronze body with bronze disc and union-ring bonnet.

C. Type 1, Class 150, Bronze Globe Valves: Bronze body with bronze disc and union-ring bonnet.

2.9 CAST-IRON GLOBE VALVES

A. Cast-Iron Globe Valves, General: MSS SP-85.

B. Type I, Class 125, Cast-Iron Globe Valves: Gray-iron body with bronze seats.

C. Type I, Class 250, Cast-Iron Globe Valves: Gray-iron body with bronze seats.

2.10 CAST-IRON PLUG VALVES

A. Cast-Iron Plug Valves, General: MSS SP-78.

B. Class 125 or 150, lubricated-type, cast-iron plug valves.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine piping system for compliance with requirements for installation tolerances and other conditions affecting performance.
   1. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.

C. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.

D. Examine threads on valve and mating pipe for form and cleanliness.

E. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.

F. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE APPLICATIONS

A. Refer to piping Sections for specific valve applications. If valve applications are not indicated, use the following:
   1. Shutoff Service: Ball, butterfly, or plug valves.
   2. Throttling Service: Ball, butterfly, or globe valves.
   3. Pump Discharge: Swing check, lift-disc check valves.

B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP class or CWP ratings may be substituted.

C. Chilled-Water Piping: Use the following types of valves:
   1. Ball Valves, NPS 2 and Smaller: Two-piece, full port, 400-psig CWP rating, copper alloy.
   2. Butterfly Valves, NPS 2-1/2 and Larger: Flanged, 150-psig CWP rating, full port, ferrous alloy, with EPDM liner.
   3. Swing Check Valves, NPS 2 and Smaller: Type 4, Class 125, bronze.
   4. Swing Check Valves, NPS 2-1/2 and Larger: Type II, Class 125, gray iron.
   5. Gate Valves, NPS 2-1/2 and Larger: Type I, Class 125, NRS, bronze-mounted cast iron.
   6. Globe Valves, NPS 2 and Smaller: Type 2, Class 125, bronze.
   7. Globe Valves, NPS 2-1/2 and Larger: Type I, Class 125, bronze-mounted cast iron.

D. Domestic Water Piping: Use the following types of valves:
   1. Ball Valves, NPS 2 and Smaller: One-piece, normal port, 400-psig) CWP rating, copper alloy.
   2. Gate Valves, NPS 2-1/2 and Larger: Type I, Class 125, normal port, bronze mounted cast iron.
   3. Globe Valves, NPS 2 and Smaller: Type 2, Class 125, normal port, bronze.
   4. Globe Valves, NPS 2-1/2 and Larger: Type I, Class 125, normal port, bronze mounted cast iron.

E. Select valves, except wafer and flangeless types, with the following end connections:
   1. For Copper Tubing, NPS 2 and Smaller: Solder-joint or threaded ends.
   2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends.
   3. For Copper Tubing, NPS 5 and Larger: Flanged ends.
   4. For Steel Piping, NPS 2 and Smaller: Threaded ends.
   5. For Steel Piping, NPS 2-1/2 to NPS 4: Flanged ends.
   6. For Steel Piping, NPS 5 and Larger: Flanged ends.

F. Specialty Hydronic Piping Valves
   1. Gate, globe, check, ball, and butterfly valves are specified in Division 22 Section 22 05 23 "General-Duty Valves for Plumbing and Piping."
   2. Refer to Part 3 "Valve Applications" Article for applications of each valve.
   3. Calibrated Balancing Valves, NPS 2 and Smaller: Brass body, full port, ball type, 125-psig working pressure, 250 deg F maximum operating temperature and having threaded ends. Valves shall have calibrated orifice or venturi, connections for portable differential pressure meter with integral seals, and be equipped with a memory stop to retain set position.
   4. Calibrated Balancing Valves, NPS 2-1/2 and Larger: Cast-iron or steel body, full port, ball type, 125-psig working pressure, 250 deg F maximum operating temperature and having flanged or grooved connections. Valves shall have calibrated orifice or venturi, connections for portable differential pressure meter with integral seals, and be equipped with a memory stop to retain set position.
   5. Pressure-Reducing Valves: Diaphragm-operated, bronze or brass body with low inlet pressure check valve, inlet strainer removable without system shutdown, and noncorrosive valve seat and stem. Select valve size, capacity, and operating pressure to suit system. Valve shall be factory set at operating pressure and have capability for field adjustment.
   6. Safety Valves: Diaphragm-operated, bronze or brass body with brass and rubber, wetted, internal working parts; shall suit system pressure and heat capacity and shall comply with the ASME Boiler and Pressure Vessel Code, Section IV.
   7. Automatic Flow-Control Valves: Factory set to maintain constant flow with plus or minus 5 percent over system pressure fluctuations, and equipped with a readout kit including flow meter, probes, hoses, flow charts, and carrying case. Each valve shall have an identification tag attached by chain, and be factory marked with the zone identification, valve number, and flow rate. Valve shall be line size and one of the following designs:
      a. Gray-iron or brass body, designed for 175 psig at 200 deg F with stainless-steel piston and spring.

b. Brass or ferrous-metal body, designed for 300 psig at 250 deg F with corrosion-resistant, tamperproof, self-cleaning, piston-spring assembly easily removable for inspection or replacement.
c. Combination assemblies, including bronze ball valve and brass alloy control valve, with stainless-steel piston and spring, fitted with pressure and temperature test valves, and designed for 300 psig at 250 deg F.

3.3 VALVE INSTALLATION

A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

C. Locate valves for easy access and provide separate support where necessary.

D. Install valves in horizontal piping with stem at or above center of pipe.

E. Install valves in position to allow full stem movement.

F. Install check valves for proper direction of flow and as follows:
1. Swing Check Valves: In horizontal position with hinge pin level.

3.4 JOINT CONSTRUCTION

A. Refer to Division 23 Section "Basic Mechanical Materials and Methods" for basic piping joint construction.

B. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

3.5 ADJUSTING

A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

END OF SECTION 22 05 23

SECTION 22 05 29 - HANGERS AND SUPPORT FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes hangers and supports for mechanical system piping and equipment.

B. Related Sections include the following:
1. Division 5 Sections for materials for attaching hangers and supports to building structure.
2. Division 21 Sections on fire-suppression piping for fire-suppression pipe hangers.
3. Division 22 Section "Mechanical Vibration Controls and Seismic Restraints" for vibration isolation and seismic restraint devices.

1.3 DEFINITIONS

A. MSS: Manufacturers Standardization Society for the Valve and Fittings Industry.

B. Terminology: As defined in MSS, "Guidelines on Terminology for Pipe Hangers and Supports."

1.4 SUBMITTALS

A. Product Data: For each type of pipe hanger, channel support system component, and thermal hanger shield insert indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Pipe Hangers:
   a. B-Line Systems, Inc.
   b. Globe Pipe Hanger Products, Inc.
   c. Grinnell Corp.
   d. Michigan Hanger Co., Inc.
   e. PHD Manufacturing, Inc.
   f. PHS Industries, Inc.
2. Channel Support Systems:
   a. B-Line Systems, Inc.
   b. Grinnell Corp.
   c. Michigan Hanger Co., Inc.
   d. Unistrut Corp.
3. Thermal-Hanger Shield Inserts:
   a. Michigan Hanger Co., Inc.
   b. PHS Industries, Inc.
   c. Pipe Shields, Inc.

2.2 MANUFACTURED UNITS

A. Pipe Hangers, Supports, and Components: MSS SP-58, factory-fabricated components. Refer to "Hanger and Support Applications" Article in Part 3 for where to use specific hanger and support types.
   1. Galvanized, Metallic Coatings: For piping and equipment that will not have field-applied finish.
   2. Nonmetallic Coatings: On attachments for electrolytic protection where attachments are in direct contact with copper tubing.

B. Thermal-Hanger Shield Inserts: 100-psi minimum compressive-strength insulation, encased in sheet metal shield.
   1. Material for Cold Piping: Type I cellular glass or water-repellent-treated, complying with ASTM Standards, Type I calcium silicate with vapor barrier.
   2. Material for Hot Piping: Type I cellular glass or water-repellent-treated, complying with ASTM Standards, Type I calcium silicate.
   3. For Trapeze or Clamped System: Insert and shield cover entire circumference of pipe.
   4. For Clevis or Band Hanger: Insert and shield cover lower 180 degrees of pipe.
   5. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.3 MISCELLANEOUS MATERIALS

A. Powder-Actuated Drive-Pin Fasteners: To be used for ductwork only and with written permission from structural engineer.

B. Mechanical-Anchor Fasteners: Insert-type attachments with pull-out and shear capacities appropriate for supported loads and building materials where used.

C. Structural Steel: Steel plates, shapes, and bars, black and galvanized complying with ASTM Standards.

D. Grout: Grade B, factory-mixed and -packaged, non-shrink and nonmetallic, dry, hydraulicccement grout complying with ASTM Standards.
   1. Characteristics: Post hardening and volume adjusting; recommended for both interior and exterior applications.
   2. Properties: Nonstaining, noncorrosive, and nongaseous.
   3. 80Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT APPLICATIONS

A. Specific hanger requirements are specified in Sections specifying equipment and systems.

B. Comply with MSS Standards for pipe hanger selections and applications that are not specified in piping system Specification Sections.

C. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
   1. Adjustable Steel Clevis Hangers (MSS Type 1): For suspension of non-insulated or insulated stationary pipes, NPS 1/2 to NPS 30.
   2. Adjustable Swivel-Ring Band Hangers (MSS Type 10): For suspension of non-insulated stationary pipes, NPS 1/2 to NPS 2.

3. Split Pipe-Ring with or without Turnbuckle-Adjustment Hangers (MSS Type 11): For suspension of non-insulated stationary pipes, NPS 3/8 to NPS 8.
4. Extension Hinged Clamps (MSS Type 12): For suspension of non-insulated stationary pipes, NPS 3/8 to NPS 3.
5. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
6. Single Pipe Rolls (MSS Type 41): For suspension of pipes, NPS 1 to NPS 30, from two rods if longitudinal movement caused by expansion and contraction might occur.
7. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes, NPS 2-1/2 to NPS 20, from single rod if horizontal movement caused by expansion and contraction might occur.

D. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.

E. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
2. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
3. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
4. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.

F. Building Attachments: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
1. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction to attach to top flange of structural shape.
2. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
3. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
4. C-Clamps (MSS Type 23): For structural shapes.
5. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
6. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I beams for heavy loads.
7. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I beams for heavy loads, with link extensions.
8. Malleable Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.

G. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
1. Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended by manufacturer to prevent crushing insulation.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe, 360-degree insert of high density, 100-psi minimum compressive-strength, water-repellent-treated calcium silicate or cellular-glass pipe insulation, same thickness as adjoining insulation with vapor barrier and encased in 360-degree sheet metal shield.

H. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Specification sections, install the following types:

1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 11/4 inches.

3.2 HANGER AND SUPPORT INSTALLATION

A. Pipe Hanger and Support Installation: Comply with current MSS Standards. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.

B. Install building attachments within concrete slabs or attach to structural steel. Space attachments within maximum piping span length indicated in MSS SP-69. Install additional attachments at concentrated loads, including valves, flanges, guides, strainers, and expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

C. Install mechanical-anchor fasteners in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

D. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

E. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

F. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

G. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME, "Building Services Piping," is not exceeded.

H. Insulated Piping: Comply with the following:
   1. Attach clamps and spacers to piping.
      a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
      b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
      c. Do not exceed pipe stress limits according to ASME Standards.
   2. Install MSS, Type 39 protection saddles, if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
      a. Option: Thermal-hanger shield inserts may be used. Include steel weight distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
   3. Install MSS, Type 40 protective shields on cold piping with vapor barrier. Shields shall span arc of 180 degrees.
      a. Option: Thermal-hanger shield inserts may be used. Include steel weight distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
   4. Shield Dimensions for Pipe: Not less than the following:
      a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
      b. NPS 4: 12 inches long and 0.06 inch thick.
      c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
      d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
      e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.
   5. Pipes NPS 8 and Larger: Include wood inserts.
   6. Insert Material: Length at least as long as protective shield.
   7. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.3 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure above or to support equipment above floor.

B. Grouting: Place grout under supports for equipment and make smooth bearing surface.

3.4 METAL FABRICATION

A. Cut, drill, and fit miscellaneous metal fabrications for heavy-duty steel trapezes and equipment supports.

B. Fit exposed connections together to form hairline joints. Field-weld connections that cannot be shop-welded because of shipping size limitations.

C. Field Welding: Comply with AWS standard procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and with the following:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

3.5 ADJUSTING

A. Hanger Adjustment: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

3.6 PAINTING

A. Touching Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 9.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM Standards.

END OF SECTION 22 05 29

SECTION 22 05 48 - VIBRATION AND SEISMIC CONTROLS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
1. Elastomeric isolation pads.
2. Freestanding spring isolators.
3. Elastomeric hangers.
4. Spring hangers.
5. Spring hangers with vertical-limit stops.
6. Pipe riser resilient supports.
7. Resilient pipe guides.
8. Steel and inertia, vibration isolation equipment bases.

1.3 DEFINITIONS

A. Effective peak velocity related acceleration coefficient.

B. OSHPD: Office of Statewide Health Planning & Development for the State of California. OSHPD assigns a unique anchorage preapproval "R" number to each seismic restraint it tests. The number describes a specific device applied as tested.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers:
1. Ace Mounting Co., Inc.
2. Amber/Booth Company, Inc.
3. B-Line Systems, Inc.
4. California Dynamics Corp.
5. Isolation Technology, Inc.
6. Kinetics Noise Control, Inc.
7. Mason Industries, Inc.

2.2 VIBRATION ISOLATORS

A. Elastomeric Isolator Pads: Oil- and water-resistant elastomer or natural rubber, arranged in single or multiple layers, molded with a nonslip pattern and galvanized steel baseplates of sufficient stiffness for uniform loading over pad area, and factory cut to sizes that match requirements of supported equipment.
1. Material: 1-inch Standard neoprene.
2. Durometer Rating: 50.
3. Number of Layers: 1.

B. Housed Spring Mounts: Housed spring isolator with integral seismic snubbers.
1. Housing: Ductile-iron or steel housing to provide all-directional seismic restraint.
2. Base: Factory drilled for bolting to structure.
3. Snubbers: Vertically adjustable to allow a maximum of 1/4-inch travel before contacting a resilient collar.

C. Elastomeric Hangers: Double-deflection type, with molded, oil-resistant rubber or neoprene isolator elements bonded to steel housings with threaded connections for hanger rods. Color-code or otherwise identify to indicate capacity range.

D. Spring Hangers: Combination coil-spring and elastomeric-insert hanger with spring and insert in compression.
   1. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
   2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
   3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
   4. Lateral Stiffness: More than 80 percent of the rated vertical stiffness.
   5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
   6. Elastomeric Element: Molded, oil-resistant rubber or neoprene. Steel-washer-reinforced cup to support spring and bushing projecting through bottom of frame.

E. Spring Hangers with Vertical-Limit Stop: Combination coil-spring and elastomeric-insert hanger with spring and insert in compression and with a vertical-limit stop.
   1. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
   2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
   3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
   4. Lateral Stiffness: More than 80 percent of the rated vertical stiffness.
   5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
   6. Elastomeric Element: Molded, oil-resistant rubber or neoprene.
   7. Adjustable Vertical Stop: Steel washer with neoprene washer "up-stop" on lower threaded rod.

F. Pipe Riser Resilient Support: All-directional, acoustical pipe anchor consisting of 2 steel tubes separated by a minimum of 1/2-inch- thick, 60-durometer neoprene. Include steel and neoprene vertical-limit stops arranged to prevent vertical travel in both directions. Design support for a maximum load on the isolation material of 500 psig and for equal resistance in all directions.

G. Resilient Pipe Guides: Telescopic arrangement of 2 steel tubes separated by a minimum of 1/2-inch-thick, 60-durometer neoprene. Factory set guide height with a shear pin to allow vertical motion due to pipe expansion and contraction. Shear pin shall be removable and re-insertable to allow for selection of pipe movement. Guides shall be capable of motion to meet location requirements.

2.3 VIBRATION ISOLATION EQUIPMENT BASES

A. Steel Base: Factory-fabricated, welded, structural-steel bases and rails.
   1. Design Requirements: Lowest possible mounting height with not less than 1-inch clearance above the floor. Include equipment anchor bolts and auxiliary motor slide bases or rails. Include supports for suction and discharge elbows for pumps.
   2. Structural Steel: Steel shapes, plates, and bars complying with ASTM A Standards. Bases shall have shape to accommodate supported equipment.
   3. Support Brackets: Factory-welded steel angles on frame for outrigger isolation mountings and to provide for anchor bolts and equipment support.

B. Inertia Base: Factory-fabricated, welded, structural-steel bases and rails ready for field-applied, cast-in-place concrete.
   1. Design Requirements: Lowest possible mounting height with not less than 1-inch clearance above the floor. Include equipment anchor bolts and auxiliary motor slide bases or rails. Include supports for suction and discharge elbows for pumps.

2. Structural Steel: Steel shapes, plates, and bars complying with ASTM A Standards. Bases shall have shape to accommodate supported equipment.
3. Support Brackets: Factory-welded steel angles on frame for outrigger isolation mountings and to provide for anchor bolts and equipment support.
4. Fabrication: Fabricate steel templates to hold equipment anchor-bolt sleeves and anchors in place during placement of concrete. Obtain anchor-bolt templates from supported equipment manufacturer.

2.4 FACTORY FINISHES

A. Finish: Manufacturer's standard paint applied to factory-assembled and -tested equipment before shipping.
1. Powder coating on springs and housings.
2. All hardware shall be electrogalvanized. Hot dip galvanize metal components for exterior use.
3. Baked enamel for metal components on isolators for interior use.
4. Color-code or otherwise mark vibration isolation to indicate capacity range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and equipment to receive vibration isolation for compliance with requirements, installation tolerances, and other conditions affecting performance.

B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install thrust limits at centerline of thrust, symmetrical on either side of equipment.

3.3 EQUIPMENT BASES

A. Fill concrete inertia bases, after installing base frame, with 3000-psi concrete, trowel to a smooth finish.
1. Cast-in-place concrete materials and placement requirements are specified in Division 3.

B. Concrete Bases: Anchor equipment to concrete base according to supported equipment manufacturer's written instructions for seismic codes at Project site.
1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
2. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base and anchor into structural concrete floor.
3. Place and secure anchorage devices. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
4. Install anchor bolts to elevations required for proper attachment to supported equipment.
5. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
6. Cast-in-place concrete materials and placement requirements are specified in Division 3.

3.4 FIELD QUALITY CONTROL

A. Testing: Perform the following field quality-control testing:

1. Isolator deflection.
2. Snubber minimum clearances.

3.5 ADJUSTING

A. Adjust isolators after piping systems have been filled and equipment is at operating weight.

B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

C. Adjust air spring leveling mechanism.

D. Adjust active height of spring isolators.

E. Adjust snubbers according to manufacturer's written recommendations.

3.6 CLEANING

A. After completing equipment installation, inspect vibration isolation and seismic-control devices. Remove paint splatters and other spots, dirt, and debris.

3.7 VIBRATION ISOLATION APPLICATION

A. Equipment:
1. Chilled Water Pump: Concrete inertia base with open spring mounts.
2. Chillers: Housed spring mounts.
3. Floor-mounted Air Handlers: Elastomeric isolator pads.
4. Suspended Fans under 1 HP: Elastomeric hangers.
5. Suspended Fans over and Including 1 HP: Spring hangers.
6. Mechanical Room Chilled Water Piping: Spring hangers with vertical stop.

END OF SECTION 22 05 48

SECTION 22 05 54 - IDENTIFICATION FOR PLUMBING, HVAC, AND FIRE PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following mechanical identification materials and their installation:
   1. Equipment nameplates.
   2. Equipment markers.
   3. Access panel and door markers.
   4. Pipe markers.
   5. Duct markers.
   6. Stencils.
   7. Valve tags.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Valve numbering scheme.

C. Valve Schedules: For each piping system. Furnish extra copies (in addition to mounted copies) to include in maintenance manuals.

1.4 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with location of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT IDENTIFICATION DEVICES

A. Equipment Nameplates: Metal, with data engraved or stamped, for permanent attachment on equipment.
   1. Data:
      a. Manufacturer, product name, model number, and serial number.
      b. Capacity, operating and power characteristics, and essential data.
      c. Labels of tested compliances.
   2. Location: Accessible and visible.
   3. Fasteners: As required to mount on equipment.

B. Equipment Markers: Engraved, color-coded laminated plastic. Include contact-type, permanent adhesive.

1. Terminology: Match schedules as closely as possible.
2. Data:
    a. Name and plan number.
    b. Equipment service.
    c. Design capacity.
    d. Other design parameters such as pressure drop, entering and leaving conditions, and speed.
3. Size: 2-1/2 by 4 inches for control devices, dampers, and valves; 4-1/2 by 6 inches for equipment.

C. Access Panel and Door Markers: 1/16-inch-thick, engraved laminated plastic, with abbreviated terms and numbers corresponding to identification. Provide 1/8-inch center hole for attachment.
1. Fasteners: Self-tapping, stainless-steel screws or contact-type, permanent adhesive.

2.2 PIPING IDENTIFICATION DEVICES

A. Manufactured Pipe Markers, General: Preprinted, color-coded, with lettering indicating service, and showing direction of flow.
1. Colors: Comply with ASME Standards, unless otherwise indicated.
2. Lettering: Use piping system terms indicated and abbreviate only as necessary for each application length.
3. Pipes with OD, Including Insulation, Less Than 18 Inches: Strip-type pipe markers at least three times letter height and of length required for label.
4. Arrows: Integral with piping system service lettering to accommodate both directions; or as separate unit on each pipe marker to indicate direction of flow.

B. Self-Adhesive Pipe Markers: Plastic with pressure-sensitive, permanent-type, self-adhesive back.

C. Plastic Tape: Continuously printed, vinyl tape at least 3 mils thick with pressure sensitive, permanent-type, self-adhesive back.
1. Width for Markers on Pipes with OD, Including Insulation, Less Than 6 Inches: 3/4 inch minimum.
2. Width for Markers on Pipes with OD, Including Insulation, 6 Inches or Larger: 1-1/2 inches minimum.

2.3 DUCT IDENTIFICATION DEVICES

A. Duct Markers: Engraved, color-coded laminated plastic. Include direction and quantity of airflow and duct service (such as supply, return, and exhaust). Include contact-type, permanent adhesive.

2.4 STENCILS

A. Stencils: Prepared with letter sizes according to ASME Standards for ducts; and minimum letter height of 3/4 inch for access panel and door markers, and similar operational instructions.
1. Stencil Material: Metal or fiberboard.
2. Stencil Paint: Exterior, gloss, acrylic enamel black, unless otherwise indicated. Paint may be in pressurized spray-can form.
3. Identification Paint: Exterior, acrylic enamel in colors according to ASME Standards, unless otherwise indicated.

2.5 VALVE TAGS

A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers, with numbering scheme approved by Engineer. Provide 5/32inch hole for fastener.
   1. Material: 0.032-inch-thick brass.
   2. Material: 3/32-inch- thick laminated plastic with 2 black surfaces and white inner layer.
   3. Valve-Tag Fasteners: Brass wire-link or beaded chain; or S-hook.

PART 3 - EXECUTION

3.1 APPLICATIONS, GENERAL

A. Products specified are for applications referenced in other Division 23 Sections. If more than single-type material, device, or label is specified for listed applications, selection is Installer's option.

3.2 EQUIPMENT IDENTIFICATION

A. Install and permanently fasten equipment nameplates on each major item of mechanical equipment that does not have nameplate or has nameplate that is damaged or located where not easily visible. Locate nameplates where accessible and visible. Include nameplates for the following general categories of equipment:
   1. Pumps, compressors, chillers, condensers, and similar motor-driven units.
   2. Fans, blowers, primary balancing dampers, and mixing boxes.
   3. Packaged HVAC central-station and zone-type units.

B. Install equipment markers with permanent adhesive on or near each major item of mechanical equipment. Data required for markers may be included on signs, and markers may be omitted if both are indicated.
   1. Letter Size: Minimum 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
   2. Data: Distinguish among multiple units, indicate operational requirements, indicate safety and emergency precautions, warn of hazards and improper operations, and identify units.
   3. Locate markers where accessible and visible. Include markers for the following general categories of equipment:
      a. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
      b. Fire department hose valves and hose stations.
      c. Meters, gages, thermometers, and similar units.
      d. Fuel-burning units, including boilers, furnaces, heaters, stills, and absorption units.
      e. Pumps, compressors, chillers, condensers, and similar motor-driven units.
      f. Fans, blowers, primary balancing dampers, and mixing boxes.
      g. Packaged HVAC central-station and zone-type units.
      h. Tanks and pressure vessels.
      i. Strainers, filters, humidifiers, water-treatment systems, and similar equipment.

C. Install equipment signs with screws or permanent adhesive on or near each major item of mechanical equipment. Locate signs where accessible and visible.
   1. Identify mechanical equipment with equipment markers in the following color codes:
      a. Green: For cooling equipment and components.
      b. Yellow: For heating equipment and components.
      c. Orange: For combination cooling and heating equipment and components.
      d. Brown: For energy-reclamation equipment and components.
   2. Letter Size: Minimum 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for

greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

3. Data: Distinguish among multiple units, indicate operational requirements, indicate safety and emergency precautions, warn of hazards and improper operations, and identify units.
4. Include signs for the following general categories of equipment:
   a. Pumps, compressors, chillers, condensers, and similar motor-driven units.
   b. Fans, blowers, primary balancing dampers, and mixing boxes.

D. Install access panel markers with screws on equipment access panels.

3.3 PIPING IDENTIFICATION

A. Install manufactured pipe markers indicating service on each piping system. Install with flow indication arrows showing direction of flow.
1. Pipes with OD, Including Insulation, Less Than 6 Inches: Self-adhesive pipe markers. Use color-coded, self-adhesive plastic tape, 1-1/2 inches wide, lapped at least 1-1/2 inches at both ends of pipe marker, and covering full circumference of pipe.
2. Pipes with OD, Including Insulation, 6 Inches and Larger: Self-adhesive pipe markers. Use color-coded, self-adhesive plastic tape, at least 1-1/2 inches wide, lapped at least 3 inches at both ends of pipe marker, and covering full circumference of pipe.

B. Locate pipe markers where piping is exposed in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior non concealed locations as follows:
1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and non-accessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
7. On piping above removable acoustical ceilings. Omit intermediately spaced markers.

3.4 DUCT IDENTIFICATION

A. Install duct markers with permanent adhesive on air ducts in the following color codes:
1. Green: For cold-air supply ducts.
2. Yellow: For hot-air supply ducts.
3. Blue: For exhaust-, outside-, relief-, return-, and mixed-air ducts.
4. ASME Standard Colors and Designs: For hazardous material exhaust.
5. Letter Size: Minimum 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

B. Stenciled Duct Marker Option: Stenciled markers, showing service and direction of flow, may be provided instead of laminated-plastic duct markers, at Installer's option, if lettering larger than 1 inch high is needed for proper identification because of distance from normal location of required identification.

C. Locate markers near points where ducts enter into concealed spaces and at maximum intervals of 50 feet in each space where ducts are exposed or concealed by removable ceiling system.

3.5 VALVE-TAG INSTALLATION

A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; plumbing fixture supply stops; shutoff valves; faucets; convenience and lawn-watering hose connections; and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.

B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following:
   1. Valve-Tag Size and Shape:
      a. Cold Water: 1-1/2 inches, round.
      b. Hot Water: 1-1/2 inches, round.
      c. Fire Protection: 2 inches, square.
      d. Gas: 2 inches, square.
   2. Valve-Tag Color:
      a. Cold Water: Green.
      b. Hot Water: Yellow.
      c. Fire Protection: Red.
      d. Gas: White.
   3. Letter Color:
      a. Cold Water: White.
      b. Hot Water: White.
      c. Fire Protection: White.
      d. Gas: Black.

3.6 ADJUSTING

A. Relocate mechanical identification materials and devices that have become visually blocked by other work.

3.7 CLEANING

A. Clean faces of mechanical identification devices and glass frames of valve schedules.

END OF SECTION 22 05 54

SECTION 22 13 16 - SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following for soil, waste, and vent piping inside the building:
   1. Pipe, tube, and fittings.
   2. Special pipe fittings.
   3. Encasement for underground metal piping.

1.3 DEFINITIONS

A. ABS: Acrylonitrile-butadiene-styrene plastic.

B. EPDM: Ethylene-propylene-diene terpolymer rubber.

C. LLDPE: Linear, low-density polyethylene plastic.

D. NBR: Acrylonitrile-butadiene rubber.

E. PE: Polyethylene plastic.

F. PVC: Polyvinyl chloride plastic.

G. TPE: Thermoplastic elastomer.

1.4 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure, unless otherwise indicated:
   1. Soil, Waste, and Vent Piping: 10-foot head of water.
   2. Sanitary Sewer, Force-Main Piping: 100 psig.

1.5 SUBMITTALS

A. Product Data: For pipe, tube, fittings, and couplings.

B. Shop Drawings:
   1. Design Calculations: Signed and sealed by a qualified professional engineer for selecting seismic restraints.
   2. Sovent Drainage System: Include plans, elevations, sections, and details.

C. Field quality-control inspection and test reports.

1.6 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping; "NSF-drain" for plastic drain piping; "NSF-tubular" for plastic continuous waste piping; and "NSF-sewer" for plastic sewer piping.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
   2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 PIPING MATERIALS

A. Refer to Part 3 "Piping Applications" Article for applications of pipe, tube, fitting, and joining materials.

2.3 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 74, Service and Extra-Heavy class(es).

B. Gaskets: ASTM C 564, rubber.

C. Calking Materials: ASTM B 29, pure lead and oakum or hemp fiber.

2.4 HUBLESS CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 888 or CISPI 301.

B. Sovent Stack Fittings: ASME B16.45 or ASSE 1043, hubless, cast-iron aerator and deaerator drainage fittings.

C. Shielded Couplings: ASTM C 1277 assembly of metal shield or housing, corrosion-resistant fasteners, and rubber sleeve with integral, center pipe stop.
   1. Standard, Shielded, Stainless-Steel Couplings: CISPI 310, with stainless-steel corrugated shield; stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve.
      a. Manufacturers:
         1) ANACO.
         2) Fernco, Inc.
         3) Ideal Div.; Stant Corp.
         4) Mission Rubber Co.
         5) Tyler Pipe; Soil Pipe Div.
   2. Heavy-Duty, Shielded, Stainless-Steel Couplings: With stainless-steel shield, stainless steel bands and tightening devices, and ASTM C 564, rubber sleeve. a. Manufacturers:
         1) ANACO.
         2) Clamp-All Corp.
         3) Ideal Div.; Stant Corp.
         4) Mission Rubber Co.
         5) Tyler Pipe; Soil Pipe Div.

3. Heavy-Duty, Shielded, Cast-Iron Couplings: ASTM A 48/A 48M, two-piece, cast-iron housing; stainless-steel bolts and nuts; and ASTM C 564, rubber sleeve. a. Manufacturers:
    1) MG Piping Products Co.
    2) Approved equal.

D. Rigid, Unshielded Couplings: ASTM C 1461, sleeve-type, reducing- or transition-type mechanical coupling molded from ASTM C 1440, TPE material with corrosion-resistant-metal tension band and tightening mechanism on each end.
1. Manufacturers:
    a. ANACO.
    b. Approved equal.

2.5 STEEL PIPE AND FITTINGS

A. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade A or B, Standard Weight, or Schedule 40, galvanized. Include ends matching joining method.

B. Drainage Fittings: ASME B16.1, threaded, cast-iron drainage pattern.

C. Pressure Fittings:
1. Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, galvanized, seamless steel pipe. Include ends matching joining method.
2. Malleable-Iron Unions: ASME B16.39; Class 150; hexagonal-stock body with ball-and socket, metal-to-metal, bronze seating surface; and female threaded ends.
3. Gray-Iron, Threaded Fittings: ASME B16.4, Class 125, standard pattern.
4. Cast-Iron Flanges: ASME B16.1, Class 125.
5. Cast-Iron, Flanged Fittings: ASME B16.1, Class 125.

D. Grooved-Joint Systems (only in concealed spaces, pipe chases, crawl spaces, etc)
1. Manufacturers:
    a. Anvil International.
    b. Star Pipe Products; Star Fittings Div.
    c. Victaulic Company.
    d. Ward Manufacturing, Inc.
2. Grooved-End, Steel-Piping Fittings: ASTM A 47/A 47M, malleable-iron casting; ASTM A 106, galvanized-steel pipe; or ASTM A 536, ductile-iron casting; with dimensions matching steel pipe.
3. Grooved-End, Steel-Piping Couplings: AWWA C606, for steel-pipe dimensions. Include ferrous housing sections, gasket suitable for water, and bolts and nuts.

2.6 STAINLESS-STEEL PIPE AND FITTINGS

A. Pipe and Fittings: ASME A112.3.1, drainage pattern with socket and spigot ends.

B. Gaskets: Lip seals shaped to fit socket groove, with plastic backup ring.
1. Material: EPDM, unless NBR is indicated.

2.7 DUCTILE-IRON PIPE AND FITTINGS

A. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint bell and plain spigot end, unless grooved or flanged ends are indicated.
1. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
2. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

B. Push-on-Joint, Ductile-Iron Pipe: AWWA C151, with push-on-joint bell and plain spigot end, unless grooved or flanged ends are indicated.
   1. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
   2. Gaskets: AWWA C111, rubber.

C. Grooved-Joint Systems (only in concealed spaces, pipe chases, crawl spaces, etc)
   1. Manufacturers:
      a. Victaulic Company.
      b. Approved equal.
   2. Grooved-End, Ductile-Iron Fittings: ASTM A 47/A 47M, malleable-iron castings or ASTM A 536, ductile-iron castings with dimensions matching pipe.
   3. Grooved-End, Ductile-Iron-Piping Couplings: AWWA C606, for ductile-iron-pipe dimensions. Include ferrous housing sections, gasket suitable for water, and bolts and nuts.

D. Flanges: ASME 16.1, Class 125, cast iron.

2.8 COPPER TUBE AND FITTINGS

A. Copper DWV Tube: ASTM B 306, drainage tube, drawn temper.
   1. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.

B. Hard Copper Tube: ASTM B 88, Types L and M water tube, drawn temper.
   1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wroughtcopper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
   2. Copper Flanges: ASME B16.24, Class 150, cast copper with solder-joint end.
   3. Copper Unions: MSS SP-123, copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

C. Soft Copper Tube: ASTM B 88, Type L, water tube, annealed temper.
   1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.

2.9 SPECIAL PIPE FITTINGS

A. Flexible, Non-pressure Pipe Couplings: Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition pattern. Include shear ring, ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.
   1. Manufacturers:
      a. Dallas Specialty & Mfg. Co.
      b. Fernco, Inc.
      c. Logan Clay Products Company (The).
      d. Mission Rubber Co.
      e. NDS, Inc.
      f. Plastic Oddities, Inc.
   2. Sleeve Materials:
      a. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
      b. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
      c. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

B. Shielded Non-pressure Pipe Couplings: ASTM C 1460, elastomeric or rubber sleeve with full length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.
   1. Manufacturers:
      a. Cascade Waterworks Mfg. Co.
      b. Mission Rubber Co.
      c. Approved equal.

C. Rigid, Unshielded, Non-pressure Pipe Couplings: ASTM C 1461, sleeve-type reducing- or transition-type mechanical coupling molded from ASTM C 1440, TPE material with corrosion resistant-metal tension band and tightening mechanism on each end.
   1. Manufacturers:
      a. ANACO.
      b. Approved equal.

D. Pressure Pipe Couplings: AWWA C219 metal, sleeve-type same size as, with pressure rating at least equal to, and ends compatible with, pipes to be joined.
   1. Manufacturers:
      a. Cascade Waterworks Mfg. Co.
      b. Dresser, Inc.; DMD Div.
      c. EBAA Iron Sales, Inc.
      d. Ford Meter Box Company, Inc. (The); Pipe Products Div.
      e. JCM Industries, Inc.
      f. Romac Industries, Inc.
      g. Smith-Blair, Inc.
      h. Viking Johnson.
   2. Center-Sleeve Material: Manufacturer's standard.
   3. Gasket Material: Natural or synthetic rubber.
   4. Metal Component Finish: Corrosion-resistant coating or material.

E. Flexible Ball Joints: Ductile-iron fitting with combination of flanged and mechanical-joint ends complying with AWWA C110 or AWWA C153. Include gasketed ball-joint section and ductile iron gland, rubber gasket, and steel bolts.
   1. Manufacturers:
      a. EBAA Iron Sales, Inc.
      b. Approved equal.

F. Expansion Joints: Two or three-piece, ductile-iron assembly consisting of telescoping sleeve(s) with gaskets and restrained-type, ductile-iron, bell-and-spigot end sections complying with AWWA C110 or AWWA C153. Select and assemble components for expansion indicated.
   Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.
   1. Manufacturers:
      a. EBAA Iron Sales, Inc.
      b. Romac Industries, Inc.
      c. Star Pipe Products; Star Fittings Div.
      d. Approved equal.

G. Wall-Penetration Fittings: Compound, ductile-iron coupling fitting with sleeve and flexing sections for up to 20-degree deflection, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.
   1. Manufacturers:
      a. SIGMA Corp.
      b. Approved equal.

2.10 ENCASEMENT FOR UNDERGROUND METAL PIPING

A. Description: ASTM A 674 or AWWA C105, high-density, cross laminated PE film of 0.004-inch or LLDPE film of 0.008-inch minimum thickness.

B. Form: Sheet or tube.

C. Color: Black or natural.

PART 3 – EXECUTION

3.1 EXCAVATION

A. Refer to Division 31 Section "Earth Moving" for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

A. Flanges and unions may be used on aboveground pressure piping, unless otherwise indicated.

B. Aboveground, soil and waste piping NPS 4 and smaller shall be any of the following:
1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless cast-iron soil pipe and fittings standard, shielded, stainless-steel and rigid, unshielded couplings; and hubless-coupling joints.
3. Steel pipe, drainage fittings, and threaded joints.

C. Aboveground, soil and waste piping NPS 5 and larger shall be any of the following:
1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless cast-iron soil pipe and fittings standard, and heavy-duty shielded, stainless-steel couplings; and hubless-coupling joints.
3. Steel pipe, drainage fittings, and threaded joints.

D. Aboveground, vent piping NPS 4 and smaller shall be any of the following:
1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless cast-iron soil pipe and fittings; standard, shielded, stainless-steel and rigid, unshielded couplings; and hubless-coupling joints.
3. Steel pipe, drainage fittings, and threaded joints.
4. Stainless-steel pipe and fittings gaskets, and gasketed joints.
5. Copper DWV tube, copper drainage fittings, and soldered joints.
    a. Option for Vent Piping, NPS 2-1/2 and NPS 3-1/2: Hard copper tube, Type M; copper pressure fittings; and soldered joints.

E. Aboveground, vent piping NPS 5 and larger shall be any of the following:
1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless cast-iron soil pipe and fittings; standard, and heavy-duty shielded, stainless-steel couplings; and hubless-coupling joints.
3. Steel pipe, drainage fittings, and threaded joints.

F. Underground, soil, waste, and vent piping NPS 4 and smaller shall be any of the following:
1. Service class, cast-iron soil piping; gaskets, calking materials; and calked joints.
2. Hubless cast-iron soil pipe and fittings; standard, shielded, stainless-steel couplings; and hubless-coupling joints.

G. Underground, soil and waste piping NPS 5 and larger shall be any of the following:
1. Service class, cast-iron soil piping; calking materials; and calked joints.

2. Hubless cast-iron soil pipe and fittings; standard, shielded, stainless-steel and heavy-duty shielded, cast-iron couplings; and hubless-coupling joints.

H. Aboveground sanitary-sewage force mains NPS 1-1/2 and NPS 2 shall be any of the following:
1. Hard copper tube, Type L; copper pressure fittings; and soldered joints.
2. Steel pipe, pressure fittings, and threaded joints.

I. Aboveground sanitary-sewage force mains NPS 2-1/2 to NPS 6 shall be any of the following:
1. Hard copper tube, Type L; copper pressure fittings; and soldered joints.
2. Steel pipe, pressure fittings, and threaded joints.
3. Grooved-end steel pipe, grooved-joint system fittings and couplings, and grooved joints.

J. Underground sanitary-sewage force mains NPS 4 and smaller shall be any of the following:
1. Hard copper tube, Type L; copper pressure fittings; and soldered joints.
2. Steel pipe, pressure fittings, and threaded joints.
   a. Include grooved-joint system fittings and couplings and grooved joints where indicated.
3. Mechanical-joint, ductile-iron pipe; mechanical-joint, ductile-iron fittings; glands, gaskets, and bolts; and mechanical joints.
   a. Include grooved-joint system fittings and couplings and grooved joints where indicated.
4. Push-on-joint, ductile-iron pipe; push-on-joint ductile-iron fittings; gaskets; and gasketed joints.
   a. Include grooved-joint system fittings and couplings and grooved joints where indicated.
5. Pressure pipe couplings, if dissimilar pipe materials or piping with small difference in OD must be joined.

K. Underground sanitary-sewage force mains NPS 5 and larger shall be any of the following:
1. Steel pipe, pressure fittings, and threaded joints.
2. Mechanical-joint, ductile-iron pipe; mechanical-joint, ductile-iron fittings; glands, gaskets, and bolts; and mechanical-joint joints.
3. Push-on-joint, ductile-iron pipe; push-on-joint, ductile-iron fittings; gaskets; and gasketed joints.
4. Pressure pipe couplings, if dissimilar pipe materials or piping with small difference in OD must be joined.

3.3 PIPING INSTALLATION

A. Sanitary sewer piping outside the building is specified in Division 22 Section 22 13 16 "Sanitary Waste and Vent Piping."

B. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.

C. Install cleanout fitting with closure plug inside the building in sanitary force-main piping.

D. Install underground, steel, force-main piping. Install encasement on piping according to ASTM A 674 or AWWA C105.

E. Install underground, ductile-iron, force-main piping according to AWWA C600. Install buried piping inside the building between wall and floor penetrations and connection to sanitary sewer piping outside the building with restrained joints. Anchor pipe to wall or floor. Install thrust block supports at vertical and horizontal offsets.
1. Install encasement on piping according to ASTM A 674 or AWWA C105.

F. Install underground, copper, force-main tubing according to CDA's "Copper Tube Handbook."
   1. Install encasement on piping according to ASTM A 674 or AWWA C105.

G. Install underground, ductile-iron, special pipe fittings according to AWWA C600.
   1. Install encasement on piping according to ASTM A 674 or AWWA C105.

H. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Sleeves and mechanical sleeve seals are specified in Division 22 Section "Common Work Results for Plumbing."

I. Install wall-penetration fitting at each service pipe penetration through foundation wall. Make installation watertight.

J. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
   1. Install encasement on underground piping according to ASTM A 674 or AWWA C105.

K. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if 2 fixtures are installed back-to-back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

L. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

M. Install soil and waste drainage and vent piping at the following minimum slopes, unless otherwise indicated:
   1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
   2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
   3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.

N. Install engineered soil and waste drainage and vent piping systems as follows:
   1. Combination Waste and Vent: Comply with standards of authorities having jurisdiction.
   2. Sovent Drainage System: Comply with ASSE 1043 and sovent fitting manufacturer's written installation instructions.
   3. Reduced-Size Venting: Comply with standards of authorities having jurisdiction.

O. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.

P. Install ABS soil and waste drainage and vent piping according to ASTM D 2661.

Q. Install PVC soil and waste drainage and vent piping according to ASTM D 2665.

R. Install underground PVC soil and waste drainage piping according to ASTM D 2321.

S. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

3.4 JOINT CONSTRUCTION

A. Basic piping joint construction requirements are specified in Division 22 Section "Common Work Results for Plumbing."

B. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.

C. Join hub-and-spigot, cast-iron soil piping with calked joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead and oakum calked joints.

D. Join hubless cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joints.

E. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

3.5 VALVE INSTALLATION

A. General valve installation requirements are specified in Division 22 Section "General-Duty Valves for Plumbing Piping."

B. Shutoff Valves: Install shutoff valve on each sewage pump discharge.
1. Install gate or full-port ball valve for piping NPS 2 and smaller.
2. Install gate valve for piping NPS 2-1/2 and larger.

C. Check Valves: Install swing check valve, between pump and shutoff valve, on each sewage pump discharge.

D. Backwater Valves: Install backwater valves in piping subject to sewage backflow.
1. Horizontal Piping: Horizontal backwater valves. Use normally closed type, unless otherwise indicated.
2. Floor Drains: Drain outlet backwater valves, unless drain has integral backwater valve.
3. Install backwater valves in accessible locations.

3.6 HANGER AND SUPPORT INSTALLATION

A. Seismic-restraint devices are specified in Division 22 Section "Vibration and Seismic Controls for Plumbing and HVAC Piping"

B. Pipe hangers and supports are specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment." Install the following:
1. Vertical Piping: MSS Type 8 or Type 42, clamps.
2. Install individual, straight, horizontal piping runs according to the following:
    a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
    c. Longer Than 100 Feet, if Indicated: MSS Type 49, spring cushion rolls.
3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
4. Base of Vertical Piping: MSS Type 52, spring hangers.

C. Install supports according to Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."

D. Support vertical piping and tubing at base and at each floor.

E. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch minimum rods.

F. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
   1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
   2. NPS 3: 60 inches with 1/2-inch rod.
   3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
   4. NPS 6: 60 inches with 3/4-inch rod.
   5. NPS 8 to NPS 12: 60 inches with 7/8-inch rod.

G. Install supports for vertical cast-iron soil piping every 15 feet.

H. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:
   1. NPS 1-1/4: 84 inches with 3/8-inch rod.
   2. NPS 1-1/2: 108 inches with 3/8-inch rod.
   3. NPS 2: 10 feet with 3/8-inch rod.
   4. NPS 2-1/2: 11 feet with 1/2-inch rod.
   5. NPS 3: 12 feet with 1/2-inch rod.
   6. NPS 4 and NPS 5: 12 feet with 5/8-inch rod.
   7. NPS 6: 12 feet with 3/4-inch rod.
   8. NPS 8 to NPS 12: 12 feet with 7/8-inch rod.

I. Install supports for vertical steel piping every 15 feet.

J. Install hangers for stainless-steel piping with the following maximum horizontal spacing and minimum rod diameters:
   1. NPS 2: 84 inches with 3/8-inch rod.
   2. NPS 3: 96 inches with 1/2-inch rod.
   3. NPS 4: 108 inches with 1/2-inch rod.
   4. NPS 6: 10 feet with 5/8-inch rod.

K. Install supports for vertical stainless-steel piping every 10 feet.

L. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
   1. NPS 1-1/4: 72 inches with 3/8-inch rod.
   2. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
   3. NPS 2-1/2: 108 inches with 1/2-inch rod.
   4. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
   5. NPS 6: 10 feet with 5/8-inch rod.
   6. NPS 8: 10 feet with 3/4-inch rod.

M. Install supports for vertical copper tubing every 10 feet.

N. Install hangers for ABS and PVC piping with the following maximum horizontal spacing and minimum rod diameters:
   1. NPS 1-1/2 and NPS 2: 48 inches with 3/8-inch rod.
   2. NPS 3: 48 inches with 1/2-inch rod.

3. NPS 4 and 5: 48 inches with 5/8-inch rod.
4. NPS 6: 48 inches with 3/4-inch rod.
5. NPS 8 to NPS 12: 48 inches with 7/8-inch rod.

O. Install supports for vertical ABS and PVC piping every 48 inches.

P. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.7 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

C. Connect drainage and vent piping to the following:
1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.
4. Equipment: Connect drainage piping as indicated. Provide shutoff valve, if indicated, and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 and larger.

D. Connect force-main piping to the following:
1. Sanitary Sewer: To exterior force main or sanitary manhole.
2. Sewage Pumps: To sewage pump discharge.

3.8 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections, and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping, except outside leaders, on completion of roughing-in. Close openings in piping system and fill with water

to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.

4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.
5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
6. Prepare reports for tests and required corrective action.

E. Test force-main piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Leave uncovered and unconcealed new, altered, extended, or replaced force-main piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
2. Cap and subject piping to static-water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
3. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
4. Prepare reports for tests and required corrective action.

3.9 CLEANING

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

3.10 PROTECTION

A. Exposed ABS and PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

END OF SECTION 22 13 16

SECTION 23 00 50 - BASIC MECHANICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following basic mechanical materials and methods to complement other Division 23 Sections.
   1. Piping materials and installation instructions common to most piping systems.
   2. Concrete base construction requirements.
   3. Escutcheons.
   4. Dielectric fittings.
   5. Flexible connectors.
   6. Mechanical sleeve seals.
   7. Equipment nameplate data requirements.
   8. Non shrink grout for equipment installations.
   9. Field-fabricated metal and wood equipment supports.
   10. Installation requirements common to equipment specification sections.
   11. Mechanical demolition.
   12. Cutting and patching
   13. Touchup painting and finishing.

1.03 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

F. The following are industry abbreviations for plastic materials.
   1. CPVC: Chlorinated polyvinyl chloride plastic
   2. PVC: Polyvinyl chloride plastic.

1.04 SUBMITTALS

A. Product Data: For dielectric fittings, flexible connectors, mechanical sleeve seals, escutcheons, and identification materials and devices.

B. Coordination Drawings: Detail major elements, components, and systems of mechanical equipment and materials in relationship with other systems, installations, and building components. Show space requirements for installation and access. Indicate if sequence and coordination of installations are important to efficient flow of the Work. Include the following: 1.
   1. Planned piping layout, including valve and specialty locations and valve-stem movement.
   2. Clearances for servicing and maintaining equipment, accessories, and specialties, including space for disassembly required for periodic maintenance.
   3. Sizes and location of required concrete pads and bases.
   4. Floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations.
   5. Reflected ceiling plans to coordinate and integrate installation of air outlets and inlets, light fixtures, communication system components, sprinklers, and other ceiling-mounted items.

1.05 QUALITY ASSURANCE

A. Comply with ASME Standards for lettering size, length of color field, colors, and viewing angles of identification devices.

B. Equipment Selection: Equipment of higher electrical characteristics, physical dimensions, capacities, and ratings may be furnished provided such proposed equipment is approved in writing and connecting mechanical and electrical services, circuit breakers, conduit, motors, bases, and equipment spaces are increased. Additional costs shall be approved in advance by appropriate Contract Modification for these increases. If minimum energy ratings or efficiencies of equipment are specified, equipment must meet design and commissioning requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and prevent entrance of dirt, debris, and moisture.

B. Protect stored pipes, ductwork, equipment, and tubes from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor. Store all material and equipment with protective covering intact and out of inclement weather or dirty conditions.

C. Protect flanges, fittings, and piping specialties from moisture and dirt.

D. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.07 SEQUENCING AND SCHEDULING

A. Coordinate mechanical equipment installation with other building components.

B. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction to allow for mechanical installations.

C. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components, as they are constructed.

D. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning before closing in building.

E. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.

F. Coordinate requirements for access panels and doors if mechanical items requiring access are concealed behind finished surfaces. Access panels and doors are specified in Division 8.

G. Coordinate installation of identifying devices after completing covering and painting if devices are applied to surfaces. Install identifying devices before installing acoustical ceilings and similar concealment.

1.08 OPERATION PRIOR TO ACCEPTANCE

A. When any equipment is operable, and it is to the advantage of the Contractor to operate the equipment, he may do so provided that he properly supervises the operation and retains full responsibility for the equipment operated.

B. Regardless of whether or not the equipment has or has not been operated, the Contractor shall clean the equipment properly, make required adjustments, change construction filters to final design filter sets, and complete punch list items before final acceptance by the Owner.

C. The date of acceptance by the Engineer, for beneficial use by the Owner, shall be the beginning date of the warranty period.

1.09 SPACE AND EQUIPMENT ARRANGEMENT

A. The size of each item of mechanical equipment shown on the Drawings is based on the dimensions of a particular manufacturer as indicated. While other manufacturers may be acceptable, it shall be the responsibility of the Contractor to determine whether or not the equipment he proposes to furnish will fit into the space. Shop drawings shall be prepared for all equipment, ductwork, and piping to indicate a suitable arrangement.

B. Install equipment in a manner to permit access to all surfaces. Install valves, motors, drives, lubricating devices, filters, coils, condenser bundles, and other accessory items in a position to allow removal for service or replacement without requiring the disassembly of another part. Adhere to the manufacturer’s clearance recommendations.

C. Provide access panels acceptable to the Engineer for equipment that is concealed above ceiling space.

D. Large equipment assemblies or components which will be installed in the building, and which are too large to permit access through doorways, stairways, or shafts, shall be brought to the site and placed in the appropriate spaces before the enclosing structure is completed. Provisions shall be implemented by the Contractor to ensure that the equipment will not be damaged in any way during the associated construction procedures.

1.10 START-UP OF EQUIPMENT AND SYSTEMS

A. Whenever the manufacturer of a particular item of equipment or a particular system makes available a start-up service after completion of the installation, such manufacturer’s start-up service (rendered by the manufacturer or his authorized representative) shall be provided.

B. Witnessing and explanations of start-up services shall be included as part of the “Instruction of Owner’s Personnel” as specified below.

1.11 INSTRUCTION OF OWNER'S PERSONNEL

A. Provide the services of competent engineers or technicians acceptable to the Engineer to instruct representatives of the Owner in complete and detailed operation and maintenance of each item of equipment, and each system. These instructions shall be provided for whatever periods may be necessary to accomplish the desired results. Upon completion of these instructions, the Contractor shall obtain a letter of release, acknowledged by the Owner or his authorized representative, stating the dates on which the various kinds of instruction were given, and the personnel to whom the instructions were given.

B. The Contractor shall be fully responsible for proper maintenance of equipment and systems until the instructions have been given to the Owner's personnel and the letter of release acknowledged.

C. In providing the instructions to the Owner's personnel, the written operating and maintenance manuals shall be followed in all instances, and the Owner's personnel shall be familiarized with such manuals. Operating and maintenance manuals used for instructions shall include piping diagrams, valve identification charts, control and interlocking wiring diagrams, manufacturers' operation and maintenance manuals, parts lists (with sources identified), and other data as appropriate for each system, and as required elsewhere in the Specifications to be furnished to the Owner prior to final acceptance of the project.

D. Provide the Owner with three (3) complete sets of all maintenance manuals, pamphlets, brochures, or instructions. This material shall be catalogued, indexed, and bound into books.

1.12 ACCEPTABLE MANUFACTURERS

A. Provide equipment and materials from listed manufacturers listed within this specification. Deviations from this specification will not be acceptable. When one manufacturer is listed, alternate materials and equipment may be provided "equal to" the listed. When more than one manufacturer is listed, equipment and material must be provided by one of the listed manufacturers.

1.13 ASBESTOS

A. Contractor shall field verify all existing conditions prior to starting any work. If asbestos is discovered during construction, contractor shall immediately notify Owner of conditions. Owner to provide all asbestos removal and/or containment before work can proceed. If asbestos is known to exist prior to bidding, contractor shall refer to Owner's documentation and proceed with work up to contaminated area.

PART 2 - PRODUCTS

2.01 STANDARD PRODUCTS

A. Each item of equipment furnished under this Division of the Specifications shall be essentially the standard product of the manufacturer. Where two or more units of the same kind or class of equipment are required, these shall be the products of a single manufacturer; however, the component parts of the equipment need not be the products of one manufacturer.

B. Materials and equipment shall be of the base quality normally used in good commercial practice and shall be the products of reputable domestic manufacturers unless otherwise specified. Each major component shall bear a nameplate giving the name and address of the manufacturer, and the catalog number or designation of the component.

2.02 QUALITY AND CLASSIFICATION OF MATERIALS

A. Materials and equipment shall be new and of the quality specified and shall be free from defects through the completion of the project. Materials or equipment damaged in shipment or otherwise damaged shall not be repaired at the job site but shall be replaced with new materials or equipment identical with those damaged.

B. Wherever a UL standard has been established for a particular type of material or equipment, each such material or equipment provided on this project shall meet the requirements of the UL standard in every way and shall be UL listed and labeled.

2.03 LOCAL PARTS AND SERVICE

A. Each item of equipment furnished on this project shall have local representation, factory authorized service, and an adequate stock of repair parts. “Local” shall be defined, for this purpose, as “within 100 miles of the project site.”

2.04 FLAME SPREAD PROPERTIES OF MATERIALS

A. Materials used for insulation, acoustical linings, adhesives, jackets and coatings, and combinations of these materials, shall each have a flame spread rating of 25 or less, and a smoke developed rating of 50 or less, as determined by an independent testing laboratory in accordance with NFPA-255.MANUFACTURERS

2.05 MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:

A. Dielectric Unions or Flanges:
1. Eclipse, Inc.; Rockford-Eclipse Div.
2. Epco Sales Inc.
3. Hart Industries International, Inc.
4. Watts Industries, Inc.; Water Products Div.
5. Zurn Industries, Inc.; Wilkins Div.

B. Transition Fittings:
1. Cascade Waterworks Manufacturing Company.
2. Dresser Industries, Inc.
3. JCM Industries.
4. Smith-Blair, Inc.
5. Mobco.
6. Mission Rubber Company.

C. Dielectric Nipples:
1. Perfection Corporation.
2. Precision Plumbing Products
3. Victaulic Company.

D. Mechanical Sleeve Seals:
1. Thunderline/Link-Seal.
2. Metraflex Company.
3. Calpico, Inc.
4.

2.06 PIPE AND PIPE FITTINGS

A. Refer to individual Division 22 piping Sections for pipe and fitting materials and joining methods.

B. Pipe Threads: Factory-threaded pipe and pipe fittings complying with ASME Standards.

2.07 JOINING MATERIALS

A. Refer to individual Division 22 piping Sections for special joining materials not listed below.

B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
   1. Nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness, unless thickness or specific material is indicated complying with ASME Standards.
      a. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
      b. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
   2. Rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated complying with AWWA Standards.

C. Flange Bolts and Nuts: Carbon steel, unless otherwise indicated complying with ASME Standards.

D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

E. Solder Filler Metals:
   1. Alloy Sn95 or Alloy Sn94: Approximately 95 percent tin and 5 percent silver, with 0.10 percent lead content complying with ASTM Standards.

F. Brazing Filler Metals:
   1. BCuP Series: Copper-phosphorus alloys complying with AWS Standards.
   2. BAg1: Silver alloy complying with AWS Standards.

G. Welding Filler Metals: Comply with AWS Standards for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

H. Solvent Cements: Manufacturer's standard solvent cements for the following:
   1. PVC Piping: Include primer according to ASTM Standards.
   2. PVC to ABS Piping Transition: Comply with ASTM Standards.

I. Plastic Pipe Seals: Elastomeric gasket complying with ASTM Standards.

J. Flanged, Ductile-Iron Pipe Gasket, Bolts, and Nuts: Rubber gasket, carbon-steel bolts and nuts complying with AWWA Standards.

K. Couplings: Iron-body sleeve assembly, fabricated to match OD of plain-end, pressure pipes.
   1. Sleeve: Class B, gray iron complying with ASTM Standards.
   2. Followers: Malleable iron or ductile iron complying with ASTM Standards.
   3. Gaskets: Rubber.
   4. Bolts and Nuts: Comply with AWWA Standards.
   5. Finish: Enamel paint.

2.08 TRANSITION FITTINGS

A. AWWA Transition Couplings: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.
   1. Underground Piping NPS 1-1/2 and Smaller: Manufactured fitting or coupling.

2. Underground Piping NPS 2 and Larger: Metal sleeve-type coupling complying with AWWA Standards.
3. Aboveground Pressure Piping: Pipe fitting.

B. Plastic-to-Metal Transition Fittings: PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.

C. Plastic-to-Metal Transition Adaptors: One-piece fitting with manufacturer's SDR 11 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.

D. Plastic-to-Metal Transition Unions: MSS Standard, PVC four-part union. Include brass end, solvent-cement-joint end, rubber O-ring, and union nut.

E. Flexible Transition Couplings for Underground Non pressure Drainage Piping: Elastomeric sleeve, ends same size as piping to be joined, and corrosion-resistant metal band on each end complying with ASTM Standards.

2.09 DIELECTRIC FITTINGS

A. General: Assembly or fitting with insulating material isolating joined dissimilar metals, to prevent galvanic action and stop corrosion.

B. Description: Combination of copper alloy and ferrous; threaded, solder, plain, and weld-neck end types and matching piping system materials.

C. Insulating Material: Suitable for system fluid, pressure, and temperature.

D. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.

E. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.

F. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.

G. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.

2.10 MECHANICAL SLEEVE SEALS

A. Description: Modular design, with interlocking rubber links shaped to continuously fill annular space between pipe and sleeve. Include connecting bolts and pressure plates.
1. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Carbon steel. Include two for each sealing element.
3. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.11 PIPING SPECIALTIES

A. Sleeves: The following materials are for wall, floor, slab, and roof penetrations:
1. Steel Sheet Metal: 0.0239-inch minimum thickness, galvanized, round tube closed with welded longitudinal joint.

2. Steel Pipe: ASTM A 53, Type E, Grade A, Schedule 40, galvanized, plain ends.
3. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral water stop, unless otherwise indicated.
4. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing. a. Underdeck Clamp: Clamping ring with set screws.

B. Escutcheons: Manufactured wall, ceiling, and floor plates; deep-pattern type if required to conceal protruding fittings and sleeves.
1. ID: Closely fit around pipe, tube, or insulation of insulated piping.
2. OD: Completely cover opening.
3. Cast Brass: One piece cast, with set screw for exposed areas and split casting for concealed areas.
   a. Finish: Rough brass (concealed areas).
   b. Finish: Polished chrome-plate (exposed areas).
4. Cast-Iron Floor Plate: One-piece casting.

2.12 GROUT

A. Non shrink, Nonmetallic Grout:
1. Characteristics: Post-hardening, volume-adjusting, dry, hydraulic-cement grout, non-staining, noncorrosive, nongaseous, and recommended for interior and exterior applications complying with ASTM Standards.
2. Design Mix: 5000-psig, 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.01 PIPING SYSTEMS - GENERAL REQUIREMENTS

A. General: Install piping as described below, unless piping Sections specify otherwise. Individual Division 22 piping Sections specify unique piping installation requirements.

B. General Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Install piping at indicated slope.

D. Install components with pressure rating equal to or greater than system operating pressure.

E. Install piping in concealed interior and exterior locations, except in equipment rooms and service areas.

F. Install piping free of sags and bends.

G. Install exposed interior and exterior piping at right angles or parallel to building walls. Diagonal runs are prohibited, unless otherwise indicated.

H. Install piping tight to slabs, beams, joists, columns, walls, and other building elements. Allow sufficient space above removable ceiling panels to allow for ceiling panel removal.

I. Install piping to allow application of insulation plus 1-inch clearance around insulation.

J. Locate groups of pipes parallel to each other, spaced to permit valve servicing.

K. Install fittings for changes in direction and branch connections.

L. Install couplings according to manufacturer's written instructions.

M. Install pipe escutcheons for pipe penetrations of concrete and masonry walls, wall board partitions, and suspended ceilings according to the following:
   1. New Piping:
      a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
      b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
      c. Insulated Piping: One-piece, stamped-steel type with spring clips.
      d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast brass type with polished chrome-plated finish.
      e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
      f. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type with concealed or exposed-rivet hinge and set screw.
      g. Bare Piping in Equipment Rooms: One-piece, stamped-steel type with set screw.
      h. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.

N. Install sleeves for pipes passing through concrete and masonry walls, and concrete floor and roof slabs.

O. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
   1. Cut sleeves to length for mounting flush with both surfaces.
      a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
   2. Build sleeves into new walls and slabs as work progresses.
   3. Install sleeves large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
      a. Steel Pipe Sleeves: For pipes smaller than 6-inch NPS.
      b. Steel, Sheet-Metal Sleeves: For pipes 6-inch NPS and larger, penetrating gypsum-board partitions.
      c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 7.
   4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using elastomeric joint sealants. Refer to Division 7 for materials.
   5. Use Type S, Grade NS, Class 25, Use O, neutral-curing silicone sealant, unless otherwise indicated.

P. Aboveground, Exterior-Wall, Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeve for 1-inch annular clear space between pipe or pipe insulation and sleeve for installing mechanical sleeve seals.
   1. Install steel pipe for sleeves smaller than 6 inches in diameter.
   2. Install cast-iron "wall pipes" for sleeves 6 inches in diameter and larger.
   3. Assemble and install mechanical sleeve seals according to manufacturer's written instructions. Tighten bolts that cause rubber sealing elements to expand and make watertight seal.

Q. Underground, Exterior-Wall, Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Size sleeve for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
   1. Assemble and install mechanical sleeve seals according to manufacturer's written instructions. Tighten bolts that cause rubber sealing elements to expand and make watertight seal.

R. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestopping materials. Refer to Division 7 for materials.

S. Verify final equipment locations for roughing-in.

T. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

U. Piping Joint Construction: Join pipe and fittings as follows and as specifically required in individual piping specification Sections:
   1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
   2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
   3. Soldered Joints: Construct joints according to AWS's "Soldering Manual," Chapter "The Soldering of Pipe and Tube"; or CDA's "Copper Tube Handbook."
   4. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."
   5. Threaded Joints: Thread pipe with tapered pipe threads according to ASME Standards. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
      a. Note internal length of threads in fittings or valve ends, and proximity of internal seat or wall, to determine how far pipe should be threaded into joint.
      b. Apply appropriate tape or thread compound to external pipe threads, unless dry seal threading is specified.
      c. Align threads at point of assembly.
      d. Tighten joint with wrench. Apply wrench to valve end into which pipe is being threaded.
      e. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
   6. Welded Joints: Construct joints according to AWS Standards, "Recommended Practices and Procedures for Welding Low Carbon Steel Pipe," using qualified processes and welding operators according to "Quality Assurance" Article.
   7. Flanged Joints: Align flange surfaces parallel. Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly using torque wrench.
   8. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join pipe and fittings according to the following:
      a. Comply with ASTM Standards for safe-handling practice of cleaners, primers, and solvent cements.
      b. PVC Non-pressure Piping: Comply with ASTM Standards.
      c. PVC to ABS Non-pressure Transition Fittings: Procedure and solvent cement according to ASTM Standards.

V. Piping Connections: Make connections according to the following, unless otherwise indicated:

1. Install unions, in piping 2-inch NPS and smaller, adjacent to each valve and at final connection to each piece of equipment with 2-inch NPS or smaller threaded pipe connection.
2. Install flanges, in piping 2-1/2-inch NPS and larger, adjacent to flanged valves and at final connection to each piece of equipment with flanged pipe connection.
3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.02 EQUIPMENT AND MATERIAL INSTALLATION - GENERAL REQUIREMENTS

A. Install equipment and material to provide maximum possible headroom if mounting heights are not indicated.

B. Install equipment according to approved submittal data. Portions of the Work are shown only in diagrammatic form. Refer conflicts to Architect.

C. Install equipment level and plumb, parallel, and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

D. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

E. Install equipment and ductwork giving right of way to piping installed at required slope.

F. Install flexible connectors on equipment side of shutoff valves, horizontally and parallel to equipment shafts if possible.

3.03 PAINTING AND FINISHING

A. Refer to Division 9 for paint materials, surface preparation, and application of paint.

B. Do not paint piping specialties with factory-applied finish.

C. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.04 CONCRETE BASES

A. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit. Follow supported equipment manufacturer's setting templates for anchor bolt and tie locations. Use 3000-psig, 28-day compressive-strength concrete and reinforcement or as specified in Division 3.

3.05 ERECTION OF METAL SUPPORTS AND ANCHORAGE

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.

B. Field Welding: Comply with AWS Standards, "Structural Welding Code--Steel."

3.06 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor mechanical materials and equipment.

B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.

C. Attach to substrates as required to support applied loads.

3.07 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for mechanical installations. Perform cutting by skilled mechanics of trades involved. B. Repair cut surfaces to match adjacent surfaces.

3.08 GROUTING

A. Install nonmetallic, non-shrink, grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors. Mix grout according to manufacturer's written instructions.

B. Clean surfaces that will come into contact with grout.

C. Provide forms as required for placement of grout.

D. Avoid air entrapment during placing of grout.

E. Place grout, completely filling equipment bases.

F. Place grout on concrete bases to provide smooth bearing surface for equipment.

G. Place grout around anchors.

H. Cure placed grout according to manufacturer's written instructions.

END OF SECTION 23 00 50

SECTION 23 05 00 - COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.01 DESCRIPTION

A. The General Requirements for mechanical work are intended to be complementary to the General Requirements of the Construction Contract.

B. Work Included: Provide complete mechanical systems where shown on the drawings, as specified herein, and as needed for a complete and proper installation including, but not necessarily limited to the following summary of work:

1. Chilled water cooling, electric heating air conditioning system consisting of:
   a. Variable volume air handling units with cooling coils with 2-way control valves, 35 % and 95% air filters, heating water coils equipped with 2-way control valves, and supply air fan with VFD.
   b. Air distribution system.
   c. Building energy management control system (LON).
   d. Roof top units.
   e. Toilet exhaust systems shall be replaced.
   f. Variable volume chilled and heating water pumps equipped with VFD drives.
   g. New Condensing Unit for the Computer lab.,
2. Plumbing system including:
   a. Sanitary waste and vent piping
   b. Hot and cold-water systems with electric heating heaters and re-circulating pump.
   c. Fire protection system
3. Other items and services required to complete the systems.

C. Scope of Work:

1. HVAC:
   a. Replace the entire BAS throughout the entire Facility with a new DDC system, which complies with the latest DISD requirements as to the performance and the approved Manufacturer.
   b. Replace all existing kitchen Hood make-up and exhaust fans with same capacity fans.
   c. Replace kitchen hoods.
   d. Replace existing toilet fans through-out entire Facility.
   e. Replace condensing unit serving AHU-6.
   f. Replace existing ground mounted Roof Top Unit SPAC -1, serving Classroom #150.
2. Plumbing:
   a. Existing wall-mounted fire sprinkler heads in Counselor Office, student classrooms, faculty lounge, computer labs, science labs, Cafeteria, and Auditorium to be altered as follows: remove existing heads, extend lines, and install recessed fire sprinkler ceiling pendants with covers.
   b. Remove existing water closets, urinals, and lavatories in the student restrooms and other various areas of the building replace with new plumbing fixtures.
   c. Remove existing electric water coolers and replace with new ADA electric water coolers in the cafeteria and student restrooms.

d. Remove grease interceptor from the existing vault and replace with a new 1000-gallon minimum capacity grease interceptor system. Also, replace vault cover.
e. Existing domestic water heater being replaced with new one.

D. Provide $50,000 Dollar allowance for miscellaneous MEP items not included or missed in the mechanical and plumbing construction documents and/or specifications. Once the construction is completed, mechanical and plumbing contractor shall return any and all unused amount of money to the owner.

1.02 QUALITY ASSURANCE AND APPLICABLE STANDARDS

A. Use adequate numbers of skilled workmen that are thoroughly trained and experienced in the necessary crafts and are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Without additional cost to the Owner, provide such other labor and materials as are required to complete the work of this Section in accordance with the requirements of governmental agencies having jurisdiction, regardless of whether such materials and associated labor are called for elsewhere in these Contract Documents.

C. Codes: Perform all work in accordance with the latest edition of the following codes:
1. State and city building, fire, plumbing and mechanical codes.
2. National Electrical Code.
3. National Fire Protection Association.
4. American with Disabilities Act (ADA)
5. Texas Accessibility Standards (TAS)
6. Texas Department of Criminal Justice Standards.
7. All authorities having jurisdiction.
8. When codes conflict, the more stringent requirements shall govern.

D. Where conflicts occur between drawings, specifications or code requirements, the most stringent requirement shall take precedence.

E. Standards: The specifications and standards of the following organizations are by reference made a part of these specifications. All work, unless otherwise indicated, shall comply with the requirements and recommendations wherever applicable:
American National Standards Institute (A.N.S.I.)
Air Conditioning and Refrigeration Institute (A.R.I.)
American Gas Association (A.G.A.)
American Society for Testing and Materials (A.S.T.M.)
American Society of Mechanical Engineers (A.S.M.E.)
American Society of Refrigeration, Heating and Air Conditioning Engineers (A.S.H.R.A.E.)
Electrical Testing Laboratories (E.T.L)
National Bureau of Standards (N.B.S)
National Electrical Manufacturer's Association (N.E.M.A.)
National Fire Protection Association (N.F.P.A.)
Sheet Metal and Air Conditioning National Association (S.M.A.C.N.A.)
Underwriters' Laboratories, Inc. (U.L.)

1.03 REQUIREMENTS OF REGULATORY AGENCIES

A. The requirements and recommendations of the latest edition of the Occupational Safety and Health Act are by reference made a part of these specifications. All work shall comply with the requirements and recommendations wherever applicable.

1.04 RELATED WORK SPECIFIED ELSEWHERE

A. All Other Sections of Divisions 23 and 26.

B. All other divisions of the contract documents. Refer to each division's specifications and drawings for all requirements.

1.05 SUBMITTALS

A. Comply with pertinent provisions of Section 01 33 00 “Submittal Procedures”.

B. Product Data: Submit the following:
1. Materials list of items proposed to be provided under Division 23.
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements. The term "Compliance" is understood to mean that the Contractor certifies that the submitted equipment will meet or exceed the contract document requirements. Items that do not clearly meet this definition should be identified and explained as required in the following paragraph.
3. Identify the difference between the specified item or function and the proposed. Explain with enough detail so that the Engineer/Owner can easily determine that the item complies with the functional intent. List any disadvantages or advantages of the proposed item versus the specified item. Submit technical data sheets and/or pictures and diagrams to support and clarify. Organize in a clear and concise format. All substitutions shall be approved in writing by Architect. The Architect’s decision shall be final.
4. Allow a minimum of ten (10) working days for the review of submittals and each re-submittal.
5. Compliance with the Contract documents shall be the sole responsibility of the Contractor. Items on equipment that are were not accepted by the Architect in writing as an approved equal shall be replaced or revised to comply with the contract documents at the Contractor's expense.
6. Manufacturer's recommended installation procedures which, when reviewed by the Architect, shall become the basis for accepting or rejecting actual installation procedures used on the work.
7. Sign the submittal as an indication of compliance with the contract documents. Any deviations from the contract documents, shall be indicated on the submittal prior to signing. Any deviations not indicated shall be cause for rejection and removal of the non-complying equipment at the Contractor’s expense.

C. Submittals required of materials and equipment under this section include the following:
1. Piping and Accessories Materials:
a. Clearly marked up manufacturer's data showing compliance with the specifications for:
b. Piping material proposed for each system.
c. Valves, cocks, and specialties.
d. Test and measuring devices.
e. Heating, chilled, and condenser water specialties.
f. Flexible connectors for piping.

g. Flanges.

b. l/8" scale (minimum) sanitary sewer, domestic hot and cold water, storm, chilled water, condenser water, heating water and refrigerant piping shop drawings showing coordinated piping routing and arrangements with all equipment, accessories and system expansion and contraction compensation methods.

2. Vibration Isolation and Sound Control Materials:
   a. Submit shop drawings showing the structural design and details of inertia bases, steel beam bases, and other custom-fabricated work not covered by manufacturer's submitted data.
   b. Furnish layouts of templates to be furnished to fabricators of equipment bases, foundations, and other support systems, as needed for coordination of vibration isolation units with other work.
   c. Submit shop drawings indicating the scope of vibration isolation work, locations of units and flexible connections. Include support isolation points for piping, air handling units, inertia bases, etc.
   d. Include schedule of isolation units, showing size or manufacturer's part number, the weight supported and resulting deflection of each unit.
   e. For spring isolation units, show wire size, spring diameter, free height, solid-compression height, operating height, fatigue characteristics and ratio of horizontal to vertical stiffness.
   f. For spring-and-pad type isolation units, show the basis of spring rate selection for the range of loading weights.
3. Mechanical Identification Materials:
   a. Clearly marked-up product literature or samples showing compliance with specified materials for:

1) Valve tagging.
2) Pipe marking.
3) Equipment marking.

4. Insulation:
   a. Manufacturer's certified data on thermal performance.
   b. Details, when required, of methods to be used in providing for unusual piping expansion and contraction.
   c. Manufacturer's product data and application information on heat tracing system including all electrical requirements.
   d. Manufacturer's data on any alternate insulation material of reduced thickness, including pre-insulated pipe.
   e. Manufacturer's data on all jacketing materials, sealants and fasteners.
5. Pumps:
   a. Provide factory certified performance curve clearly marked with the operating point of each pump.
   b. Provide manufacturer's data on all panels, accessories, and specified factory options.
   c. Provide all electrical characteristics.

8. Fire Protection System:
   a. Provide hydraulic calculations for all areas.
   b. Provide l/8" scale piping shop drawings showing coordinated piping routing and arrangements with all accessories.
   c. Provide clearly marked-up manufacturer's data showing compliance with the specifications for:
      a. All required system valves and switches.
      b. Sprinkler heads for all areas and sprinkler cabinet.
      c. Fire pump (if used) with jockey pump and controller.
      d. Fire hoses, hose valves and cabinets.

e. Fire department connection.

d. Provide all electrical characteristics.

e. Submit all hydraulic calculations and drawings to be submitted to the Authority Having Jurisdiction and obtain stamp of approval prior to submission to the Architect/Engineer.

9. Plumbing Materials:
   a. Clearly marked-up manufacturer's data showing compliance with the specifications on:
      a. Fixtures, carriers, and all accessories.
      b. Plumbing equipment.
      c. Water hammer arresters.
      d. Backflow preventers.
      e. Trap primers
      f. Tempering valves.
      g. Natural gas regulators.
      h. Water heaters (see Heating below).
10. Heating:
   a. Provide clearly marked-up manufacturer's data showing compliance with scheduled values and specifications for:
      a. Hot water heaters.
      b. Boilers.
      c. Water softener.
      d. Unit heaters.
   b. Provide all electrical characteristics.
11. Refrigeration:
   a. Provide clearly marked-up manufacturer's data showing compliance with scheduled values and specifications for:
      a. Chillers.
   b. Provide all electrical characteristics.
12. Air Handling:
   a. Provide clearly marked-up manufacturer's data showing compliance with scheduled values and specifications for:
      a. AHU, factory assembled.
      b. Chilled water coils.
      c. Ventilation fans.
      d. Filters.
      e. Intake/relief hoods.
      f. Wall louvers.
   b. Provide all electrical characteristics.
13. Air Distribution Materials:
   a. Provide clearly marked-up manufacturer's data showing compliance with scheduled values and specifications for:
      a. Air devices.
      b. 1/4" scale ductwork shop drawings for all systems showing equipment locations, detailed data such as bottom of duct elevations, airstream sizes, all duct accessories, and duct construction details showing compliance with SMACNA requirements for the specified duct pressure of each system.
      c. Fire dampers, fire, and smoke dampers.
      d. Air terminals.
14. Controls and Instrumentation:
   a. Provide detailed shop drawings showing all components, wiring, tubing, and accessories.

b. Provide comprehensive sequence of operation description of each control system.
c. Provide clearly marked-up manufacturer's data showing compliance with the specifications for all products proposed.
d. Provide all electrical characteristics of components.

15. Energy Management System:
    a. Provide detailed schematic drawings showing all components and their arrangement and their relation to the control system.
    b. Provide manufacturer's data showing compliance with specified control components and functions specified.
    c. Provide all electrical power source requirements.
16. Testing and Balancing:
    a. List of instruments to be used with latest date of calibration test for each.
    b. Brief description of test and balance contractor experience.
17. Variable Frequency Drives/Speed Controllers (VFD):
    a. Provide clearly marked-up manufacturer's data showing compliance with scheduled values and specifications.
    b. Provide electrical characteristic.
18. Record Documents: Reference the requirements detailed in this section.
19. Operation and Maintenance Data: Reference the requirements detailed in this section.

D. Resubmittals of rejected submittals shall be limited to one (1) in number. Costs for processing subsequent resubmittals in excess of the first resubmittal, resulting from the Contractor's disregard of Architect/Engineer's primary submittal rejection comments, shall be borne by the Contractor. Costs shall be based on Architect/Engineer's hourly rates as published in their current professional fee schedules and shall also include reimbursable costs for delivery, mailing, and photocopies at direct cost-plus ten percent (10%).

1.06 SUBSTITUTIONS

A. The use of manufacturers' names and catalog numbers followed by the phrase "or equal" is generally used to establish a standard of quality and utility for the specified items and to provide a dimensional reference for construction documents that are drawn to scale.

B. Submittals for "equal" items shall, where applicable, include the following data which are not necessarily required for specified items:
1. Performance characteristics.
2. Materials.
3. Finish.
4. Certification of conformance with specified codes and standards.
5. Manufacturer's specifications and other data needed to prove compliance with the specified requirements. The term "Compliance" is understood to mean that the Contractor certifies that the submitted equipment will meet or exceed the contract document requirements. Items that do not clearly meet this definition should be identified and explained as required in Paragraph 6 below.
6. Identify the difference between the specified item or function and the proposed. Explain with enough detail so that the Architect/ Engineer/Owner can <u>easily</u> determine that the item complies with the functional intent. List any disadvantages or advantages of the proposed item versus the specified item.

   Submit technical data sheets and/or pictures and diagrams to support and clarify. Include shop drawings for all piping and ductwork equipment per Paragraph 1.5 Submittals. Organize in a clear and concise format.

C. Submittals of "equal" components or systems may be rejected if:

1. The material or equipment would necessitate the alteration of any portion of the mechanical, electrical, architectural, or structural design.
2. Dimensions vary from the specified material or equipment in such a manner that accessibility or clearances are impaired, or the work of other trades is adversely affected.

D. Proposed substitutions for materials or equipment must be submitted ten (10) days prior to final bid date for consideration as approved equals. Otherwise, such substitutions will not be permitted. Proposals for substitutions shall be made only by the prime bidders. Manufacturers, distributors, and sub-contractors shall not make proposals to the Architect for substitutions.

E. No substitution shall be made unless authorized in writing by the Architect. Should a substitution be accepted and should the substitute material prove defective or otherwise unsatisfactory for the service intended, and within the guarantee period, the Contractor shall replace this material or equipment with material or equipment specified, at his own expense, and to the satisfaction of the Architect.

F. Contractors submitting bids on substitute materials and equipment must also provide a written performance guarantee certifying that the substitute materials and equipment will produce the specified effects and meet the approval of the Architect.

1.07 ORDINANCES, PERMITS, METERS, UTILITIES AND ROYALTIES

A. Procure all permits and licenses necessary for completion of this project and pay all lawful fees required and necessary pursuant in obtaining said permits and licenses. All required certificates of approvals and inspections by local governing and regulating authorities shall be obtained and paid for by the Contractor.

B. Pay all fees required for the connection of water, gas and sewer to utility mains, and any meter fees if required.

C. Pay any royalty payments required or fees for the use of patented equipment or systems. Defend all lawsuits or claims for infringement of any patent rights and shall hold the Owner and/or Architect/Engineer harmless from loss as a result of said suits or claims.

1.08 COMPATIBILITY OF EQUIPMENT:

A. Assume full responsibility for satisfactory operation of all component parts of the mechanical systems to assure compatibility of all equipment and performance of the integrated systems in accordance with the requirements of the specifications. Should the Contractor consider any part of the specifications or drawings as rendering his acceptance of such responsibility impossible, prohibitive, or restrictive, he shall notify the Engineer before submitting his bid, and the bid shall be accompanied by a written statement of any objections or exceptions to the specifications and drawings.

1.09 EXISTING UTILITIES AND TEMPORARY SERVICES FOR CONSTRUCTION

A. Verify the location and capacity of existing utility services pertaining to work of Division 23. Relocate existing utilities unearthed by excavation as directed by the utility service companies affected.

B. Temporary Services for Construction:
1. Provide temporary services in strict accordance with the provisions of these specifications.

1.10 EXCAVATION AND BACKFILLING

A. Perform all excavation and backfilling necessary for the installation of the work. This shall include shoring and pumping in ditches to keep them in dry condition until the work has been installed. All shoring required to protect the excavation and safeguard employees shall be properly performed.

B. Perform excavation and backfilling in strict accordance with the provisions of these specifications including trench safety requirements.

C. All excavations shall be made to the proper depth, with allowances made for floor slabs, forms, beams, etc. Ground under piping shall be well compacted before piping is installed.

D. Backfilling shall be made with selected soil, free from rocks and debris and shall be pneumatically tamped with 6-inch layers to secure a field density ratio of 95 percent as defined by ASTM Designation D698-57T (Proctor Soil Compaction Test).

E. Excavated materials not suitable and not used in the backfill shall be removed from the site.

F. Field check and verify the locations of all underground utilities. Avoid disturbing these as far as possible. In the event existing utilities are damaged, they shall be repaired at no cost to Owner.

G. In a lime stabilized area, the lime stabilization shall be fully restored after the excavation is complete.

H. Replace concrete, curbs, paving and other surface improvements cut during excavation to their original condition.

1.11 JOBSITE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Include required work to correct conditions detrimental to the timely and proper completion of all Division 23 Work. Do not proceed until unsatisfactory conditions are corrected.

1.12 PREPARATION AND COORDINATION

A. Perform coordination work in strict accordance with provisions of these specifications and the following:
   1. Coordinate as necessary with other trades to assure proper and adequate interface with all work.
   2. Where ducts, pipes other mechanical items are shown in conflict with locations of structural members and other equipment, include labor and materials required for extensions, offsets and supports to clear the encroachment.
   3. Although such work is not specifically indicated, furnish, and install all supplementary or miscellaneous items, appurtenances, and devices incidental to or necessary for a sound, secure and complete installation.
   4. Coordinate accepted equipment changes from those scheduled or specified with other trades affected. Additional compensation to other trades for equipment changes is the responsibility of the Contractor making the change.

B. The Mechanical Drawings are diagrammatic but are required to be followed as closely as actual construction and work of other trades will permit. Duct and piping arrangement have been designed

for maximum economy consistent with good practice and other considerations. Install the systems arranged as shown on the drawings, except as otherwise approved in advance by the Architect.

C. Data indicated on the Drawings and in these Specifications are as exact as could be secured, but their absolute accuracy is not warranted. The exact locations, distances, levels, and other conditions will be governed by actual construction and the Drawings and Specifications should be used only for guidance in such regard.

D. Where items such as diffusers, thermostats, switches, and control panels are not specifically located on the Drawings, locate as determined in the field by the Architect. Where such items are installed without such specific direction, relocate as directed by the Architect and at no additional cost to the Owner.

E. Verify all dimensions and distances. No additional compensation will be allowed because of differences between work shown on the Drawings and actual dimensions and distances at the jobsite.

1.13 CONSTRUCTION REQUIREMENTS

A. The drawings show the arrangements of work. Should project conditions necessitate rearrangement, or if the materials or equipment can be installed to a better advantage in a different manner, the Contractor shall, before proceeding with the work, prepare and submit five copies of Drawings of the proposed arrangement for the Architect's review. Allow a minimum of ten (10) working days for review.

B. Should the Contractor propose to install equipment requiring space conditions other than those shown, or rearrange the equipment, he shall assume responsibility for the rearrangement of the space and shall have the Architect review the change before proceeding with the work. The request for such changes shall be accompanied by shop drawings of the space in question. Identify monetary credits proposed or other benefits of the change. Allow a minimum of ten (10) working days for review.

C. The Contractor shall be responsible for the proper location and size of all slots, holes or openings in the building structure pertaining to his work and for the correct location of pipe sleeves.

1.14 CUTTING AND PATCHING

A. Perform cutting and patching associated with the work in strict accordance with the provisions of Division 1 of these Specifications and the following:
   1. Coordinate work to minimize cutting and patching work.
   2. Request for Architect's consent:
      a. Prior to cutting or coring of the building structure, submit a written request to the Architect for permission to proceed with cutting. Include x-rays of any floor area where cutting or coring is proposed.
      b. Contractor is cautioned that concrete floor contains steel tendons which cannot be cut or damaged.
   3. Perform Architect-approved cutting and demolition by methods which will prevent damage to other portions of the work and provide proper surfaces to receive installation of new work and/or repair.
   4. Perform fitting and adjusting of products to provide finished installation complying with the specified tolerances and finishes.

5. Provide all core drilling of holes. Where sleeves and/or block outs are required, they shall be cut or provided at locations required. On completion of this work or as work progresses, make all repairs and do all patching required as a result of work under this Contract. All patching shall be performed in a manner that will restore the surrounding work to its original condition to the satisfaction of the Architect.
6. Assume responsibility for the proper size of all sleeves and/or block outs in the building structure pertaining to the work and for providing the correct location of pipe sleeves and/or block outs.
7. Where openings are cut through masonry walls, provide lintels or structural supports to protect the remaining masonry. Adequate support shall be provided during the cutting operation to prevent any damage to the affected masonry.

1.15 PROJECT RECORD DOCUMENTS

A. Provide the record documents associated with the work of Division 23 in strict accordance with the provisions of these specifications.

B. Throughout progress of the Division 23 Work, maintain an accurate record of changes in the Contract Documents that apply to work of Division 23. Changes shall include all addendums issued during bidding. Maintain an accurate record of the location of mechanical service lines and outlets and all outside utilities.

C. Delegate the responsibility for maintenance of Record Documents to one person on the Contractor's staff.

D. Accuracy of Records:
   1. Thoroughly coordinate changes within the Record Documents, making adequate and proper entries on each page of Specifications and each sheet of drawings and other documents where such entry is required to show the change properly. Match the symbology and format of the base documents.
   2. Accuracy of records shall be such that a future verification of items shown in the Contract Documents may rely reasonably on information obtained from the approved Project Record Documents.

E. Maintain the job set of Record Documents completely protected from deterioration and from loss and damage until completion of the work and transfer of all recorded data to the final Project Record Documents.

F. Making Entries on Drawings:
   1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by graphic line and note as required.
   2. Date all entries.
   3. Call attention to the entry by a "cloud" drawn around the area or areas affected.
   4. In the event of overlapping changes, use different colors for the overlapping changes.
   5. Make entries within 24 hours after receipt of information that the change has occurred.
   6. Maintain the base drawing format and use the same symbology.
   7. Convert field mark-ups to finished CADD record drawings when required in this section.

G. Conversion of Schematic Layouts:
   1. In some cases, on the drawings, arrangements of ductwork and piping and similar items are shown schematically and are not intended to portray precise physical layout. Determine final physical arrangement subject to the Architect's approval. However, design of future modifications of the facility may require accurate information as to the final physical layout of items which are shown only schematically on the drawings.

2. Show on the job set of record drawings, by dimension accurate to within one inch, the centerline of each run of items such as all sleeves and piping, etc., below grade, in walls, or in the concrete slab. A surface mounted device indicates the exact location:
   a. Clearly identify the item by accurate note such as "Sanitary Sewer " and the like.
   b. Show, by symbol or note, the vertical location of the item "under slab," "in ceiling plenum," "exposed," and the like.
   c. Make all identification sufficiently descriptive that it may be related reliably to the specifications.

H. Final Project Record Documents:
1. The purpose of the final Project Record Documents is to provide factual information regarding all aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive site measurement, investigation, and examination.
2. Provide CADD Electronic files in .DWG format. Upon written request by the Contractor, the Engineer will provide AutoCADD electronic files of the base contract drawings in .DWG format. Engineer will also provide a list of drawing layers and names that shall be maintained in the record set prepared by the Contractor.

1.16 OPERATION AND MAINTENANCE DATA

A. Submit two copies of a preliminary draft of the proposed manual or manuals to the Architect for review and comments. Allow a minimum of ten (10) working days for review.

B. Submit specified number copies of the approved manual to the Architect prior to indoctrination of operation and maintenance personnel.

C. Prepare in accordance with the following:
Format:
Size: 8½" x 11"

Paper: White bond, at least 20 lb. weight

Text: Neatly written or printed

Drawings: 11" in height preferable; bind in with text; foldout acceptable; larger drawings acceptable but fold to fit within the Manual and provide a drawing pocket inside rear cover or bind in with text.

Flysheets: Separate each section of the Manual with neatly prepared flysheets briefly describing contents of the ensuing section; flysheets may be in color.

Binding: Use heavy-duty plastic or fiber-board covers with binding mechanism concealed inside the manual; 3-ring binders will be acceptable; all binding is subject to the Architect's approval.

Measurements: Provide all measurements in U.S. standard units such as feet-and-inches, lbs, and cfm. Where items may be expected to be measured within ten years in accordance with metric formulae, provide additional measurements in the "International System of Units" (SI).

D. Provide front and back covers for each manual, using durable material approved by the Architect, and clearly identified on or through the cover with at least the following information:

OPERATING AND MAINTENANCE INSTRUCTIONS
Name and Address of Work
Name of Contractor
General subject of this manual
Space for approval signature of the engineer and approval date

E. Contents: Include at least the following:
1. Neatly typewritten index near the front of the manual, giving immediate information as to location within the manual of all emergency information regarding the installation.
2. Complete instructions regarding operation and maintenance of all equipment provided including lubrication, disassembly, and reassembly.
3. Complete nomenclature of all parts of all equipment.
4. Complete nomenclature and part number of all replaceable parts, name and address of nearest vendor, and all other data pertinent to procurement procedures.
5. Copy of all guarantees and warranties issued.
6. Manufacturer's bulletins, drawings, and descriptive data, clearly indicating the precise items included in this installation and deleting, or otherwise clearly indicating, all manufacturers' data with which this installation is not concerned.
7. Such other data as required in other sections of these specifications.

1.17 EQUIPMENT FOUNDATIONS

A. Provide equipment foundations associated with the work in accordance with the provisions of these specifications.

B. Provide concrete bases for all pad or floor mounted equipment. Bases shall be four inches (4") high above finished floors or grades (unless otherwise noted) and shall protrude two inches (2") beyond all sides of equipment and shall have exposed chamfered edges. Construct bases from ready-mixed hard rock concrete, ASTM C94, reinforced with #3 rebars, ASTM A615, Grade 40, at 18" on center each way.

C. Field verify exact location of outdoor pad mounted equipment with the Architect. Supply necessary fill and grade site to provide natural drainage away from equipment.

1.18 PAINTING

A. All equipment shall be delivered to the job with suitable factory finish. Should the finish be damaged in transit or during the installation, it shall be finished to match appearance of original finish. All work shall be subject to approval by Architect.

1.19 TESTING AND INSPECTION

A. Provide personnel and equipment, make required tests, and secure required approvals from the Architect and governmental agencies having jurisdiction.

B. Make written notice to the Architect adequately in advance of each of the following stages of construction:
1. When all rough-in is complete, but not covered.
2. As specified in all Division 23 sections.
3. At the completion of the work of Division 23.

C. When material or workmanship is found to not comply with the specified requirements, remove the noncomplying items from the job site and replace them with items complying with the specified requirements at no additional cost to the Owner. This shall be performed within 3 days after receipt of written notice of noncompliance.

1.20 WARRANTY

A. Contractor shall warranty all equipment and workmanship for a period of one year after date of substantial completion and replace or repair any faulty equipment or installation at no cost to the Owner for such service during this period, all in accordance with requirements of Division 1.

B. This warranty shall not void specific warranties issued by manufacturers for greater periods of time. Nor shall it void any rights guaranteed to the Owner by law.

C. Warranties shall be in writing in a form satisfactory to the Owner and shall be delivered to the Owner before final payment is made.

1.21 PROJECT COMPLETION

A. Upon completion of the work of Division 23, thoroughly clean all exposed portions of the mechanical installation, removing all traces of soil, labels, grease, oil and other foreign material and using only the type cleaner recommended by the manufacturer of the item being cleaned.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 23 05 00

SECTION 23 05 13 - COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes basic requirements for factory-installed motors.

B. Related Sections include the following:
1. Division 22 Section 22 05 48 “Vibration and Seismic Controls for Plumbing and HVAC Piping” for mounting motors and vibration isolation and seismic-control devices.
2. Division 23 Sections for application of motors and reference to specific motor requirements for motor-driven equipment.

1.03 DEFINITIONS

A. Factory-Installed Motor: A motor installed by motorized-equipment manufacturer as a component of equipment.

1.04 QUALITY ASSURANCE

A. Source Limitations: Obtain field-installed motors of a single type through one source from a single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70 and premium efficiencies listed in ASHRAE 90.1 for all motors.

1.05 COORDINATION

A. Coordinate features of motors, installed units, and accessory devices. Provide motors that are:
1. Compatible with the following:
   a. Magnetic controllers.
   b. Multispeed controllers.
   c. Reduced-voltage controllers.
2. Designed and labeled for use with variable frequency controllers, and suitable for use throughout speed range without overheating.
3. Matched to torque and horsepower requirements of the load.
4. Matched to ratings and characteristics of supply circuit and required control sequence.

PART 2 - PRODUCTS

2.01 MOTOR REQUIREMENTS

A. Motor requirements apply to factory-installed motors except as follows:
1. Different ratings, performance, or characteristics for a motor are specified in another Section.

2. Manufacturer for a factory-installed motor requires ratings, performance, or characteristics, other than those specified in this Section, to meet performance specified.

2.02 MOTOR CHARACTERISTICS

A. Motors 1/2 HP and Larger: Three phase, unless otherwise noted on equipment schedules.

B. Motors Smaller Than 1/2 HP: Single phase.

C. Frequency Rating: 60 Hz.

D. Voltage Rating: NEMA standard voltage selected to operate on nominal circuit voltage to which motor is connected.

E. Service Factor: 1.15 for open drip proof motors; 1.0 for totally enclosed motors.

F. Duty: Continuous duty at ambient temperature of 105 deg F and at altitude of 3300 feet above sea level.

G. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

H. Enclosure: Open drip proof, unless otherwise noted on equipment schedules.

2.03 POLYPHASE MOTORS

A. Description: NEMA MG 1, Design B, medium induction motor.

B. Efficiency: Premium efficiency in accordance with ASHRAE 90.1.

C. Stator: Copper windings, unless otherwise indicated.
1. Multispeed motors shall have separate winding for each speed.

D. Rotor: Squirrel cage, unless otherwise indicated.

E. Bearings: Double-shielded, pre-lubricated ball bearings suitable for radial and thrust loading.

F. Temperature Rise: Match insulation rating, unless otherwise indicated.

G. Insulation: Class F, unless otherwise indicated.

H. Code Letter Designation:
1. Motors 15 HP and Larger: NEMA starting Code F or G.
2. Motors Smaller Than 15 HP: Manufacturer’s standard starting characteristic.

I. Enclosure: Cast iron for motors 7.5 hp and larger; rolled steel for motors smaller than 7.5 hp.
1. Finish: Manufacturer’s standard finish color.

2.04 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

A. Motors Used with Reduced-Inrush Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.

B. Motors Used with Variable Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.
   1. Designed with critical vibration frequencies outside operating range of controller output.
   2. Temperature Rise: Matched to rating for Class B insulation.
   3. Insulation: Class H.
   4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.

2.05 SINGLE-PHASE MOTORS

A. Type: One of the following, to suit starting torque and requirements of specific motor application:
   1. Permanent-split capacitor.

B. Shaded-Pole Motors: For motors 1/20 hp and smaller only.

C. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

D. Bearings: Ball type for belt-connected motors and other motors with high radial forces on motor shaft; sealed, pre-lubricated-sleeve type for other single-phase motors.

PART 3 - EXECUTION

3.01 MOTOR INSTALLATION

A. Anchor each motor assembly to base, adjustable rails, or other support, arranged and sized according to manufacturer's written instructions. Attach by bolting. Level and align with load transfer link.

B. Install motors on concrete bases complying with Division 3.

3.02 FIELD QUALITY CONTROL

A. Prepare for acceptance tests as follows: Performed by qualified test and balance agency.
   1. Run each motor with its controller. Demonstrate correct rotation, alignment, and speed at motor design load.
   2. Test interlocks and control features for proper operation.
   3. Verify that current in each phase is within nameplate rating.

B. Testing: Perform the following field quality-control testing:
   1. Perform each electrical test and visual and mechanical inspection stated in NETA Standards. Certify compliance with test parameters.
   2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3.03 ADJUSTING

A. Align motors, bases, shafts, pulleys and belts. Tension belts according to manufacturer's written instructions.

3.04 CLEANING

A. After completing equipment installation, inspect unit components. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish.

B. Clean motors, on completion of installation, according to manufacturer's written instructions.

END OF SECTION 23 05 13

SECTION 23 05 19 - METERS AND GAGES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following meters and gages for mechanical systems:
1. Thermometers.
2. Gages.
3. Test plugs.

1.3 DEFINITIONS

A. CR: Chlorosulfonated polyethylene synthetic rubber.

B. EPDM: Ethylene-propylene-diene terpolymer rubber.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated; include performance curves.

B. Shop Drawings: Schedule for thermometers and gages indicating manufacturer's number, scale range, and location for each.

C. Product Certificates: For each type of thermometer and gage, signed by product manufacturer.

PART 2 - PRODUCTS

2.1 METAL-CASE, LIQUID-IN-GLASS THERMOMETERS

A. Manufacturers:
1. Trerice
2. Weiss
3. Weksler Instruments

B. Case: Die-cast aluminum or brass, 7 inches long.

C. Tube: Red or blue reading, mercury or organic liquid filled, with magnifying lens.

D. Tube Background: Satin-faced, nonreflective aluminum with permanently etched scale markings.

E. Window: Glass or plastic.

F. Connector: Adjustable type, 180 degrees in vertical plane, 360 degrees in horizontal plane, with locking device.

G. Stem: Copper-plated steel, aluminum, or brass for thermowell installation and of length to suit installation.

H. Accuracy: Plus or minus 1 percent of range or plus or minus 1 scale Division to maximum of 1.5 percent of range.

2.2 THERMOWELLS

A. Manufacturers: Same as manufacturer of thermometer being used.

B. Description: Pressure-tight, socket-type metal fitting made for insertion into piping and of type, diameter, and length required to hold thermometer.

2.3 PRESSURE GAGES

A. Manufacturers:
1. AMETEK
2. Ashcroft
3. Ernst Gage Co.
4. KOBOLD Instruments, Inc.
5. Marsh Bellofram.
6. Palmer - Wahl Instruments Inc.
7. Trerice
8. Weiss Instruments
9. Weksler

B. Direct-Mounting, Dial-Type Pressure Gages: Indicating-dial type complying with ASME B40.100.
1. Case: Liquid-filled type, drawn steel or cast aluminum, 4-1/2-inch diameter.
2. Pressure-Element Assembly: Bourdon tube, unless otherwise indicated.
3. Pressure Connection: Brass, NPS 1/4, bottom-outlet type unless back-outlet type is indicated.
4. Movement: Mechanical, with link to pressure element and connection to pointer.
5. Dial: Satin-faced, nonreflective aluminum with permanently etched scale markings.
6. Pointer: Red or other dark-color metal.
7. Window: Glass or plastic.
8. Ring: Metal.
9. Accuracy: Grade B, plus or minus 2 percent of middle half scale.
10. Vacuum-Pressure Range: 30-in. Hg of vacuum to 15 psig of pressure.
11. Range for Fluids under Pressure: Two times operating pressure.

C. Pressure-Gage Fittings:
1. Valves: NPS 1/4 brass or stainless-steel needle type.
2. Syphons: NPS 1/4 coil of brass tubing with threaded ends.
3. Snubbers: ASME B40.5, NPS 1/4 brass bushing with corrosion-resistant, porous-metal disc of material suitable for system fluid and working pressure.

2.4 TEST PLUGS

A. Manufacturers:
1. Flow Design, Inc.
2. MG Piping Products Co.
3. National Meter, Inc.
4. Peterson Equipment Co., Inc.
5. Sisco Manufacturing Co.
6. Trerice, H. O. Co.
7. Watts Industries, Inc.; Water Products Div.

B. Description: Corrosion-resistant brass or stainless-steel body with core inserts and gasketed and threaded cap, with extended stem for units to be installed in insulated piping.

C. Minimum Pressure and Temperature Rating: 500 psig at 200 deg F.

D. Core Inserts: One or two self-sealing rubber valves.
   1. Insert material for air, water, oil, or gas service at 20 to 200 deg F shall be CR.
   2. Insert material for air or water service at minus 30 to plus 275 deg F shall be EPDM.

PART 3 - EXECUTION

3.1 THERMOMETER APPLICATIONS

A. Install liquid-in-glass thermometers in the following locations:
   1. Inlet and outlet of each hydronic zone.
   2. Inlet and outlet of each hydronic boiler and chiller.
   3. Inlet and outlet of each hydronic coil in air-handling units and built-up central systems.
   4. Inlet and outlet of each hydronic heat exchanger.
   5. Inlet and outlet of each hydronic heat-recovery unit.
   6. Inlet and outlet of each thermal storage tank.

B. Provide the following temperature ranges for thermometers:
   1. Domestic Hot Water: 30 to 180 deg F, with 2-degree scale divisions.
   2. Domestic Cold Water: 0 to 100 deg F, with 2-degree scale divisions.
   3. Heating Hot Water: 30 to 240 deg F, with 2-degree scale divisions.
   4. Condenser Water: 0 to 160 deg F, with 2-degree scale divisions.
   5. Chilled Water: 0 to 100 deg F, with 2-degree scale divisions.

3.2 GAGE APPLICATIONS

A. Install pressure gages for inlet and discharge of each pressure-reducing valve.

B. Install pressure gages at chilled- and condenser-water inlets and outlets of chillers.

C. Install pressure gages at suction and discharge of each pump.

3.3 INSTALLATIONS

A. Install direct-mounting thermometers and adjust vertical and tilted positions.

B. Install thermowells with socket extending one-third of diameter of pipe and in vertical position in piping tees where thermometers are indicated.

C. Install direct-mounting pressure gages in piping tees with pressure gage located on pipe at most readable position.

D. Install needle-valve and snubber fitting in piping for each pressure gage for fluids.

E. Install test plugs in tees in piping.

3.4 CONNECTIONS

A. Install meters and gages adjacent to machines and equipment to allow service and maintenance for meters, gages, machines, and equipment.

3.5 ADJUSTING

A. Calibrate meters according to manufacturer's written instructions, after installation.

B. Adjust faces of meters and gages to proper angle for best visibility.

END OF SECTION 23 05 19

SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. The Test and Balance Contractor will be provided by the DISD. This Specification Section is provided for references.

1.2 SUMMARY

A. This Section includes testing, adjusting, and balancing HVAC systems to produce design objectives, including the following:
   1. Balancing airflow and water flow within distribution systems, including submains, branches, and terminals, to indicated quantities according to specified tolerances.
   2. Adjusting total HVAC systems to provide indicated quantities.
   3. Measuring electrical performance of HVAC equipment.
   4. Setting quantitative performance of HVAC equipment.
   5. Verifying that automatic control devices are functioning properly.
   6. Measuring sound and vibration.
   7. Reporting results of the activities and procedures specified in this Section.

B. Related Sections include the following:
   1. The testing and balancing agency shall be an independent firm separate and distinct from; not to be associated with or be subsidiary of a firm performing work under other Sections of Division 23 and shall be under contract directly to the General Contractor.

1.3 DEFINITIONS

A. Adjust: To regulate fluid flow rate and air patterns at the terminal equipment, such as to reduce fan speed or adjust a damper.

B. Balance: To proportion flows within the distribution system, including submains, branches, and terminals, according to design quantities.

C. Draft: A current of air, when referring to localized effect caused by one or more factors of high air velocity, low ambient temperature, or direction of airflow, whereby more heat is withdrawn from a person's skin than is normally dissipated.

D. Procedure: An approach to and execution of a sequence of work operations to yield repeatable results.

E. Report Forms: Test data sheets for recording test data in logical order.

F. Static Head: The pressure due to the weight of the fluid above the point of measurement. In a closed system, static head is equal on both sides of the pump.

G. Suction Head: The height of fluid surface above the centerline of the pump on the suction side.

H. System Effect: A phenomenon that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.

I. System Effect Factors: Allowances used to calculate a reduction of the performance ratings of a fan when installed under conditions different from those presented when the fan was performance tested.

J. Terminal: A point where the controlled medium, such as fluid or energy, enters or leaves the distribution system.

K. Test: A procedure to determine quantitative performance of a system or equipment.

L. Testing, Adjusting, and Balancing Agent: The entity responsible for performing and reporting the testing, adjusting, and balancing procedures.

M. AABC: Associated Air Balance Council.

N. AMCA: Air Movement and Control Association.

O. CTI: Cooling Tower Institute.

P. NEBB: National Environmental Balancing Bureau.

Q. SMACNA: Sheet Metal and Air Conditioning Contractors' National Association.

1.4 SUBMITTALS

A. Quality-Assurance Submittals: Within 30 days from the Contractor's Notice to Proceed, submit 2 copies of evidence that the testing, adjusting, and balancing Agent and this Project's testing, adjusting, and balancing team members meet the qualifications specified in the "Quality Assurance" Article below.

B. Contract Documents Examination Report: Within 45 days from the Contractor's Notice to Proceed, submit 2 copies of the Contract Documents review report as specified in Part 3 of this Section.

C. Certified Testing, Adjusting, and Balancing Reports: Submit 2 copies of reports prepared, as specified in this Section, on approved forms certified by the testing, adjusting, and balancing Agent.

D. Warranty: Submit 2 copies of special warranty specified in the "Warranty" Article below.

1.5 QUALITY ASSURANCE

A. Testing and Balancing: The TAB agency shall also employ a permanent full time Registered Professional Engineer on staff with a minimum of five years specialized experience in testing and balancing. The testing and balancing agency shall possess calibrated instruments, qualified engineers, and skilled technicians to perform required tests in accordance with the AABC National Standards or NEBB Procedural Standards for TAB.

B. Testing, Adjusting, and Balancing Reports: Use standard forms from AABC's "National Standards for Testing, Adjusting, and Balancing."

C. Testing, Adjusting, and Balancing Reports: Use standard forms from NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems."

D. Instrumentation Type, Quantity, and Accuracy: As described in AABC national standards.

E. Instrumentation Type, Quantity, and Accuracy: As described in NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems," Section II, "Required Instrumentation for NEBB Certification."

F. Instrumentation Calibration: Calibrate instruments at least every 6 months or more frequently if required by the instrument manufacturer.

1.6 PROJECT CONDITIONS

A. Full Owner Occupancy: The Owner will occupy the site and existing building during the entire testing, adjusting, and balancing period. Cooperate with the Owner during testing, adjusting, and balancing operations to minimize conflicts with the Owner's operations.

B. Partial Owner Occupancy: The Owner may occupy completed areas of the building before Substantial Completion. Cooperate with the Owner during testing, adjusting, and balancing operations to minimize conflicts with the Owner's operations.

1.7 COORDINATION

A. Coordinate the efforts of factory-authorized service representatives for systems and equipment, HVAC controls installers, and other mechanics to operate HVAC systems and equipment to support and assist testing, adjusting, and balancing activities.

B. Notice: Provide 7 days' advance notice for each test. Include scheduled test dates and times.

C. Perform testing, adjusting, and balancing after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

1.8 WARRANTY

A. General Warranty: The national project performance guarantee specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. National Project Performance Guarantee: Provide a guarantee on AABC'S "National Standards" forms stating that AABC will assist in completing the requirements of the Contract Documents if the testing, adjusting, and balancing Agent fails to comply with the Contract Documents. Guarantee includes the following provisions:

C. Special Guarantee: Provide a guarantee on NEBB forms stating that NEBB will assist in completing the requirements of the Contract Documents if the testing, adjusting, and balancing Agent fails to comply with the Contract Documents. Guarantee includes the following provisions:
   1. The certified Agent has tested and balanced systems according to the Contract Documents.
   2. Systems are balanced to optimum performance capabilities within design and installation limits.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine Contract Documents to become familiar with project requirements and to discover conditions in systems' designs that may preclude proper testing, adjusting, and balancing of systems and equipment. Provide in writing any deficiencies that preclude any testing, adjusting, or balancing of the system.
   1. Contract Documents are defined in the General and Supplementary Conditions of the Contract.
   2. Verify that balancing devices, such as test ports, gage cocks, thermometer wells, flow control devices, balancing valves and fittings, and manual volume dampers, are required by the Contract Documents. Verify that quantities and locations of these balancing devices are accessible and appropriate for effective balancing and for efficient system and equipment operation.

B. Examine approved submittal data of HVAC systems and equipment.

C. Examine project record documents described in Division 1. Obtain all specifications, shop drawings, change orders, revisions, submittals, and other data that will aid in the evaluation and balancing of the system.

D. Examine Architect's and Engineer's design data, including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.

E. Examine equipment performance data, including fan and pump curves. Relate performance data to project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system. Calculate system effect factors to reduce the performance ratings of HVAC equipment when installed under conditions different from those presented when the equipment was performance tested at the factory. To calculate system effects for air systems, use tables and charts found in AMCA Standards; or in SMACNA's "HVAC Systems--Duct Design," Sections 5 and 6. Compare this data with the design data and installed conditions.

F. Examine system and equipment installations to verify that they are complete and that testing, cleaning, adjusting, and commissioning specified in individual Specification Sections have been performed.

G. Examine system and equipment test reports.

H. Examine HVAC system and equipment installations to verify that indicated balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are properly installed, and their locations are accessible and appropriate for effective balancing and for efficient system and equipment operation.

I. Examine systems for functional deficiencies that cannot be corrected by adjusting and balancing.

J. Examine air-handling equipment to ensure clean filters have been installed, bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

K. Examine terminal units, such as variable-air-volume boxes and mixing boxes, to verify that they are accessible, and their controls are connected and functioning.

L. Examine plenum ceilings, utilized for supply air, to verify that they are airtight. Verify that pipe penetrations and other holes are sealed.

M. Examine strainers for clean screens and proper perforations.

N. Examine 3, and 2-way valves for proper installation for their intended function of diverting or mixing fluid flows.

O. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

P. Examine equipment for installation and for properly operating safety interlocks and controls.

Q. Examine automatic temperature system components to verify the following:
1. Dampers, valves, and other controlled devices operate by the intended controller.
2. Dampers and valves are in the position indicated by the controller.
3. Integrity of valves and dampers for free and full operation and for tightness of fully closed and fully open positions. This includes dampers in multizone units, mixing boxes, and variable-air-volume terminals.
4. Automatic modulating and shutoff valves, including 2-way valves and 3-way mixing and diverting valves, are properly connected.
5. Thermostats and humidistats are located to avoid adverse effects of sunlight, drafts, and cold walls.
6. Sensors are located to sense only the intended conditions.
7. Sequence of operation for control modes is according to the Contract Documents.
8. Controller set points are set at design values. Observe and record system reactions to changes in conditions. Record default set points if different from design values.
9. Interlocked systems are operating.
10. Changeover from heating to cooling mode occurs according to design values.

R. Report deficiencies discovered before and during performance of testing, adjusting, and balancing procedures.

3.2 PREPARATION

A. Complete system readiness checks and prepare system readiness reports. Verify the following:
1. Permanent electrical power wiring is complete.
2. Hydronic systems are filled, clean, and free of air.
3. Automatic temperature-control systems are operational.
4. Equipment and duct access doors are securely closed.
5. Balance, smoke, and fire dampers are open.
6. Isolating and balancing valves are open and control valves are operational.
7. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
8. Windows and doors can be closed so design conditions for system operations can be met.

3.3 GENERAL TESTING AND BALANCING PROCEDURES

A. Perform testing and balancing procedures on each system according to the procedures contained in AABC national standards and this Section.

B. Perform testing and balancing procedures on each system according to the procedures contained in NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and this Section.

C. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing, close probe holes and patch insulation with new materials identical to those removed. Restore vapor barrier and finish according to the insulation Specifications for this Project.

D. Mark equipment settings with paint or other suitable, permanent identification material, including damper-control positions, valve indicators, fan-speed-control levers, and similar controls and devices, to show final settings.

3.4 FUNDAMENTAL AIR SYSTEMS' BALANCING PROCEDURES

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' "as-built" duct layouts.

C. For variable-air-volume systems, develop a plan to simulate diversity.

D. Determine the best locations in main and branch ducts for accurate duct airflow measurements.

E. Check the airflow patterns from the outside-air louvers and dampers and the return- and exhaust-air dampers, through the supply-fan discharge and mixing dampers.

F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

G. Verify that motor starters are equipped with properly sized thermal protection.

H. Check dampers for proper position to achieve desired airflow path.

I. Check for airflow blockages.

J. Check condensate drains for proper connections and functioning.

K. Check for proper sealing of air-handling unit components.

3.5 CONSTANT-VOLUME AIR SYSTEMS' BALANCING PROCEDURES

A. The procedures in this Article apply to constant-volume supply-, return-, and exhaust-air systems. Additional procedures are required for variable-air-volume, multizone, dual-duct, induction-unit supply-air systems and process exhaust-air systems. These additional procedures are specified in other articles in this Section.

B. Adjust fans to deliver total design airflows within the maximum allowable rpm listed by the fan manufacturer.
   1. Measure fan static pressures to determine actual static pressure as follows:
      a. Measure outlet static pressure as far downstream from the fan as practicable and upstream from restrictions in ducts such as elbows and transitions.
      b. Measure static pressure directly at the fan outlet or through the flexible connection.
      c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from flexible connection and downstream from duct restrictions.
      d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.
   2. Measure static pressure across each air-handling unit component.

a. Simulate dirty filter operation and record the point at which maintenance personnel must change filters.

3. Measure static pressures entering and leaving other devices such as sound traps, heat recovery equipment, and air washers under final balanced conditions.
4. Compare design data with installed conditions to determine variations in design static pressures versus actual static pressures. Compare actual system effect factors with calculated system effect factors to identify where variations occur. Recommend corrective action to align design and actual conditions.
5. Adjust fan speed higher or lower than design with the approval of the Architect. Make required adjustments to pulley sizes, motor sizes, and electrical connections to accommodate fan-speed changes.
6. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan motor amperage to ensure no overload will occur. Measure amperage in full cooling, full heating, and economizer modes to determine the maximum required brake horsepower.

C. Adjust volume dampers for main duct, submain ducts, and major branch ducts to design airflows within specified tolerances.
1. Measure static pressure at a point downstream from the balancing damper and adjust volume dampers until the proper static pressure is achieved.
a. Where sufficient space in submains and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
2. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submains and branch ducts to design airflows within specified tolerances.

D. Measure terminal outlets and inlets without making adjustments.
1. Measure terminal outlets using a direct-reading hood or the outlet manufacturer's written instructions and calculating factors.

E. Adjust terminal outlets and inlets for each space to design airflows within specified tolerances of design values. Make adjustments using volume dampers rather than extractors and the dampers at the air terminals.
1. Adjust each outlet in the same room or space to within specified tolerances of design quantities without generating noise levels above the limitations prescribed by the Contract Documents.
2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.6 VARIABLE-AIR-VOLUME SYSTEMS' ADDITIONAL PROCEDURES

A. Compensating for Diversity: When the total airflow of all terminal units is more than the fan design airflow volume, place a selected number of terminal units at a maximum set-point airflow condition until the total airflow of the terminal units equals the design airflow of the fan. Select the reduced airflow terminal units so they are distributed evenly among the branch ducts.

B. Pressure-Independent, Variable-Air-Volume Systems: After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:
1. Set outside-air dampers at minimum, and return- and exhaust-air dampers at a position that simulates full-cooling load.
2. Select the terminal unit that is most critical to the supply-fan airflow and static pressure. Measure static pressure. Adjust system static pressure so the entering static pressure for the critical terminal unit is not less than the sum of the terminal unit manufacturer's recommended minimum inlet static pressure plus the static pressure needed to overcome terminal-unit discharge duct losses.
3. Measure total system airflow. Adjust to within 10 percent of design airflow.

4. Set terminal units at maximum airflow and adjust controller or regulator to deliver the designed maximum airflow. Use the terminal unit manufacturer's written instructions to make this adjustment. When total airflow is correct, balance the air outlets downstream from terminal units as described for constant-volume air systems.
5. Set terminal units at minimum airflow and adjust controller or regulator to deliver the designed minimum airflow. Check air outlets for a proportional reduction in airflow as described for constant-volume air systems.
   a. If air outlets are out of balance at minimum airflow, report the condition but leave the outlets balanced for maximum airflow.
6. Remeasure the return airflow to the fan while operating at maximum return airflow and minimum outside airflow. Adjust the fan and balance the return-air ducts and inlets as described for constant-volume air systems.
7. Measure static pressure at the most critical terminal unit and adjust the static-pressure controller at the main supply-air sensing station to ensure adequate static pressure is maintained at the most critical unit.
8. Record the final fan performance data.

3.7 FUNDAMENTAL PROCEDURES FOR HYDRONIC SYSTEMS

A. Prepare test reports with pertinent design data and number in sequence starting at pump to end of system. Check the sum of branch-circuit flows against approved pump flow rate. Correct variations that exceed plus or minus 5 percent.

B. Prepare schematic diagrams of systems' "as-built" piping layouts.

C. Prepare hydronic systems for testing and balancing according to the following, in addition to the general preparation procedures specified above:
   1. Open all manual valves for maximum flow.
   2. Check expansion tank liquid level.
   3. Check makeup-water-station pressure gage for adequate pressure for highest vent.
   4. Check flow-control valves for specified sequence of operation and set at design flow.
   5. Set differential-pressure control valves at the specified differential pressure. Do not set at fully closed position when pump is positive-displacement type, unless several terminal valves are kept open.
   6. Set system controls so automatic valves are wide open to heat exchangers.
   7. Check pump-motor load. If motor is overloaded, throttle main flow-balancing device so motor nameplate rating is not exceeded.
   8. Check air vents for a forceful liquid flow exiting from vents when manually operated.

3.8 HYDRONIC SYSTEMS' BALANCING PROCEDURES

A. Determine water flow at pumps. Use the following procedures, except for positive-displacement pumps:
   1. Verify impeller size by operating the pump with the discharge valve closed. Verify with the pump manufacturer that this will not damage pump. Read pressure differential across the pump. Convert pressure to head and correct for differences in gage heights. Note the point on the manufacturer's pump curve at zero flow and confirm that the pump has the intended impeller size.
   2. Check system resistance. With all valves open, read pressure differential across the pump and mark the pump manufacturer's head-capacity curve. Adjust pump discharge valve until design water flow is achieved.
   3. Verify pump-motor brake horsepower. Calculate the intended brake horsepower for the system based on the pump manufacturer's performance data. Compare calculated brake horsepower with nameplate data on the pump motor. Report conditions where actual amperage exceeds motor nameplate amperage.

4. Report flow rates that are not within plus or minus 5 percent of design.

B. Set calibrated balancing valves, if installed, at calculated presettings.

C. Measure flow at all stations and adjust, where necessary, to obtain first balance.
   1. System components that have Cv rating or an accurately cataloged flow-pressure-drop relationship may be used as a flow-indicating device.

D. Measure flow at main balancing station and set main balancing device to achieve flow that is 5 percent greater than design flow.

E. Adjust balancing stations to within specified tolerances of design flow rate as follows:
   1. Determine the balancing station with the highest percentage over design flow.
   2. Adjust each station in turn, beginning with the station with the highest percentage over design flow and proceeding to the station with the lowest percentage over design flow.
   3. Record settings and mark balancing devices.

F. Measure pump flow rate and make final measurements of pump amperage, voltage, rpm, pump heads, and systems' pressures and temperatures, including outdoor-air temperature.

G. Measure the differential-pressure control valve settings existing at the conclusions of balancing.

3.9 MOTORS

A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:
   1. Manufacturer, model, and serial numbers.
   2. Motor horsepower rating.
   3. Motor rpm.
   4. Efficiency rating if high-efficiency motor.
   5. Nameplate and measured voltage, each phase.
   6. Nameplate and measured amperage, each phase.
   7. Starter thermal-protection-element rating.

B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass for the controller to prove proper operation. Record observations, including controller manufacturer, model and serial numbers, and nameplate data.

3.10 CHILLERS

A. Balance water flow through each evaporator to within specified tolerances of design flow with all pumps operating. With only one chiller operating in a multiple chiller installation, do not exceed the flow for the maximum tube velocity recommended by the chiller manufacturer. Measure and record the following data with each chiller operating at design conditions:
   1. Evaporator water entering and leaving temperatures, pressure drop, and water flow.
   2. Evaporator and condenser refrigerant temperatures and pressures, using instruments furnished by the chiller manufacturer.
   3. Power factor if factory-installed instrumentation is furnished for measuring kW.
   4. The kW input if factory-installed instrumentation is furnished for measuring kW.
   5. Capacity: Calculate in tons of cooling.
   6. Air-Cooled Chillers: Verify condenser-fan rotation and record fan data, including number of fans and entering- and leaving-air temperatures.

3.11 HEAT-TRANSFER COILS

A. Electric-Heating Coils: Measure the following data for each coil:
   1. Nameplate data.
   2. Airflow.
   3. Entering- and leaving-air temperatures at full load.
   4. Voltage and amperage input of each phase at full load and at each incremental stage.
   5. Calculated kW at full load.
   6. Fuse or circuit-breaker rating for overload protection.

3.12 TEMPERATURE TESTING

A. During testing, adjusting, and balancing, report need for adjustment in temperature regulation within the automatic temperature-control system.

B. Measure indoor wet- and dry-bulb temperatures every other hour for a period of 2 successive 8hour days, in each separately controlled zone, to prove correctness of final temperature settings. Measure when the building or zone is occupied.

C. Measure outside-air, wet- and dry-bulb temperatures.

3.13 TEMPERATURE-CONTROL VERIFICATION

A. Verify that controllers are calibrated and commissioned.

B. Check transmitter and controller locations and note conditions that would adversely affect control functions.

C. Record controller settings and note variances between set points and actual measurements.

D. Verify operation of limiting controllers (i.e., high- and low-temperature controllers).

E. Verify free travel and proper operation of control devices such as damper and valve operators.

F. Verify sequence of operation of control devices. Note air pressures and device positions and correlate with airflow and water-flow measurements. Note the speed of response to input changes.

G. Confirm interaction of electrically operated switch transducers.

H. Confirm interaction of interlock and lockout systems.

I. Verify main control supply-air pressure and observe compressor and dryer operations.

J. Record voltages of power supply and controller output. Determine if the system operates on a grounded or non-grounded power supply.

K. Note operation of electric actuators using spring return for proper fail-safe operations.

3.14 TOLERANCES

A. Set HVAC system airflow and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans: Plus 5 to plus 10 percent.
2. Air Outlets and Inlets: 0 to minus 10 percent.
3. Cooling-Water Flow Rate: 0 to minus 5 percent.

3.15 REPORTING

A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article above, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices.
to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

B. Status Reports: As Work progresses, prepare reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.16 FINAL REPORT

A. General: Typewritten, or computer printout in letter-quality font, on standard bond paper, in 3ring binder, tabulated and divided into sections by tested and balanced systems.

B. Include a certification sheet in front of binder signed and sealed by the certified testing and balancing engineer.
1. Include a list of the instruments used for procedures, along with proof of calibration.

C. Final Report Contents: In addition to the certified field report data, include the following:
1. Pump curves.
2. Fan curves.
3. Manufacturers' test data.
4. Field test reports prepared by system and equipment installers.
5. Other information relative to equipment performance, but do not include approved Shop Drawings and Product Data.

D. General Report Data: In addition to the form titles and entries, include the following data in the final report, as applicable:
1. Title page.
2. Name and address of testing, adjusting, and balancing Agent.
3. Project name.
4. Project location.
5. Architect's name and address.
6. Engineer's name and address.
7. Contractor's name and address.
8. Report date.
9. Signature of testing, adjusting, and balancing Agent who certifies the report.
10. Summary of contents, including the following:
    a. Design versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.
11. Nomenclature sheets for each item of equipment.

12. Data for terminal units, including manufacturer, type size, and fittings.
13. Notes to explain why certain final data in the body of reports vary from design values.
14. Test conditions for fans and pump performance forms, including the following:
    a. Settings for outside-, return-, and exhaust-air dampers.
    b. Conditions of filters.
    c. Cooling coil, wet- and dry-bulb conditions.
    d. Face and bypass damper settings at coils.
    e. Fan drive settings, including settings and percentage of maximum pitch diameter.
    f. Inlet vane settings for variable-air-volume systems.
    g. Settings for supply-air, static-pressure controller.
    h. Other system operating conditions that affect performance.

E. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present with single-line diagrams and include the following:
1. Quantities of outside, supply, return, and exhaust airflows.
2. Water and steam flow rates.
3. Duct, outlet, and inlet sizes.
4. Pipe and valve sizes and locations.
5. Terminal units.
6. Balancing stations.

F. Air-Handling Unit Test Reports: For air-handling units with coils, include the following:
1. Unit Data: Include the following:
    a. Unit identification.
    b. Location.
    c. Make and type.
    d. Model number and unit size.
    e. Manufacturer's serial number.
    f. Unit arrangement and class.
    g. Discharge arrangement.
    h. Sheave make, size in inches, and bore.
    i. Sheave dimensions, center-to-center and amount of adjustments in inches.
    j. Number of belts, make, and size.
    k. Number of filters, type, and size.
2. Motor Data: Include the following:
    a. Make and frame type and size.
    b. Horsepower and rpm.
    c. Volts, phase, and hertz.
    d. Full-load amperage and service factor.
    e. Sheave make, size in inches, and bore.
    f. Sheave dimensions, center-to-center and amount of adjustments in inches.
3. Test Data: Include design and actual values for the following:
    a. Total airflow rate in cfm.
    b. Total system static pressure in inches wg.
    c. Fan rpm.
    d. Discharge static pressure in inches wg.
    e. Filter static-pressure differential in inches wg.
    f. Preheat coil static-pressure differential in inches wg.
    g. Cooling coil static-pressure differential in inches wg.
    h. Heating coil static-pressure differential in inches wg.
    i. Outside airflow in cfm.
    j. Return airflow in cfm.
    k. Outside-air damper position.
    l. Return-air damper position.
    m. Vortex damper position.

G. Electric-Coil Test Reports: For electric furnaces, duct coils, and electric coils installed in central station air-handling units, include the following:
   1. Unit Data: Include the following:
      a. System identification.
      b. Location.
      c. Coil identification.
      d. Capacity in Btuh (kW).
      e. Number of stages.
      f. Connected volts, phase, and hertz.
      g. Rated amperage.
      h. Airflow rate in cfm.
      i. Face area in sq. ft.
      j. Minimum face velocity in fpm.
   2. Test Data: Include design and actual values for the following:
      a. Heat output in Btuh (kW).
      b. Airflow rate in cfm.
      c. Air velocity in fpm.
      d. Entering-air temperature in deg F.
      e. Leaving-air temperature in deg F.
      f. Voltage at each connection.
      g. Amperage for each phase.

H. Fan Test Reports: For supply, return, and exhaust fans, include the following:
   1. Fan Data: Include the following:
      a. System identification.
      b. Location.
      c. Make and type.
      d. Model number and size.
      e. Manufacturer's serial number.
      f. Arrangement and class.
      g. Sheave make, size in inches, and bore.
      h. Sheave dimensions, center-to-center and amount of adjustments in inches.
   2. Motor Data: Include the following:
      a. Make and frame type and size.
      b. Horsepower and rpm.
      c. Volts, phase, and hertz.
      d. Full-load amperage and service factor.
      e. Sheave make, size in inches, and bore.
      f. Sheave dimensions, center-to-center and amount of adjustments in inches.
      g. Number of belts, make, and size.
   3. Test Data: Include design and actual values for the following:
      a. Total airflow rate in cfm.
      b. Total system static pressure in inches wg.
      c. Fan rpm.
      d. Discharge static pressure in inches wg.
      e. Suction static pressure in inches wg.

I. Round and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:
   1. Report Data: Include the following:
      a. System and air-handling unit number.
      b. Location and zone.
      c. Traverse air temperature in deg F.
      d. Duct static pressure in inches wg.

e. Duct size in inches.
f. Duct area in sq. ft..
g. Design airflow rate in cfm.
h. Design velocity in fpm.
i. Actual airflow rate in cfm.
j. Actual average velocity in fpm.
k. Barometric pressure in psig.

J. Air-Terminal-Device Reports: For terminal units, include the following:
1. Unit Data: Include the following:
a. System and air-handling unit identification.
b. Location and zone.
c. Test apparatus used.
d. Area served.
e. Air-terminal-device make.
f. Air-terminal-device number from system diagram.
g. Air-terminal-device type and model number.
h. Air-terminal-device size.
i. Air-terminal-device effective area in sq. ft.
2. Test Data: Include design and actual values for the following:
a. Airflow rate in cfm.
b. Air velocity in fpm.
c. Preliminary airflow rate as needed in cfm.
d. Preliminary velocity as needed in fpm.
e. Final airflow rate in cfm.
f. Final velocity in fpm.
g. Space temperature in deg F.

K. Packaged Chiller Reports: For each chiller, include the following:
1. Unit Data: Include the following:
a. Unit identification.
b. Make and model number.
c. Manufacturer's serial number.
d. Refrigerant type and capacity in gal.
e. Starter type and size.
f. Starter thermal protection size.
2. Condenser Test Data: Include design and actual values for the following:
a. Refrigerant pressure in psig.
b. Refrigerant temperature in deg F.
c. Entering-water temperature in deg F.
d. Leaving-water temperature in deg F.
e. Entering-water pressure in feet of head or psig.
f. Water pressure differential in feet of head or psig.
3. Evaporator Test Reports: Include design and actual values for the following:
a. Refrigerant pressure in psig.
b. Refrigerant temperature in deg F.
4. Compressor Test Data: Include design and actual values for the following:
a. Make and model number.
b. Manufacturer's serial number.
c. Suction pressure in psig.
d. Suction temperature in deg F.
e. Discharge pressure in psig.
f. Discharge temperature in deg F.
g. Oil pressure in psig.

h. Oil temperature in deg F.
i. Voltage at each connection.
j. Amperage for each phase.
k. The kW input.
l. Crankcase heater kW.
m. Chilled water control set point in deg F.
n. Condenser water control set point in deg F.
o. Refrigerant low-pressure-cutoff set point in psig.
p. Refrigerant high-pressure-cutoff set point in psig.

5. Refrigerant Test Data: Include design and actual values for the following:
   a. Oil level.
   b. Refrigerant level.
   c. Relief valve setting in psig.
   d. Unloader set points in psig.
   e. Percentage of cylinders unloaded.
   f. Bearing temperatures in deg F.
   g. Vane position.
   h. Low-temperature-cutoff set point in deg F.

L. Compressor and Condenser Reports: For refrigerant side of unitary systems, stand-alone refrigerant compressors, air-cooled condensing units, or water-cooled condensing units, include the following:

1.

2. Unit Data: Include the following:
   a. Unit identification.
   b. Location.
   c. Unit make and model number.
   d. Manufacturer’s compressor serial numbers.
   e. Compressor make.
   f. Compressor model and serial numbers.
   g. Refrigerant weight in lb.
   h. Low ambient temperature cutoff in deg F.

3.

4. Test Data: Include design and actual values for the following:
   a. Inlet-duct static pressure in inches wg.
   b. Outlet-duct static pressure in inches wg.
   c. Entering-air, dry-bulb temperature in deg F.
   d. Leaving-air, dry-bulb temperature in deg F.
   e. Control settings.
   f. Unloader set points.
   g. Low-pressure-cutout set point in psig.
   h. High-pressure-cutout set point in psig.
   i. Suction pressure in psig.
   j. Suction temperature in deg F.
   k. Condenser refrigerant pressure in psig.
   l. Condenser refrigerant temperature in psig.
   m. Voltage at each connection.
   n. Amperage for each phase.
   o. The kW input.
   p. Crankcase heater kW.
   q. Number of fans.
   r. Condenser fan rpm.
   s. Condenser fan airflow rate in cfm.
   t. Condenser fan motor make, frame size, rpm, and horsepower.

u. Condenser fan motor voltage at each connection.
v. Condenser fan motor amperage for each phase.

M. Pump Test Reports: For pumps, include the following data. Calculate impeller size by plotting the shutoff head on pump curves.
1. Unit Data: Include the following:
a. Unit identification.
b. Location.
c. Service.
d. Make and size.
e. Model and serial numbers.
f. Water flow rate in gpm.
g. Water pressure differential in feet of head or psig.
h. Required net positive suction head in feet of head or psig.
i. Pump rpm.
j. Impeller diameter in inches.
k. Motor make and frame size.
l. Motor horsepower and rpm.
m. Voltage at each connection.
n. Amperage for each phase.
o. Full-load amperage and service factor.
p. Seal type.
2. Test Data: Include design and actual values for the following:
a. Static head in feet of head or psig.
b. Pump shutoff pressure in feet of head or psig.
c. Actual impeller size in inches.
d. Full-open flow rate in gpm.
e. Full-open pressure in feet of head or psig.
f. Final discharge pressure in feet of head or psig.
g. Final suction pressure in feet of head or psig.
h. Final total pressure in feet of head or psig.
i. Final water flow rate in gpm.
j. Voltage at each connection.
k. Amperage for each phase.

N. Instrument Calibration Reports: For instrument calibration, include the following:
1. Report Data: Include the following:
a. Instrument type and make.
b. Serial number.
c. Application.
d. Dates of use.
e. Dates of calibration.

3.17 ADDITIONAL TESTS

A. Within 90 days of completing testing, adjusting, and balancing, perform additional testing and balancing to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

B. Seasonal Periods: If initial testing, adjusting, and balancing procedures were not performed during near-peak summer and winter conditions, perform additional inspections, testing, and adjusting during near-peak summer and winter conditions.

END OF SECTION 32 05 93

SECTION 23 07 13 - THERMAL INSULATION FOR DUCTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes semirigid and flexible duct, plenum, and breeching insulation; insulating cements; field-applied jackets; accessories and attachments; and sealing compounds.

B. Related Sections include the following:
1. Division 7 Sections for firestopping materials and requirements for penetrations through fire and smoke barriers.
2. Division 23 Section "Metal Ducts" for duct liner.

1.3 SUBMITTALS

A. Product Data: Identify thermal conductivity, thickness, and jackets (both factory and field applied, if any), for each type of product indicated.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing materials identical to those specified in this Section according to ASTM Standards, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and sealer and cement material containers with appropriate markings of applicable testing and inspecting agency.
1. Insulation Installed Indoors: Flame-spread rating of 25 or less, and smoke-developed rating of 50 or less.
2. Insulation Installed Outdoors: Flame-spread rating of 75 or less, and smoke-developed rating of 150 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Ship insulation materials in containers marked by manufacturer with appropriate ASTM specification designation, type and grade, and maximum use temperature.

B. Deliver and store all insulation with protective material until installation. Any material left exposed to moisture and/or any particulate matter shall be removed and replaced.

C. Any installed insulation left temporarily incomplete shall be covered with protective material until final connections can be installed.

1.6 COORDINATION

A. Coordinate clearance requirements with duct Installer for insulation application.

1.7 SCHEDULING

A. Schedule insulation application after testing duct systems. Insulation application may begin on segments of ducts that have satisfactory test results.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Mineral-Fiber Insulation:
      a. CertainTeed Manson.
      b. Knauf FiberGlass GmbH.
      c. Owens-Corning Fiberglas Corp.
      d. Schuller International, Inc.

2.2 INSULATION MATERIALS

A. Mineral-Fiber Blanket Thermal Insulation: Glass fibers bonded with a thermosetting resin 2" – 1-1/2 lb. Comply with ASTM Standards, with all-service jacket manufactured from kraft paper, reinforcing scrim, aluminum foil, and vinyl film.

2.3 ACCESSORIES AND ATTACHMENTS

A. Glass Cloth and Tape: Comply with MIL Standards, Type I for cloth and Type II for tape. Woven glass-fiber fabrics, plain weave, pre-sized a minimum of 8 oz./sq. yd.
   1. Tape Width: 4 inches.

B. Bands: 3/4 inch wide, in one of the following materials compatible with jacket:
   1. Galvanized Steel: 0.005 inch thick.

C. Wire: 0.062-inch, soft-annealed, stainless steel.

D. Adhesive-Attached Anchor Pins and Speed Washers: Galvanized steel plate, pin, and washer manufactured for attachment to duct and plenum with adhesive. Pin length sufficient for insulation thickness indicated.
   1. Adhesive: Recommended by the anchor pin manufacturer as appropriate for surface temperatures of ducts, plenums, and breechings; and to achieve a holding capacity of 100 lb for direct pull perpendicular to the adhered surface.

2.4 VAPOR RETARDERS

A. Mastics: Materials recommended by insulation material manufacturer that are compatible with insulation materials, jackets, and substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL APPLICATION REQUIREMENTS

A. Apply insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; and free of voids throughout the length of ducts and fittings.

B. Refer to schedules at the end of this Section for materials, forms, jackets, and thicknesses required for each duct system.

C. Use accessories compatible with insulation materials and suitable for the service. Use accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Apply single layer of insulation as specified with longitudinal and end seams staggered.

E. Seal joints and seams with vapor-retarder mastic on insulation indicated to receive a vapor retarder.

F. Keep insulation materials dry and dust free during storage, application, and finishing.

G. Apply insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by the insulation material manufacturer. H. Apply insulation with the least number of joints practical.

I. Apply insulation over fittings and specialties, with continuous thermal and vapor-retarder integrity, unless otherwise indicated.

J. Hangers and Anchors: Where vapor retarder is indicated, seal penetrations in insulation at hangers, supports, anchors, and other projections with vapor-retarder mastic. Apply insulation continuously through hangers and around anchor attachments.

K. Insulation Terminations: For insulation application where vapor retarders are indicated, seal ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.

L. Apply insulation with integral jackets as follows:
   1. Pull jacket tight and smooth.
   2. Joints and Seams: Cover with tape and vapor retarder as recommended by insulation material manufacturer to maintain vapor seal.
   3. Vapor-Retarder Mastics: Where vapor retarders are indicated, apply mastic on seams and joints and at ends adjacent to duct flanges and fittings.

M. Cut insulation according to manufacturer's written instructions to prevent compressing insulation to less than 75 percent of its nominal thickness.

N. Install vapor-retarder mastic on ducts and plenums scheduled to receive vapor retarders.
   1. Ducts with Vapor Retarders: Overlap insulation facing at seams and seal with vapor retarder mastic and pressure-sensitive tape having same facing as insulation. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-retarder seal.
   2. Ducts without Vapor Retarders: Overlap insulation facing at seams and secure with outward clinching staples and pressure-sensitive tape having same facing as insulation.

O. Roof Penetrations: Apply insulation for interior applications to a point even with top of roof flashing.
   1. Seal penetrations with vapor-retarder mastic.
   2. Apply insulation for exterior applications tightly joined to interior insulation ends.
   3. Seal insulation to roof flashing with vapor-retarder mastic.

P. Interior Wall and Partition Penetrations: Apply insulation continuously through walls and partitions, except fire-rated walls and partitions.

Q. Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire/smoke damper sleeves for fire-rated wall and partition penetrations.

R. Floor Penetrations: Terminate insulation at underside of floor assembly and at floor support at top of floor.
   1. For insulation indicated to have vapor retarders, taper termination and seal insulation ends with vapor-retarder mastic.

3.4 MINERAL-FIBER INSULATION APPLICATION

A. Blanket Applications for Ducts and Plenums: Secure blanket insulation with adhesive and anchor pins and speed washers.
   1. Apply adhesives according to manufacturer's recommended coverage rates per square foot, for 100 percent coverage of duct and plenum surfaces.
   2. Install anchor pins and speed washers on sides and bottom of horizontal ducts and all sides of vertical ducts as follows:
      a. On duct sides with dimensions 18 inches and smaller, along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
      b. On duct sides with dimensions larger than 18 inches. Space 16 inches o.c. each way, and 3 inches maximum from insulation joints. Apply additional pins and clips to hold insulation tightly against surface at cross bracing.
      c. Anchor pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
      d. Do not over compress insulation during installation.
   3. Impale insulation over anchors and attach speed washers.
   4. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
   5. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation segment with 1/2-inch staples, 1 inch o.c., and cover with pressure-sensitive tape having same facing as insulation.
   6. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. Secure with steel band at end joints and spaced a maximum of 18 inches o.c.
   7. Apply insulation on rectangular duct elbows and transitions with a full insulation segment for each surface. Apply insulation on round duct elbows with individually mitered gores cut to fit the elbow.
   8. Insulate duct stiffeners, hangers, and flanges that protrude beyond the insulation surface with 6-inch-wide strips of the same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with anchor pins spaced 6 inches o.c.
   9. Apply vapor-retarder mastic to open joints, breaks, and punctures for insulation indicated to receive vapor retarder.

3.5 DUCT SYSTEM APPLICATIONS

A. Insulation materials and thicknesses are specified in schedules at the end of this Section.

B. Materials and thicknesses for systems listed below are specified in schedules at the end of this Section.

C. Insulate the following plenums and duct systems:
   1. Indoor concealed supply-, return-, and outside-air ductwork.
   2. Indoor exposed supply-, return-, and outside-air ductwork.
   3. Indoor exposed range-hood exhaust ductwork.
   4. Indoor concealed range-hood exhaust ductwork.

D. Items Not Insulated: Unless otherwise indicated, do not apply insulation to the following systems, materials, and equipment:
   1. Fibrous-glass ducts.
   2. Metal ducts with duct liner.
   3. Factory-insulated flexible ducts.
   4. Factory-insulated plenums, casings, terminal boxes, and filter boxes and sections.
   5. Flexible connectors.
   6. Vibration-control devices.
   7. Testing agency labels and stamps.
   8. Nameplates and data plates.
   9. Access panels and doors in air-distribution systems.

3.6 INDOOR DUCT AND PLENUM APPLICATION SCHEDULE

A. Service: Round and rectangular, supply-air ducts, concealed.
   1. Material: Mineral-fiber blanket.
   2. Thickness: 2 inches.
   3. Number of Layers: One.
   4. Field-Applied Jacket: None.
   5. Vapor Retarder Required: Yes.

B. Service: Round and rectangular, return-air ducts, concealed.
   1. Material: Mineral-fiber blanket.
   2. Thickness: 2 inches.
   3. Number of Layers: One.
   4. Field-Applied Jacket: None.
   5. Vapor Retarder Required: Yes.

C. Service: Round and rectangular, outside-air ducts, concealed.
   1. Material: Mineral-fiber blanket.
   2. Thickness: 2 inches.
   3. Number of Layers: One.
   4. Field-Applied Jacket: None.
   5. Vapor Retarder Required: Yes.

D. Service: Round and rectangular, supply and return-air ducts, exposed. (Mechanical rooms only.)
   1. Material: Mineral-fiber blanket.
   2. Thickness: 2 inches.
   3. Number of Layers: One.
   4. Field-Applied Jacket: None.
   5. Vapor Retarder Required: Yes.

END OF SECTION 23 07 13

SECTION 23 08 00 – COMMISSIONING OF HVAC

PART 1 - GENERAL

1.1 SUMMARY

A. The purpose of this section is to specify the Division 23 responsibilities and participation in the Commissioning Process.

B. Work under this contract shall conform to requirements of Division 01, General Requirements, Conditions of the Contract, and Supplementary Conditions. This specification covers commissioning of mechanical systems which are part of this project.

C. Commissioning work shall be a team effort to ensure that all mechanical equipment and systems have been completely and properly installed, function together correctly to meet the design intent, and document system performance. Commissioning shall coordinate system documentation, equipment start-up, control system calibration, testing and balancing, and verification and performance testing.

D. The Commissioning Team shall be made up of representatives from the owner, Design Team, General Contractor (GC), manufacturers, and construction trades. The trades represented on the Commissioning Team shall include, but not be limited to: sheet metal, piping and fitting, controls, test and balance, and electrical. The lead person for each trade who will actually perform or supervise the work is to be designated as the representative to the Commissioning Team. Responsibility for various steps of the Commissioning Process shall be divided among the members of the Commissioning Team, as described in this section.

E. The CxA (Commissioning Authority) shall have responsibility for coordinating and directing each step of the Commissioning Process.

F. Mechanical system installation, start-up, testing, balancing, preparation of O&M manuals, and operator training are the responsibility of the Division 23 Contractors, with coordination, observation, verification and commissioning the responsibility of Division 01. The Division 01 Commissioning Process does not relieve Division 23 from the obligations to complete all portions of work in a satisfactory and fully operational manner.

1.2 MECHANICAL CONTRACTOR (MC) AND MECHANICAL SUB-CONTRACTORS:

A. Provide all personnel, tools, materials, and equipment to support the commissioning process. Facilitate the coordination of the commissioning work by the CxP (Commissioning Providers) and incorporate commissioning activities into the master schedule.

B. Incorporate all commissioning related activities into the project schedule, ensuring that Cx (Commissioning) activities do not delay project completion.

C. Notify Dallas ISD and the CxP in writing that equipment and systems are ready for functional testing.

D. Perform equipment startups using authorized manufacturing representatives.

E. Provide written documentation to the CxP that equipment and systems are fully operational and ready to be functionally performance tested.

F. Perform commissioning tests at the direction of the CxP, including change of season testing.

G. Attend construction phase commissioning coordination meetings.

H. Provide qualified personnel for participation in commissioning tests.

I. Provide equipment, materials, and labor necessary to correct deficiencies found during the commissioning process.

J. Attend TAB (Testing, Adjusting, and Balancing) review and coordination meetings.

K. Participate in HVAC systems, assemblies, equipment, and component maintenance orientations and inspections as directed by the CxP.

L. Provide information requested by the CxP for commissioning documentation and testing.

M. Perform all quality control functions to ensure equipment and systems are installed properly. Ensure equipment and systems are brought to a state of readiness and full functionality prior to commencing the commissioning functional performance testing processes.

N. Provide measuring instruments and HVAC control personnel who are to operate the HVAC controls during the functional performance Test phases.

O. Provide qualified personnel for participation in Commissioning tests.

P. Provide a representative to attend end of warranty testing.

PART 2 - PRODUCTS – (Not Used)

PART 3 - EXECUTION – (Not Used)

END OF SECTION 23 08 00

SECTION 23 09 24 – BUILDING MANAGEMENT CONTROL SYSTEM (LON)

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions, Division 1 and Section 23 00 50, apply to this Section.

B. Central Monitoring and Control System Division 23 specifications for the central monitoring and control requirements of the BMCS.

1.2 SECTION INCLUDES

A. It is the intent of this specification to describe the basic architecture and performance requirements of the Building Management and Control System (BMCS). The BMCS shall be based on a distributed system of fully intelligent, stand-alone controllers, operating in a multitasking, multi-user environment on a true peer-to-peer, token passing Local Area Network (LAN), called the Controller LAN. The BMCS shall include all workstation software and hardware, Distributed Control Units (DCUs), Local Area Networks (LANs), sensors, control devices, actuators, installation and calibration, supervision, adjustments and fine tuning necessary for a complete and fully operational system.

B. The BMCS will be fully compatible with the District's Central Management Control System as provided by Schneider Electric. Communications will be through the LonWorks Protocol. Contact Jeff Eggleston at 972-323-5432. CMCS work provided under separate contract.

C. Configuration and commissioning of the BMCS devices and network shall be performed using Echelon LonMaker for Windows 3.1x or NL220TE.

1.3 RELATED SECTIONS

A. Section 23 00 50 - Basic Mechanical Materials and Methods

B. Section 23 05 93 – Testing, Adjusting, and Balancing for HVAC

C. Section 26 05 00 – Common Work Results for Electrical

1.4 DEFINITIONS AND ACRONYMS

EMCS	Energy Management Control System. The EMCS controls all of the HVAC functions as well as lighting schedules and lawn sprinkler schedules.
TCS	Temperature Control Sensor. This is the device that controls the temperature in the space.
VFD	Variable Frequency Drive.
DDC	Direct Digital Control.
NLC	Network Level Controller
RWS	Remote Workstation
HMI	Human Machine Interface
ASC	Application Specific Controller
OAU	Outside Air Unit.
CO_2	Carbon Dioxide.
CFM	Cubic Feet per Minute

GPM	Gallons Per Minute
A/H	Air Handler
F/C	Fan Coil Unit
CHW	Chilled Water
HW	Hot Water
VAV	Variable Air Volume
ppm	Parts Per Million – A measurement of the concentration of one substance within another. In this case, it is the number of CO_2 particles in a sample of one million air particles.
Adj	Adjustable – All set points are assumed to be adjustable whether specified or not. The set points specified are values that should be programmed initially but can be changed if necessary.

A. Building Management and Control System, Facility Management System, Control System are to be considered the same.

B. BMCS: This shall mean the individual school/building, Building Management and Control Systems including the components at the Field, Automation and Management Levels.

C. CMCS: This refers to the District's existing Central Management Control System as provided by Schneider Electric. This system is the management level system to which all BMCS must integrate.

D. Component: Any individual element of the BMCS furnished under this contract including hardware, software, and materials.

E. Contractor: The BMCS Contractor who shall provide the Building Management and Control System and shall be responsible for the integration of the BMCS with the remote CMCS as detailed in the specifications.

F. Direct Digital Control (DDC) involves the connection of microprocessor-based controllers to field level sensors and actuators. The signals received from field level instrumentation are converted from analogue to digital format so that the data can be used in software logic. Control signals are determined by software logic, and they are converted from digital to analogue format so that the final control elements, e.g., relays, actuators, etc., can be adjusted.

G. Distributed Control: A system whereby all control processing is decentralized and independent of a central computer.

H. Owner: Dallas Independent School District or their appointed representative.

I. Furnish: Purchase and deliver to the appropriate installing Contractor, complete with every appurtenance, document, commission, and warranty.

J. Domain: A grouping of up to 32,385 nodes that can be communicate directly with each other.

K. Human-Machine Interface (HMI): Human-machine interfacing allows the operator to manage, command, monitor, and program the system.

L. Integration: Establishing communication between two devices through the use of a gateway.

M. Interoperability: The ability of systems from different manufacturers and of different types to share information with each other without losing any of their independent functional capabilities and without the need for complex programming.

N. LNS Plug-ins: Software, which runs in an LNS compatible software tool. Device configuration plug-ins provides a user-friendly interface to configuration parameters.

O. LonWorks Network Services (LNS): Add. LonWorks Network Services (LNS): A network management and database standard for ASSI/EIA 709.1 devices.

P. LonMark Interoperability Association: Standards committee consisting of numerous independent product developers and systems integrators dedicated to determining and maintaining the interoperability guidelines for the LonWorks® industry.

Q. Lon Marked™: Device has been certified for compliance with LonMark standards by the LonMark association.

R. Lon Talk™: Standard communication protocol developed by the Echelon Corporation.

S. LonWorks: The overall communications technology for control systems developed by Echelon Corporation. The technology employs routers, gateways, bridges, and multimedia transceivers to permit topology and media-independent control solutions. Refer to standard ANSI/EIA - 709.1

T. Network: A system of distributed control units that are linked together on a communication bus. A network allows sharing of point information between all control units. Additionally, a network provides central monitoring and control of the entire system from any distributed control unit location.

U. Network Configuration Tool: The software used to configure the control network and set device configuration properties. This software creates and modifies the control network database (LNS database).

V. Operating System (OS): Software which controls the execution of computer programs, and which provides scheduling, debugging, input/output controls, accounting, compilation, storage assignment, data management, and related services.

W. Peer-to-Peer Communication: Communication directly between devices that operate on the same communications level of a network, without intervention from any intermediary devices such as a host or server PC.

X. Programmable Device: A device that does not have a pre-established built in application. An application creation software tool is required for an application to be created and downloaded to the device.

Y. Provide: Furnish, install, commission, test and warrant.

Z. Router: A device that routes messages destined for a node on another segment sub-net or domain of the control network. The device controls message traffic based on node address and priority.

AA. Standard Network Variable Type (SNVT): LonWorks controllers use SNVTs to define data objects. Each SNVT is identified by a code number that the receiving controller can use to determine how to interpret the information presented.

BB. Stand-Alone Control: Refers to the digital controller performing required climate control and energy management functions without connection to another digital controller or computer. Requirements for stand-alone control are a time clock, a microprocessor, resident control programs, PID control and I/O.

CC. Software: Generic term used for those components of the computer systems that are intangible rather than physical. The term "software" is used to refer to the programs executed by the computer systems as distinct from the physical hardware of the computer systems and encompasses any programs such as operating systems, applications programs, operating sequences and databases. The term "software" shall be interpreted to include firmware if, in the context in which it is used, the term "software" does not exclude the use of read-only memory and the use of firmware meets all of the applicable criteria detailed in these specifications.

DD. Unitary Controller: A controller designed for a specific application and for a single piece of equipment. Examples are controllers for VAV, FCU, and Unit Ventilator.

EE. XIF: “External Interface File” contains the contents of the BMCS Contractor’s uniquely configured controller. A specific xif for each controller on the project shall be submitted with the LNS database.

FF. The above definitions shall apply to the words:
1. When they are in upper case, when they are in lower case and when they are capitalized.
2. In the singular and in the plural.
3. In all grammatical tenses.

1.5 OVERALL BUILDING AUTOMATION SYSTEM STRUCTURE

A. SCHNEIDER ELECTRIC is the selected vendor for the DISD CMCS. All work performed shall be 100% compatible and an extension of this system. The following is a description of the overall CMCS philosophy that shall be applicable to the CMCS and all school BMCS. It is provided for the purpose of placing the work of the school BMCS contracts, as identified in 1.7 below, in context with the total work involved in the CMCS. The Direct Digital Control (DDC) system shall be complete system suitable for the control of the heating, ventilating and air conditioning and other building-level systems as specified. BMCS installed under this specification shall have the following characteristics:
1. The control system shall be open implementation of LonWorks technology using the latest ANSI/EIA 709.1 as the communications protocol and using LonMark Standard Network Variable Type (SNVT) as defined in LonMark SNVT Master List for communication over the network.
2. LonWorks Network Services (LNS) shall be used for all network management including addressing and binding of network variables. A copy of the LNS database shall be provided to the district on standard USB flash drive.
3. Control sequence logic shall reside in DDC hardware in the building. The building control network shall not be dependent upon connection to a CMCS for performance of control sequences in this specification.
4. The hardware shall be installed such that individual control equipment can be replaced by similar control equipment from other equipment manufacturers with no loss of system functionality.
5. All necessary documentation, configuration information, configuration tools, programs, drivers, and other software shall be licensed to and otherwise remain with the district such that the district or their agents are able to perform repair, replacement, upgrades, and expansions of the system without subsequent or future dependence on the contractor.

6. All DDC devices installed under this specification shall communicate via ANSI/EIA 709.1. The control system shall be installed such that a SNVT output from any node on the network can be bound to any other like node in the domain.

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B. For the purpose of describing the CMCS system architecture it shall be divided into 3 layers.
   1. Management Level:
      a. A Wide Area Network (WAN), provided by DISD, shall provide a means of interoperable communication between the CMCS and the school BMCS.
      b. It shall be the responsibility of each BMCS building contractor, to ensure that all the system data is available at the Management Level Network. Each BMCS building system contractor shall provide comprehensive and complete documentation regarding the LonWorks SNVT objects, including neuron ID address, controller type, XIF file, databases, and other pertinent information. The intent is that the CMCS shall be able to read this data from the network.
   2. Automation Level (by this BMCS Contract):
      a. The automation level shall, primarily, include the DDC controllers that interface with the field sensors and final control elements. It is anticipated that there will be two types of DDC controller within the CMCS architecture:
         (1) Distributed Control panels (DCP).
         (2) Unitary Controllers (UC).
      b. DCP controllers shall be freely programmable peer-to-peer controllers and shall have an I/O capability to handle major items of equipment such as air handling units, roof top units, chiller plants, heating plants, etc. The programmed DCP shall conform to the LonMark Interoperability Guide.
      c. UC shall be application specific and shall be suitable for the monitoring and control of specific items of smaller equipment such as VAV terminal units. UC shall be LonMark certified controllers. These UC shall operate on the same network as the LonWorks DCP or they shall operate on a separate network.
      d. All LonWorks unitary controllers shall be LonMark certified and shall comply completely with the requirements of the Interoperability Association and ANSI/EIA-709.1 requirements.
      e. The BMCS Automation Level Networks shall be LonWorks. No other protocols shall be used at the Automation Level.
      f. The Network configuration tool shall meet the following minimum requirements:
         (1) It shall solely use LonWorks Networks Services (LNS) for all network configuration and management of LONMark certified devices.
         (2) It shall be capable of executing LNS plug-ins.
         (3) It shall have a graphics-based user interface and be able to display and print a graphical representation of the control network.
         (4) It shall be capable of merging two existing standard LNS databases into a single standard LNS database.
   3. Field Level (by this BMCS Contract):
      a. The Field Level shall include the instrumentation interfaced to the Automation Level DDC controllers such as the temperature, humidity, level, pressure sensors and switches. It shall also include the final control elements such as the valve and damper actuators and the control relays.

1.6 WORK OF THE SCHOOL BMCS CONTRACTS

A. The BMCS shall be provided to meet the following criteria:
   1. Fully stand alone on a campus basis.
   2. Microprocessor based, DDC control with all electric actuations.
   3. Distributed processing.

4. LonWorks building network and control panels.

B. The BMCS covers the following scope of work:
   1. The provision of a fully functioning BMCS that will undertake the monitoring and control of the systems which shall include but shall not be limited to the following monitoring and control functions:
      a. The monitoring and control of the air handling units, fan coil units, VAV terminal units, exhaust fans and other miscellaneous fans used for the distribution of airflow.
      b. The monitoring and control of the chilled water, hot water and condenser water systems.
   2. The installation of LonWorks compliant DCP and UC as required for the individual monitoring and control requirements.
   3. Software for the configuration of the systems using programmed sequences of operation, time schedules, optimal start, energy management, and alarm monitoring.
   4. All devices including application specific devices shall be provided by the BMCS contractor. Equipment provided devices are acceptable if they comply with this specification and are provided by one of the approved BMCS manufacturers.

C. The Automation Level Network shall be a LonWorks network.

D. The DCP shall reside as nodes on the Automation Level LAN. DCP shall be fully programmable control panels. DCP shall provide an interface to the field instrumentation and final control elements.

E. UC shall reside as nodes on the Automation Level LAN. UC shall be applications specific type controllers or fully programmable controllers. Control and monitoring using UC shall be limited to unitary equipment such as terminal units, fan coil units, and miscellaneous point monitoring and control. UC shall provide an interface to the field instrumentation and final control elements for specified items of equipment.

F. Provide any access keys, which restrict programming language software functions or the ability to compile or prepare programming for download to controllers.

G. Provide final copy of each program used in both compiled and editable formats.

1.7 BMCS DESCRIPTION

A. The contractor shall provide an open, interoperable peer-to-peer networked, distributed control system using ANSI/EIA Standard 709.1-A-1999, LonWorks technology communication protocols. The system shall consist of LonWorks based microprocessor-based controllers, plus instrumentation, control valves, automatic dampers when not furnished by others, operators, control devices, interface equipment, LonWorks routers, LonWorks communication interfaces, and other apparatus required to operate the building systems and perform functions specified. The software shall employ object-oriented technology for representing all data and control devices within the system. Adherence to industry standards ANSI/EIA Standard 707.1-A-1999, LonWorks to assure interoperability between all components is required.

B. BMCS shall have backward and forward compatibility.

C. Systems shall be furnished and installed complete in all respects, including any and all equipment, controls, wiring, instrumentation, enclosures, labor, engineering,

coordination with other trades, etc. No information given in (or omitted from) these specifications shall relieve the contractor of this absolute requirement. Include all associated electrical work except as noted. Work includes furnishing of all labor, superintendence, materials, tools, equipment and sources necessary for the complete installation or modification of the following systems as herein specified. It is the intent of these specifications that the Contractor shall furnish and install the systems complete in every respect and ready to operate. All equipment, miscellaneous items and accessories required for such installation and for the correct and convenient operation of the entire installation whether or not each such item or accessory is shown on the plans or mentioned in these specifications shall be furnished and installed.

E. Bidders should take note that Schneider Electric CMCS is currently installed in the district. Any additional equipment needed to interface with this control system should be included in the bid. This includes all equipment or software needed to communicate with the CMCS.

F. Reuse of existing DDC system components is unacceptable. All work in the project shall include new components including controllers, wiring, devices, etc.

1.8 WORK OF THE CMCS CONTRACTOR FOR THIS SCHOOL

A. The CMCS Contractor shall provide the following:
1. CCP installation, configuration, and integration into the CMCS via the DISD WAN.
2. Provide review of the proposed BMCS DCP, UC, and Automation Level Network for compatibility and integration capabilities. Report to DISD on any concerns relating to compatibility or integration of the BMCS into the CMCS.
3. Coordination with the BMCS contractor for integration of the BMCS into the CMCS for:
(1) Point monitoring and control.
(2) Trending.
(3) Alarm configuration and annunciation.
(4) Reporting of real time and historical data.
(5) Equipment scheduling.
(6) Remote troubleshooting to facilitate efficient dispatching of appropriate craftsman i.e., Chiller, Pump, Package Unit, etc.

1.9 MISCELLANEOUS REQUIREMENTS

A. Where drawings are provided as part of or supplement to these specifications, such drawings are inherently schematic only and not intended to convey all controls, wiring, installation, details, etc. It shall be the responsibility of the Building Management and Control Systems (BMCS) contractor to verify that control approaches presented are appropriate for the HVAC systems involved, and that bids include all work described, specified, or otherwise necessary for a complete and functioning system.

B. Schedule:
1. Contractor acknowledges that submission of bid constitutes agreement with and conformance to the completion dates.

C. Codes, Permits, and Fees:
1. This contractor shall comply with all local, state and national codes, and shall secure and pay for all applicable costs, fees, permits, and licenses. No additional costs shall be allowed for these items.

D. Other Conditions:

1. Safety:
   a. Execute all work with the highest regard to safety. Comply with all laws governing safety, including the "Occupational Safety and Health Standards" and the "Safety and Health Regulations for Construction", State and federal. All applicable power tools used during construction shall have current approval under an approved Equipment Grounding Program, and shall bear the tag relating such. Contractor is solely responsible for all means and methods.
2. Coordination and Supervision:
   a. Each bid shall include the necessary detail and interconnection work to coordinate his work with the work of other trades. Contractor shall keep competent supervisory personnel on the job whenever work is being performed by his trade.
3. Storage of Materials:
   a. Each Contractor shall provide temporary storage facilities suitable for equipment stored at the job site. Storage facilities shall be weatherproof and lockable as required.
4. Protection of Building and Materials:
   a. Each Contractor shall take necessary precautions to prevent damage to existing buildings and to work of other trades.
5. Observations:
   a. Site observation by Owner or Engineer is for express purpose of verifying compliance by Contractor with Contract Documents, and shall not be construed as construction supervision nor indication of approval of manner or location in which work is being performed as being safe practice or place.
   b. Contractor is reminded that he shall also comply with all respects to the Invitation to Bid, General Conditions, Supplementary Conditions, Notice of Bidders, Instructions to Bidders, and all other governing parts of these specifications and the contract documents. These sections are included as part of the contract.
   c. Where the term "Contractor" is used within these specifications, it shall be understood to mean an approved controls manufacturer/contractor, and facility management systems contractor.

E. The Control System provided shall include all necessary, described, or specific elements, including but not limited to the following.
   1. Control Equipment:
      a. Control interfaces, sensors, input/output devices, enclosures, panels, microprocessor control units, communication equipment, relays, switches, cables, connectors, wiring, and all other control devices and items.
      b. Computer software for central control and monitoring. All cables, connectors and installation hardware. Provide complete functional system.
      c. Engineering, programming, coordination, supervision, calibration, installation, all associated electrical work except as noted, testing, adjustments, commissioning, warranty, training, and service.
      d. Application Specific Controllers (ASC) shall be LonMark certified.
      e. Programmable Controllers shall use Standard Network Variable Types (SNVT). All SNVTs shall be open to the CMCS and LonMark certified.

F. The entire system shall be approved and listed by Underwriters Laboratories, Inc., under UL916 for energy management systems and FCC-Part 15 Subparagraph J Class A Emissions Requirements.

G. Equipment and Software Updates/Upgrades:
   1. Equipment:
      a. All equipment, components, parts, materials, etc. provided throughout the period of Work (as governed in the Agreement) shall be fully compatible with all other equipment, etc. provided at any other time throughout the period of Work.

Should updated versions of equipment be provided which are not fully compatible with earlier equipment provided, Contractor shall replace earlier equipment with the later version at no cost to Owner.

2. Software:
   a. All software upgrades applicable to system and offered by the manufacturer/contractor for this system shall be provided at no cost to the Owner throughout the period of work and warranty. This no cost upgrade shall include installation, programming, modifications to field equipment, data base revisions, training, etc. as appropriate.

H. The Engineer shall reserve all authority regarding approval, conditional approval, or rejection of systems not fully complying with these specifications.

1.10 WARRANTY

A. The BMCS contractor and CMCS contractor shall guarantee all workmanship and material in the installed temperature regulation system for a period of one (1) year, such guarantee dating from the date of final acceptance of the entire air conditioning system by the Architect.

B. During the warranty period, the temperature controls contractor shall respond to calls for warranty service within eight (8) working hours. Emergency service shall be obtainable within four (4) hours of notification by the Owner. Emergency service shall be obtainable on a 24-hour basis, seven (7) days per week.

C. The temperature control contractor's office shall be within a 130-mile radius of the job site.

D. The Owner shall grant to the Contractor, reasonable access to the BMCS system during the warranty period.

E. Each Contractor shall guarantee all labor and materials furnished by him for a period of one (1) year.

1.11 SERVICE

A. All service of the system shall be furnished by the Contractor, at no cost s to the Owner, for a period of one (1) year, concurrent with the warranty period specified above.

1.12 SHOP DRAWINGS

A. Contractor shall provide six (6) hard copies and two (2) electronic copies of shop drawings/submittals.

B. The following information shall be included on the cover page for each shop drawing and equipment documentation submittal:
   1. Project name.
   2. Date.
   3. Submittal number and re-submittal number, as appropriate.
   4. Name and address of consultant.
   5. Name and address of General Contractor.
   6. Name and address of BMCS subcontractor.
   7. Name and address of supplier or vendor, as appropriate.
   8. Name of manufacturer.
   9. Reference to the applicable Specification Section by name and number.

C. Shop drawings shall be a minimum plot size of 11 x 17 inches. Drawings shall include diagrams, mounting instructions, installation procedures, equipment details and software descriptions for all aspects of the system to be installed. At minimum, the shop drawings shall be printed out and include:
   1. BMCS topology schematic.
   2. Installation drawings and schedules.
   3. CCP, DCP, UC and other panel layouts, including floor plan location and interconnection drawings.
   4. Field instrumentation locations on floor plan drawings.
   5. Schematic of systems indicating instrumentation locations.
   6. Installation details.
   7. Schedule of cabling including details of proposed cable types.
   8. Composite drawings of all motor starter terminal strips, damper terminal strips, and interfaces to other equipment indicating all wiring by all subcontractors on the terminal strips.
   9. Points list showing all system objects and proposed English language object names.
   10. Color prints of proposed graphics with a list of points for display.
   11. One finalized copy will remain in same location of database. See paragraph D sub paragraph 10 this section.
   12. Provide exact location of installed OAT sensor.

D. Equipment submittals shall include design, performance and installation details for all aspects of the system to be installed. At minimum, the equipment documentation submittals shall include:
   1. Equipment technical data sheets with mounting and installation details.
   2. The documentation shall include comprehensive and complete details of the SNVT and Automation Level documentation including Neuron ID address, associated controller type, XIF files for each device, , etc. as required and for the interface to the CMCS.
   3. Operator terminal specifications and data sheets.
   4. Details of networks/communications equipment, cabling and protocols proposed.
   5. Software specifications and descriptions including operating sequences.
   6. Field sensor and instrumentation specification sheets.
   7. Damper and actuator specification sheets.
   8. Valves and actuator specification sheets.
   9. Details of PID and other appropriate control algorithms.
   10. Training outline.
   11. Details of piping and/or tubing proposed.
   12. The LNS database for the complete control network provided under this specification.
   13. LNS Plug-ins for each application specific controller. LNS Plug-ins distributed under license shall be licensed to the district. Hard copy manuals shall be submitted for each Plug-in provided.

1.13 RECORD DOCUMENTATION

A. Provide Operators' Manuals with, at minimum, the following information:
   1. Details of all features and functions available to the Operators.
   2. Details of all alarm, diagnostic, error and other messages. Detail the Operator action to be taken for each instance.
   3. Detail special programs provided and provide a complete programming instruction manual. Detail operation of all software applications.
   4. Detailed list of the database for all installed devices.

5. Details of all data base management functions and features.
6. All details and descriptions shall be in a step-by-step format such that an Operator/ Manager would be able to undertake the respective actions solely on the basis of information provided in the manuals and drawings.

B. Provide hardware manuals which shall include, at minimum, the following:
1. Specifications, maintenance requirements and installation requirements for all hardware components.
2. Record drawings and schedules of the completed installation including location of devices, mounting details, cabling details.
3. Operating sequences and interlocks.
4. Names and addresses of spare parts suppliers.

C. Record drawings shall be generated and shall include, at minimum, the following:
1. Details required by the shop drawings.
2. Final locations and point ID for each monitored and controlled device.

D. XIF files- Unique External interface files shall be submitted for each specific DDC controller provided. XIF files shall be submitted as a printed copy and on CD-ROM. These files must be submitted with the Certificate of Readiness to the Commissioning Authority.

E. LNS Database- Two copies of the LNS database for the complete control network provided under this specification shall be submitted. Each copy shall be on CD-ROM and shall be clearly marked identifying it as the LNS database for the work covered under this specification and the date of the most recent database modification.

F. LNS Plug-in - LNS Plug-ins for each Application Specific Controller shall be submitted. LNS Plug-ins distributed under a license shall be licensed to the project site. Plug-ins shall be submitted on CD-ROM. Hard copy manual shall be submitted for each plug-in provided.

G. Upon completion of the work, the Contractor shall provide the Owner with "record" layouts for the system. Layouts shall indicate all equipment and the function of each item shall be indicated.

H. Operating instructions and as-built system flow diagrams and drawings shall be prepared, bound and delivered to the Owner. Each sensor, relay, switch, motor, controller, indicator (when inside panel), and item of equipment, etc., shall be identified with a number or mark identical to one which shall be tagged on each item. Large items of equipment may be identified by a suitable symbol listed in a legend on the control diagram.

1.14 QUALIFICATION REQUIREMENTS

A. The Building Management Control System Manufacturer, to be acceptable to this project, must have had an established engineering and service office serving the Owner's area for a minimum of five years prior to bid date of this project. This office shall have a staff of factory trained technicians fully capable of rendering training, instruction, calibration procedures and routine and emergency maintenance service on all system components furnished.

B. Installers shall have not less than five year’s experience with electronic and pneumatic controls.

C. The entire system shall be provided by a qualified and approved BMCS

Manufacturer/Contractor. It shall be designed by engineers and installed by competent technicians, all of which are regularly employed by the manufacturer of the control equipment. The manufacturer shall maintain permanent local facilities for engineering, installation, and 24 hour maintenance and service. Submit required Qualifications Form as specified. The manufacturer shall provide evidence of the ability to support and service the work in the Owner's facilities.

1.15 WORKMANSHIP

A. Contractor shall use only thoroughly trained and experienced workmen completely familiar with the items required and with the manufacturers recommended methods of installation. In all respects, the workmanship shall be of the highest grade, and all construction shall be done according to the best practice of the trade. Unless otherwise noted, conduit shall be concealed and installed square to the building lines. Any work not meeting these requirements shall be replaced or rebuilt without extra expense to the Owner.

B. The Bidder/Contractor shall be manufacturer and installer and ISO 9001/ISO9002.

1.16 CONTROLS MANUFACTURERS/BIDDERS

A. Equipment and performance are intended as a standard of quality, but not as a means of excluding other approved Manufacturers/Control Contractors.

B. Systems offered by other manufacturers/contractors which deviate slightly from these specifications, but which do not materially deviate from quality or performance, will also be acceptable, provided:
   1. Complete written submittals of the equipment and system that the Contractor proposes to bid shall be provided ten (10) working days prior bid opening. Submittals shall include cut sheets and engineering data. Submittals of only brochures will not be accepted. Submittal shall also include basic system architecture schematic.
   2. Manufacturers other than those listed below shall demonstrate their equipment in the Dallas ISD Bond Office or in the office of the Engineer and Complete engineering data and information shall be provided ten (10) working days prior bid opening. Demonstration of the equipment may also be required for Owner's personnel.
   3. Submittals shall fully and explicit describe deviations, if any, from the specified performance.
   4. Approval of such submittals by the Engineer is provided via an addendum issued not less than five (5) days prior to bid opening.
   5. The written deviations become an additional factor upon which bids may be evaluated, at the direction of the Engineer or Owner.
   6. Submitter is both manufacturer and installer. Provide evidence and notarized statement with submittal.
   7. Seven references of school work in Texas are provided.

C. Energy Management Control Systems shall be as follows or equal.
   1. Schneider Electric
   2. Trane
   3. Distech
   4. Siemens

D. The Engineer and Owner shall reserve all authority regarding approval, conditional approval, or rejection of systems not fully complying with these specifications.

1.17 ELECTRICAL POWER PROVISIONS

A. 120Vac power shall be provided by the electrical contractor. The BMCS Contractor is responsible for coordinating the needed locations with the electrical contractor.

B. The Electrical Contractor shall provide the necessary 120Vac power to the UC that will serve VAV terminal units. VAV terminal units shall be provided by unit manufacturer with step down transformers within panel enclosures for 24Vac. If no step down transformers are provided as part of the VAV terminal unit, then it will be the responsibility of the BMCS Contractor to provide the transformers.

C. Low voltage power shall be provided to the dampers interlocked to fans via the control transformer provided with the motor starter.

D. The BMCS subcontractor shall provide any additional power that is required as part of this contract. This shall include all conduit, cabling, circuit breakers, interfaces, etc.

PART 2 PRODUCTS

2.1 MATERIALS

A. General:
1. All materials and equipment used shall be standard components, of regular manufacture for this application. All systems and components shall have been thoroughly tested and proven in actual use.
2. Exceptions to the specification will qualify bid as unacceptable.

B. Control Valves:
1. Control valves shall be globe type constructed for tight shutoff and shall operate satisfactorily against system pressures and differentials. Provide two way or three way pattern as shown on the plans. Valves with size up to and including 2-1/2" shall be "screwed". 3" and larger valves shall be “flanged” configuration. Valves larger than 4” shall be butterfly or globe type. Water control valves shall be sized for a maximum pressure drop of 5.0 psig at rated flow (except as noted). Steam control valves shall be sized for a pressure drop equal to 80% of the inlet pressure. Two-way control valves shall exhibit equal percentage characteristics. Two-position control valves shall be line size. Ball valves are acceptable for floating or two-position operation where valve size is less than 1 inch.

C. Provide butterfly valves at the following locations:

D. Butterfly valves shall meet, at minimum, the following requirements:
1. Full lugged type. Semi-lug and wafer valves are not acceptable.
2. Valves shall be full line size.
3. Valve body shall be one of the following:
   a. Carbon steel.
   b. 316 stainless steel.
   c. Cast iron.
   d. Nickel aluminum bronze.
4. Disc shall be one of the following:
   a. 316 stainless steel.
   b. Monel.
5. Stem shall be stainless steel.
6. Seat shall be replaceable shall have a stainless steel, titanium, Inconel or equivalent metal retaining ring and shall be one of the following: a. Polymer (PTFE)

b. 316 stainless steel
c. Resilient elastomer (EPDM)
d. Monel

7. Packing shall be PTFE or equivalent.
8. Disc pins, where required to secure shaft to disc, shall be 316 stainless steel.

E. Valve Actuators:
1. The BMCS subcontractor shall provide electric actuators for all control valves that are furnished as part of the BMCS contract. Two way and three way control valve actuators shall meet, at minimum, the following requirements:
2. Motor driven type.
3. Integral self-locking gear train, mechanical travel stops and two adjustable travel limit switches with electrically isolated contacts. Gear assembly shall be made of hardened steel. No plastic components shall be acceptable.
4. Rated for continuous duty against the maximum system operating pressure. Actuator shall have an input voltage of 24 VAC.
5. Exterior housings shall be NEMA-4 rated.
6. Sized to meet the shut-off requirements when operating at the maximum system differential pressure and with the installed system pump operating at shut-off head. Actuators shall control against system maximum working pressures.
7. Normal and failure positions shall be as indicated in the Operating Sequences.
8. Visual mechanical position indication, showing valve position.
9. Equipped with an integral position potentiometer to indicate the stem position of the valve if required by the sequence of operation.
10. Manual declutch lever to enable manual operation of the valve. It shall be possible for an operator to manually modulate valves located in mechanical rooms in the event of loss of power.
11. Actuator shall be manufactured by Belimo or approved equal.
12. All actuators installed in crawl space or exterior location shall be provided with weather-tight enclosure.
13. All actuators provided by the BMCS Contractor shall be consistent with their intended use. Valves shall be selected in a manner that is consistent with their task.
14. All actuators for roof mounted equipment shall be located in a piping cabinet at the unit where provided.

F. The BMCS subcontractor shall provide electric actuators for all butterfly valves provide as part of the BMCS contract. The butterfly control valve actuators shall meet the following requirements:
1. Motor driven type.
2. Integral self-locking gear train, mechanical travel stops and two adjustable travel limit switches with electrically isolated contacts. Gear assembly shall be made of hardened steel. No plastic components shall be acceptable.
3. Rated for continuous duty and have an input voltage of 120 VAC.
4. Housing shall be NEMA 4 rated. The actuator cover shall be aluminum or material of equivalent strength and have captive bolts to eliminate loss of bolts when removing the cover from the base. Materials of construction shall be non-corroding.
5. Sized to meet the shut-off requirements when operating at the maximum system differential pressure and with the installed system pump operating at shut-off head. Actuators shall control against system maximum working pressures.
6. Valves shall fail as in the last commanded position or as indicated in the Operating Sequences.
7. Visual mechanical position indication, showing valve position and remote indication located in display panels.
8. Equipped with an integral position potentiometer to indicate the stem position of the valve if required by the sequences of operation.

9. Provide for the manual modulation (opening/closing) of the valve in the event of malfunction.
10. Chiller Isolation shall have auxiliary contacts for electrical hardwiring to facilitate interlock of chilled water pumps with Chiller.
11. Electronic valve actuators shall be suitable for direct-coupled mounting to the valve bonnet. Valve actuators shall be properly sized to provide sufficient torque to position the valve throughout its operating range. All valve actuators shall be spring return. Where butterfly valves are specified, double acting non-spring return actuators may be used. Unless otherwise stated, provide normally open valves for heating water applications and normally closed valves for chilled water applications.
12. Terminal unit reheat valve actuators shall be suitable for direct-coupled mounting to the valve bonnet. Valve actuators shall be properly sized to provide sufficient torque to position the valve throughout its operating range. Non-spring return tri-state floating valve actuators may be used on terminal units where the valve is less than 1 inch.
13. All actuators installed in crawl space or exterior location shall be provided with weather-tight enclosure.
14. All actuators provided by the BMCS Contractor shall be consistent with their intended use. Valves shall be selected in a manner that is consistent with their task.
15. All actuators for roof mounted equipment shall be located in a piping cabinet at the unit where provided.

G. Control Air Dampers:
1. Control Air dampers shall be parallel blade for two-position control and opposed blade for modulating control applications. Dampers shall be galvanized with nylon bearings. Blade edge and tip seals shall be included for all dampers. Leakage through the damper shall not exceed 20 CFM per square foot at 4" w.c. (based on a 48" x 48" test sample). Blades shall be 16-gauge minimum and 10" wide maximum and frame shall be of welded channel iron. Dampers over 48" wide shall be equipped with a jackshaft to provide sufficient force throughout the intended operating range.

H. Damper Actuators:
1. Electronic damper actuators shall be direct-couple rotary type, suitable for mounting directly on the damper end shaft. Electronic damper actuators shall be properly sized to provide sufficient torque to position the damper throughout its operating range. Damper actuators used on economizer and/or outside air dampers shall be spring return.
2. Terminal unit damper actuators shall be electric, low voltage, utilizing floating control. On single duct VAV applications, VAV box damper actuators shall be an integral part of the DDC VAV box controller.

I. Control Panels:
1. All direct digital controllers located indoors shall be installed in NEMA 1 enclosures. All direct digital controllers located outdoors shall be installed in NEMA 3R enclosures. Enclosures shall be of suitable size to accommodate all power supplies, relays and accessories required for the application. Each enclosure shall include a perforated subpanel for direct mounting of the enclosed devices. Include matched key locks for all enclosures provided.

J. Differential Pressure Switches (Air):
1. Provide differential pressure switches across fans and filters for status indication. Differential pressure switches shall have an adjustable setpoint from 0.05” w.c. to 2” w.c. with a switch differential that progressively increases from 0.02” w.c. at

minimum to 0.8” w.c. at maximum. Switch shall be SPDT rated for 15A (non-inductive) at 277VAC.

K. Differential Pressure Switches (Liquid):
1. Provide differential pressure switches across pumps and chillers to prove flow. Differential pressure switches shall have a 0-150 psig working differential pressure and have an adjustable setpoint from 4” w.c. to 43.5” w.c. on a fall and 5.5” w.c. to 45” w.c. on a rise. Liquid differential pressure switch enclosure shall carry a NEMA 4 rating. Switch shall be SPDT rated for 5A (inductive) at 125VAC.

L. Float Switches:
1. Provide float switches in condensate drain pans as required by code. Float switches shall utilize a magnetically actuated dry reed switch. Float shall be constructed of seamless polypropylene. Switch shall be SPDT rated for 16A (non-inductive) at 120VAC.

M. Mixed Air Low Limit Controllers:
1. Mixed air low limit controllers shall be manual reset, adjustable setpoint with 20-foot element serpentined across the entering air face of center cooling coil. Control shall be responsive only to the lowest temperature along the element.

N. Firestats:
1. Where duct smoke detectors are not provided, provide manual reset type firestats. Firestats shall be UL approved, and set at 125°F in air handling unit return air or 50°F above maximum operating temperature in other areas. Provided firestats in intake ductwork of all exhaust fans rated at 600 CFM or over, as required by local codes.

O. Smoke Detectors:
1. The temperature control contractor shall be responsible for interlock wiring between duct smoke detectors and starter safety circuits.

P. Static High Limit Controllers:
1. Discharge static high limit controllers shall be provided on all VAV AHU systems. When discharge static pressure exceeds setpoint, the supply fan shall be deenergized. Manual reset shall be required. The static high limit controllers must be easily accessible. If the VAV AHU is located on the roof, the static high limit controller must be located inside the AHU.

Q. Pressure Transducers:
1. Static Pressure Transducers (Air):
a. Provide static pressure transducers for monitoring supply duct static pressure. Static pressure transducers shall be 100% solid state and shall include glass on silicon, ultra stable capacitance sensors. Each static pressure transducer shall incorporate short circuit and reverse polarity protection. Transmitter output shall be either 0-10Vdc or 4-20mA. Static pressure transducers are to be provided in an enclosure that is suitable for duct mounting. The desired setpoint is to be in the top 50% of the transmitter’s operating range.

R. Differential Pressure Transducers (Air):
1. Provide differential pressure transducers for monitoring air system and airflow measuring station differential pressures. Differential pressure transducers shall be 100% solid state and shall include glass on silicon, ultra stable capacitance sensors. Each differential pressure transducer shall incorporate short circuit and reverse polarity protection. Transducer output shall be either 0-10Vdc or 4-20mA.

Differential pressure transducers are to be provided in an enclosure that is suitable for duct mounting. The desired setpoint is to be in the top 50% of the transducer's operating range.

S. Line Pressure Transducers (Liquid):
   1. Provide line pressure transducers for monitoring hydronic system line pressures. Pressure transducers shall be 100% solid state and shall include diffused piezoresistive silicon wafer type sensors. Transducer output shall be either 0-10Vdc or 4-20mA. Pressure transducers shall not require additional nulling valves. Pressure transducers are to be provided in a field mounted enclosure and all wetted parts shall be constructed from materials that are suitable for operation in the measured medium. The desired setpoint is to be in the top 50% of the transducer's operating range.

T. Differential Pressure Transducers (Liquid):
   1. Provide differential pressure transducers for monitoring hydronic system differential pressure. Differential pressure transducers shall be 100% solid state and shall include dual diffused piezoresistive silicon wafer type sensors. Transducer output shall be either 0-10Vdc or 4-20mA. Differential pressure transducers shall not require additional nulling valves. Differential pressure transducers are to be provided in a field mounted enclosure and all wetted parts shall be constructed from materials that are suitable for operation in the measured medium. The desired setpoint is to be in the top 50% of the transducer's operating range.

U. Airflow Measuring Stations:
   1. Where shown on the plans, provide airflow measuring stations utilizing multiple point averaging sensors for total pressure measurement and bullet-nose probes for static pressure measurement. Airflow measuring stations shall be factory assembled units with a sheet metal casing of at least 16 gauge galvanized steel. Airflow measuring stations shall be equipped with 3/8" aluminum hexagon cell straightening vanes. Pressure drop across airflow measuring station shall be less than .13" w.c. at 2000 FPM with the straightening vanes installed. Accuracy of airflow measurement shall be +/- 2% at 6000 FPM inlet velocity and +/- 0.5% at 2000 FPM inlet velocity.

V. Liquid Flow Meters:
   1. Provide insertion type flow meters for monitoring system hydronic system flow. Flow meters shall be 100% solid state and shall include paddle type non-magnetic, non-photoelectric sensors. Flow meters shall be provided with "hot tap" isolation valves and all accessories for bi-directional flow. Flow meter transmitter supply voltage to be 24VAC unregulated. Flow meter output shall have either a 4-20mA or pulse output that is linear with the flow rate.

W. Current Sensing Relays:
   1. Provide current switches for indication of equipment status. Amperage ratings shall be adjustable with the desired setpoint to be in the top 50% of the current relay's operating range. Current sensing relays shall incorporate trip indication LED's and shall be sized for proper operation with the equipment served.

X. Relative Humidity Sensors:
   1. Relative humidity sensors shall have an accuracy of +/- 3% from 5 to 95% RH. Output signal shall be either 0-10Vdc or 4-20mA. Humidity transmitters shall be factory calibrated and require no field setting.

Y. CO2 Sensors:

1. CO2 sensors shall be space or duct mounted carbon dioxide sensors as required by the application. Space CO2 sensors shall be mounted next to space temperature sensors. The sensor shall have a range of 0-2000 ppm with an accuracy of ±5%. The response time for the sensor shall be less than one minute. The sensor shall be capable of providing an analog signal proportional to the CO2 level sensed. The signal shall be either 0-10Vdc or 4-20mA.

Z. Temperature Sensors:
1. Duct/Well Sensors: Sensors for duct and water temperature sensing shall incorporate either RTD or Thermistor sensing devices. Sensing element accuracy shall be 0.1% over the sensor span or better. Where the element is being used for sensing mixed air or coil discharge temperatures and/or the duct cross sectional area is in excess of 14 square feet, the element shall be of the averaging type. Averaging duct sensors shall utilize a 6, 12 or 24 foot sensing element. Immersion sensors shall use matched 316 stainless steel bulb wells. All duct and immersion sensors shall be provided with conduit connection housings. Sensors shall be provided with adequate standoffs for insulation installation.

AA. Space Sensors:
1. Wall mounted space temperature sensor: Provide wall mounted temperature sensors for spaces as indicated within the Point Schedules. Temperature sensors shall meet, at minimum, the following requirements:
2. White protective enclosure without temperature indication, set point indication, or reset.
3. Location as shown on the Mechanical Drawings. No sensor shall be mounted until specific location instructions are given.
4. 10,000 ohm at 77 Deg. F. thermistor.
5. BMCS shall report the monitored temperature with an accuracy of ± 0.5 Deg. F.

BB. Electronic to Pneumatic Transducers:
1. As required by the sequence of operations, provide electronic to pneumatic transducers. Transducers shall be used for the conversion of a pulse or a 4-20mA DDC analog output signal to a 3 to 18 psi pneumatic signal. Transducers shall be equipped with a 0-30 psi pressure gauge and have an analog feedback feature.

CC. Selector Switches:
1. Selector switches shall be 2 or 3-position, knob or key type as required by the sequence of operation. Selector switches shall feature oil tight construction and be fitted with snap-fit contact blocks rated for 10A, 600VAC/DC operation. Labels shall be provided indicating switch position.

DD. Pushbutton Switches:
1. Pushbutton switches shall be either maintained or momentary as required by the sequence of operation. Pushbutton switches shall feature oil tight construction and be fitted with snap-fit contact blocks rated for 10A, 600VAC/DC operation. Labels shall be provided indicating switch function.

EE. Pilot Lights:
1. Pilot lights shall be furnished as required by the sequence of operation. Pilot lights shall utilize multi-colored dome lenses and replaceable LED lamps. Labels shall be provided to indicate light function.

FF. Outside air temperature sensor: Provide, at a minimum, one outside air temperature sensor per site. Temperature sensors shall meet, at minimum, the following requirements:
1. Ventilated white PVC sun shield.

2. Wall mount weather proof enclosure with conduit fitting.
3. 10,000 ohm at 77 Deg. F. thermistor.
4. BMCS shall report the monitored temperature with an accuracy of ± 0.5 Deg. F.

GG. Freeze stat: Provide freeze stats for all air handling systems that receive untreated outside air. Freeze stats shall meet, at minimum, the following requirements:
1. Minimum 20 feet vapor tension element, which shall serpentine the inlet face on all coils. Provide additional sensors, wired in series, to provide one linear foot per square foot of coil surface area.
2. Interlock to the associated fan so that fan will shut down when HOA switch is in Hand or Auto position. Provide time delay relays with a 0-10 minute time delay relay duration to minimize nuisance freeze stat trips. Time delay relay shall be adjustable at the associated control panel.
3. Manual Reset.
4. Set point shall be adjustable in the range of, at minimum, 32 Deg. F. to 45 Deg. F. Provide a scale with temperature setting clearly displayed.
5. Rated for 16 amps at 120 Vac.
6. Provide suitable supports.

HH. High temperature limit switches: Provide high temperature limit switches for all air systems that do not have duct type smoke detectors. High limit sensors and switches shall meet, at minimum, the following requirements:
1. Single point type sensor.
2. Interlock to the associated fan so that fan will shut down when HOA switch is in Hand or Auto position.
3. Manual reset.
4. Set point shall be adjustable. Switches shall be selected to shutdown the air system upon sensing a temperature of 75 Deg. F. above the normal system Control relays: Provide control relays as indicated. Relays shall meet, at minimum, the following requirements:
    a. Pickup rating, time and hold rating as required for individual applications.
    b. Rated for a minimum of ten (10) million mechanical operations and a minimum of 500,000 electrical operations.
    c. Provide complete isolation between the control circuit and the digital output.
    d. Located in the DCP, UC or other local enclosures.
    e. Malfunction of a BMCS component shall cause the controlled output to fail to the positions identified in the failure procedure within the operating sequences.
    f. 10 amp contact rating.
    g. Pin type terminals.
    h. LED light showing when coil of relay is energized
    i. Relay will be labeled to denote it’s purpose i.e. Start/Stop, Safety

II. Momentary control relays: Provide momentary control relays as indicated within the Point Schedules and sequences of operation. Relays shall meet, at minimum, the following requirements:
1. Coil ratings of 120 VAC, 50 mA or 10-30 VAC/VDC, 40 mA as suitable for the application.
2. Provide complete isolation between the control circuit and the digital output.
3. Located in the DCP, UC or other local enclosures.
4. 10 amp contact rating.
5. LED status indication.
6. Temperature
7. Rated for 16 amps at 120 Vac.
8. UL approved.

JJ. Photocell: Provide ambient light level sensors as indicated within the Point Schedules. Light level sensor shall meet, at minimum, the following requirements:

1. Non-corroding and weatherproof housing with sensor shield suitable for exterior installations.
2. 4-20 mA output proportional to the ambient light level.
3. Accuracy at room temperature: ± 1%, 100 Deg. F. temperature: ± 2.5%.
4. Solid-state photo diode circuitry and transducer as required.
5. Mounted on the exterior of a North wall on the roof.
6. Sensor reading from 0 to 750 foot candles.
7. Temperature and humidity independent.
8. Temperature range of 10 Deg. F to 120 Deg. F.

KK. Refrigerant leak detection monitoring:

1. Provide refrigerant leak monitoring as identified within the point schedules. Refrigerant leak detection monitors shall meet, at minimum, the following requirements:
   a. Power consumption: AC - 325 mA, DC - 250 mA.
   b. Operating temperature range of 0 Deg. C. to 70 Deg. C. (32 Deg. F. to 158 Deg. F.).
   c. Operating humidity range: 10% to 95% non-condensing.
   d. Measuring range of 0-1000 ppm proportional to 4 to 20mA output range for each sampling point.
   e. Volt free contacts to indicate an alarm condition.
   f. Refrigerant gas system detection supplier/contractor shall be familiar with standard practices of safety and installation for refrigerant gas detection systems.
   g. Submit details of refrigerant monitors, breathing apparatus, control panel and diagrams as part of the submittal process.
   h. System shall detect the presence of the of the following types of refrigerants regardless of refrigerant type using sequential sampling and multi-point monitoring method:
      (1) CFC
      (2) HCFC
      (3) HFC
   i. System shall annunciate to the BMCS and locally alarm (audible and visual) upon detection of alarm conditions. Provide silencing alarm button at control panel. Provide approved appropriate signage at all entry points to the chiller room. Initial
      alarm shall comply with recommended Allowable Exposure Level (AEL).
      Adjustable 3 level alarm for each point shall be supplied with common alarm output contacts. Provide local digital indication of ppm level for a minimum of 1 sample point per chiller. A sample point shall be located close to each chiller and the refrigerant pump out unit location. Location to be approved by the Engineer. Sample point if in alarm shall flash the associated LED. Provide local alarm horns and visual (stroboscopic) beacons at the following locations to activate upon alarm to an approved detail:
      (1) Outside of entrance doors to chiller machine room.
      (2) Inside rooms without an escape route other than through the chiller room.
      (3) At each chiller location.
      (4) At any other location in the chiller room as necessary to ensure that a person at any location in the chiller room and room that can be entered from the chiller room can see the visual alarm and hear the audible alarm and at any other location required to meet the applicable codes.
   j. System shall shut down all electrical equipment (chiller systems and associated pumps, AHU, FCU, etc.) and sequence emergency extract equipment as required to meet regulations. Where

combustion equipment is employed, refrigerant vapor monitoring system shall automatically shut down the combustion process in event of refrigerant leakage if other alternative acceptable conditions are not applied. Ventilation system, chiller and associated pumps and other equipment shut down as a result of the refrigerant leak alarm shall return to normal operation when the refrigerant monitoring system is no longer detecting refrigerant levels above set points and alarms have been silenced.

k. System shall have self-diagnostics and supply common malfunction output. Loss of sample flow at either sample or ZERO line and electrical malfunction shall annunciate to the BMS.
l. Provide two (2) additional particulate filters and zero gas filter cartridges.
m. Provide self-contained breathing apparatus that is OSHA approved and certified meeting the following requirements:
    (1) Certified for 20 minutes of use.
    (2) Furnish in clearly marked wall mount metal enclosures to be located inside each room that does not have an escape route apart from through the chiller room, outside one exterior door serving the chiller machine room, within the chiller room at locations such that no point in the chiller room is more than 50 feet from an escape door or a SCBA and at all other locations required by the code. Locations of SCBA to be approved by the Engineer.
n. Provide an emergency shut-off control button outside each chiller plant room entrance/exit door. Button shall be mounted at 1200mm above finished floor adjacent to refrigerant leak detection alarm light. Activation of any one of the buttons shall de-energize all chillers and other electrical equipment within the chiller plant room. Button shall be manually reset.

2.2 BUILDING MANAGEMENT AND CONTROL SYSTEM HARDWARE

A. General
    1. The Building Management and Control System (BMCS) shall be comprised of a network of fully “intelligent”, stand-alone digital controllers.

    2. As a minimum, the temperature control contractor shall provide the types and quantities of HMIs, RWSs, NLCs, and ASCs as required to achieve the sequence of operation.

2.3 BMCS AUTOMATION LEVEL NETWORK

A. The intent of this specification is to provide a peer-to-peer networked, stand-alone, distributed control system. The BMCS shall provide communication between the various DDC controllers over a Local Area Network (LAN) that consists of a twisted pair of 24 AWG shielded wires.

B. The controller LAN shall be a high-speed “bus type” network over which information is transmitted in a global fashion between all nodes on the network. The controller LAN shall have the capacity to contain 64 nodes at a minimum. BMCS AUTOMATION LEVEL NETWORK

C. BMCS Automation Level LAN shall meet, at minimum, the following requirements:
    1. Peer-to-peer.

2. LonTalk communication protocol.
3. Data transfer rate and data throughput as required to meet the alarm annunciation requirements.

D. The failure of any node on the secondary LAN shall in no way affect the operation of the BMCS except to inhibit monitoring and control functions at the OIW for that node or any devices served by the failed node.

E. The failure of any node shall not inhibit the communication between remaining nodes.

F. Each secondary LAN as initially configured shall have the capacity to add over 25 percent expansion of UC nodes with the addition of connection devices and LAN cabling.

G. To ensure high throughput, data transmission shall use "packetized" communization techniques, such that dozens of "messages" are contained in each "packet". The "turnaround time" for a global point to be received by any node, including HMIs, shall be less than three seconds. The FMS shall utilize the above LAN architecture to allow all of the Control Units to share data as well as to globalize alarms. The Controller LAN shall be based upon a peer-to-peer, token passing technique with a data speed of less than 19.2 KB. Systems that require a master communications controller or network manager for the Controller LAN are not acceptable.

2.4 NETWORK INTERFACE UNIT (NIU)

2.5 NETWORK LEVEL CONTROLLERS (NLC)

A. Network Level Controller (LonWorks Programmable Nodes) shall be used for all chiller, boiler, pumps, and AHU applications on this project as well as gateway interfaces to third party monitors/controllers, if required

B. LPNs shall be equipped with a 3120® Neuron® with co-processor or 3150® Neuron® microprocessor controller, (flash or EEPROM) memory for general data processing, power supply, network transceivers.

C. Standard Network Variable Types shall be used in all programming.

D. Operating system software, custom operating sequence software and application programs shall be stored in programmable, non-volatile memory.

E. An LPN shall operate totally stand-alone and independent of a central computer for all specified control applications. Software shall include a complete operating system (OS), communications handler, point processing, standard control algorithms, and specific control sequences.

F. LPNs shall include a battery backed hardware calendar/clock device.

G. LPN packaging shall be such that complete installation and checkout of field wiring can be performed prior to the installation of electronic boards. The complete LPN including power supplies, etc., wired and housed in a NEMA 1 enclosure or as required by the location and local code requirements.

H. The LPN LonWorks® network interface shall be a Type 1 transceiver. A communication connection shall be provided for attaching POT to node for downloading and troubleshooting applications.

1. The LPN shall provide for a RS232 PC connection.
2. The LPN shall provide for a connection to a local digital display unit.
3. LPNs shall include:
    a. Network service pin.
    b. Power On indicator light.
    c. Network communication indicator light.

I. Input/Output Requirements
1. Binary Input (BI) Types Supported by the LPN:
    a. The BI function shall accept on-off, open-close, or other change of state (two state data) indications.
2. Analog inputs shall include, 0-10 Vdc, 0-20 mA, 4-20 mA, and 1800 ohm (25ºC) or 10,000 ohm (25ºC) thermistors. Resolution of the Analog to Digital converter shall be a minimum of 10 bits.
3. LPNs shall include universal inputs that support either of the above describe inputs.
4. The LPN shall accommodate both binary and true analog outputs, 0-10Vdc. The resolution of the digital to analog converter shall be a minimum of 8 bits.
5. Binary outputs shall be capable of handling maintained as well as pulsed outputs for momentary or magnetic latching circuits.
6. The LPN shall accommodate expansion input/output units.
7. Enclosure shall be NEMA 1.
8. The LPN shall include all hardware and software required for communications with other nodes, PCs, and the OW over the LonWorks® LANs.
9. Provide with each controller the LonWorks configuration information including neuron ID address, controller configuration type, XIF file, SNVT object information, etc. to integrate the controller into the CMCS.

2.6 UNITARY CONTROLLERS

A. Unitary Controllers (UC) shall be fully programmable or applications specific controllers with pre-packaged operating sequences maintained in EEPROM or flash ROM. Customization of applications specific controllers shall be possible to the extent that variable operating parameters, such as set points, control loop parameters, control constants, and schedules shall be changeable on-line by the operator. UC shall be on the Automation Level LAN and shall provide an interface via PIM to the field instrumentation and final control elements of the equipment not controlled by DCP.

B. The UC shall be a node on one of the Automation LANs and shall control its own communications so that the failure of any one node shall not inhibit communications on the network between the remaining nodes.

C. UC shall be totally independent of other LAN nodes for their monitoring and control functions.

D. Provide each UC with a battery back-up for the protection of volatile memory for a minimum of 72 hours. Batteries shall be rated for a seven year life.

E. Provide a software clock at each UC. The system hardware real-time clock at the DCP shall be used to synchronize all other hardware and software clocks in the BMCS. Synchronization shall take place at least once every 24 hours. The clock shall have a battery back-up of at least 72 hours.

F. All associated applications programs shall reside at the UC.

G. Control shall be based on either three term algorithms, i.e. proportional plus integral plus derivative, or two term algorithms, i.e. proportional plus integral, unless specified otherwise.

H. Provide with each controller the LonWorks configuration information including neuron ID address, controller configuration type, XIF file, SNVT object information, etc. to integrate the controller into the CMCS.

2.7 UNITARY CONTROLLER - TERMINAL UNITS

A. Each terminal unit shall have a UC. The number and location of terminal units and air flow rates shall be as indicated on the Mechanical Drawings.

B. The terminal unit manufacturer shall provide the following components for each fan powered terminal unit for interface and mounting of the UC: 1. Primary air dampers to be controlled by the UC.
   2. Enclosure to house the UC and associated components or suitable mounting brackets within the terminal unit enclosure.
   3. Multi-point averaging type flow sensor at the primary air inlet to the terminal unit.
   4. 24 VAC control transformer.
   5. 24 VAC fan control relay interface.
   6. 24 VAC heater control relay interface (up to two stages).

C. The terminal unit manufacturer shall provide the following components for each cooling only VAV terminal unit for interface and mounting of the UC:
   1. Primary air dampers to be controlled by the UC.
   2. Enclosure to house the UC and associated components or suitable mounting brackets within the terminal unit enclosure.
   3. Multi-point averaging type flow sensor at the primary air inlet to the terminal unit.

D. The BMCS subcontractor shall furnish the terminal unit manufacturer the following components for factory installation for each terminal unit:
   1. UC.
   2. Damper actuator.

E. The BMCS subcontractor shall field install the following components for each terminal unit:
   1. Room temperature sensor.

F. Provide as part of the UC differential pressure transducers for the monitoring of the terminal unit primary air flow rate.

G. Furnish primary damper actuators, for factory mounting, meeting the following requirements:
   1. Direct shaft mounting.
   2. Adequate torque, 35 in. lbf. minimum, to properly operate the damper from fully open to fully closed without binding.
   3. Locking “V” groove or similar means to prevent slippage between actuator and shaft.

H. The UC shall monitor and control the following parameters for fan powered terminal units:
   1. Space temperature.
   2. Primary air flow rate.
   3. Damper modulation.
   4. Heating coil stage control.

5. Fan on/off control.

I. The UC shall monitor and control the following parameters for VAV terminal units:
   1. Space temperature.
   2. Primary air flow rate.
   3. Damper modulation.
   4. Heating coil stage control
   5. Fan on/off control

J. PID algorithms shall maintain the system operation within + or - 1.0 Deg. F. of the space temperature set points.

K. Following the installation of the terminal unit in the ceiling space the BMCS subcontractor shall undertake the following tasks:
   1. Physically connect the UC into the BMCS secondary LAN.
   2. Install all data into the UC as necessary for the correct operation of the terminal unit.
   3. Calibrate the instrumentation associated with the following monitored parameters:
      a. Space temperature.
      b. Primary air flow rate sensor.
   4. Verify that the UC modulates the primary air duct dampers from fully open to fully closed and vice versa within the specified time and verify either visually or by feel that the damper closes fully under UC control.
   5. Verify that each of the heating stages cycles on and off (as applicable).
   6. Verify that the terminal unit-UC is satisfactorily integrated into the LAN.
   7. Verify that the operating sequences are correct and that there is stable modulation of the primary air damper and staging of the heat.
   8. Assist the Air Balancing subcontractor as required for the complete commissioning, calibration and operational verification of the HVAC and terminal unit systems.

2.8 BMCS ALARM GERNATION

A. Alarms shall be generated by the BMCS upon the occurrence of one of the following events:
   1. Failure of a DCP, UC, or any other BMCS hardware components.
   2. Failure of communications of devices on the Automation Level LAN.
   3. A monitored status indicates a discrepancy between the actual and the required value.
   4. A monitored value does not meet criteria established by the operator.
   5. The deviation of a variable from set point exceeds operator established criteria.
   6. The output to a final control element is outside operator established criteria.
   7. A digital input is in the state defined by the operator as indicating an alarm condition.
   8. Software failures and errors shall be diagnosed and annunciated by the BMCS.

B. Provide configuration of alarming for all monitored and controlled points. Coordinate all alarm limits and definitions with DISD.

2.9 ENERGY MANAGEMENT SOFTWARE

A. An operator with BMCS configuration software shall be able to define a minimum time delay between successive starts of equipment so that disturbances created on the building electrical system are minimized in frequency and amplitude.

B. An operator with BMCS configuration software shall be able to define the minimum time delay between the stopping of a piece of equipment and its subsequent restart.

This time delay shall be in effect for motors in the BMCS software control mode and for motors in the BMCS manual control mode.

C. The BMCS shall not override any hardwired interlocks such as those provided at motor starters for overload protection, damper interlock, pressure interlock, etc. and those provided to facilitate control by the Fire Alarm System regardless of the BMCS output control mode.

D. Unless stated otherwise elsewhere in these Specifications, the modulation of final control elements by the BMCS in the BMCS software control mode shall be based on a Proportional-Integral-Derivative (PID) control algorithm. The control constants for the PID algorithm shall be definable by the operator. If self-tuning algorithms are provided, it shall still be possible for the operator to manually tune the control loops. The software shall incorporate facilities to enable the bumpless transfer of a modulating output from BMCS manual control to BMCS software control and vice versa and the prevention of integral windup. PID algorithms shall maintain the system operation within the desired tolerance around the set point. Set point tolerances shall be as follows:
1. Supply air temperature control, + or – 1.0 Deg. F.
2. Space temperature control, + or – 0.5 Deg. F.
3. Duct static pressure control, + or - 0.05 inches wag.
4. Water differential pressure, + or - 1.5 psig.
5. Space static pressure control, + or - 0.02 inches wag.
6. Water temperature control, + or - 1.0 Deg. F.
7. Water flowrate control, + or - 2 percent of set point.
8. Air flow rate control, + or - 5 percent of set point.

E. Provide psychometric software to determine the following properties of ambient air:
1. Wet bulb temperature.
2. Dewpoint temperature.
3. Enthalpy.
4. Dry bulb temperature.
5. Relative humidity.
    a. Each of the parameters shall be calculated using the monitored values of any two of the parameters. These psychometric calculations shall be based on the ASHRAE sea level charts.

F. Provide a scheduling program that will enable the BMCS to automatically schedule an item of equipment on and off. The operator shall be able to assign a minimum of four start and four stop times to each piece of equipment for each day of the week and for holidays. These schedules shall only be in effect for a piece of equipment when it is in the BMCS software control mode. The scheduling feature shall conform to the CMCS scheduling interface.

G. Provide equipment fail restart software that will restart equipment shut down as the result of a fire alarm system following the return to normal conditions or a power fail condition.

H. Provide a night setback software program that shall:
1. Start HVAC equipment after normal hours of scheduled operation to maintain building after hour set points, while reducing energy consumption.
2. Night setback temperatures for heating shall be initially set at 55 Deg. F. to activate the heating equipment and 60 Deg. F. to stop the heating equipment. Once activated, the units involved shall operate as specified in the respective sequence of operation. Coordinate the operation of this program with the requirements for terminal unit controls.

3. Night setup temperatures for cooling shall be initially set at 90 Deg. F. to activate the cooling equipment and 85 Deg. F. to stop the cooling equipment. Once activated, the units involved shall operate as specified in the respective sequence of operation. Coordinate the operation of this program with the requirements for terminal unit controls.
4. This feature shall be provided for all HVAC equipment under control of the BMCS. The operator shall be able to enable/disable this function on a unit by unit basis.

PART 3 EXECUTION

3.1 MANDATORY SNVT LIST

A. Many monitor and control points listed may not be necessary to execute the specified sequence but are useful for future sequence modifications, building control loop tuning, energy consumption analysis, CMCS operator and O&M troubleshooting.

B. Equipment interfaces are acceptable for providing information but each piece of equipment shall have a hard wired point for start/stop.

C. Any additional SNVT'S necessary for the sequence of operation shall comply with LonMark SNVT'S that are open to the CMCS.

VAV AHU	**NAME**	**READABLE**	**UNITS**	**SNVT Label**
Occupied Command	OCC_CMD	RW	-	SNVT_occupancy
Chilled Water Valve	CHWV_POS	RW	%	SNVT_switch (value)
Outside Air Damper	OAD_POS	RW	%	SNVT_switch(value)
Supply Air Fan Command	SAF_CMD	RW	-	SNVT switch (state)
Supply Air Fan Speed	SAF_SPD	RW	%	SNVT switch (value)
Supply Air Fan Run Indication	SAF RI	RW	-	SNVT_switch (state)
Supply Air Temp	SA_T	RW	°F	SNVT_temp_p
Return Air Temp	RA_T	RO	°F	SNVT_temp_p
Return Air CO_2	RA_CO_2	RO	ppm	SNVT_ppm
Mixed Air Temp	MA_T	RO	°F	SNVT_temp_p
Supply Air Static Pressure	SA_PS	RO	In water	SNVT_press_f
Hand-Off-Auto	HOA	RW	-	SNVT_count
Supply Air Temp Setpoint	SA_T_SP	RW	°F	SNVT_temp_p
Supply Air Static Pressure Setpoint	SA_PS_SP	RW	In water	SNVT_press_f
Supply Air High Static Switch	SA_HSS	RO	-	SNVT_switch (state)
Temperature Low Limit Alarm	TLL_ALM	RO	-	SNVT_switch (state)
VAV				

VAV AHU	NAME	READABLE	UNITS	SNVT Label
Space Temp	nvospacetemp	RO	°F	SNVT_temp_p
Effective Occupancy	nvooccpncystal	RO	-	SNVT_occupancy
Space Temp (input)	nvispacetemp	RW	°F	SNVT_occupancy
Occupancy Command	nviocccmd	RW	-	SNVT_occupancy
Cooling Setpoint	nvisetpoint	RW	°F	SNVT_temp_p
Effective Setpoint	nvoeffectsetpt	RO	°F	SNVT_temp_p
Setpoint Offset	nvistpointoffset	RW	°F	SNVT_temp_p
Terminal Load	nvoterminalload	RO	%	SNVT_lev_percent

Fan Status	nvounitstatus	RO	-	SNVT_hvac_status
Box Flow	nvoboxflow	RO	cfm	SNVT_flow
Box Flow (input)	nviboxflow	RO	cfm	SNVT_flow
Box Flow Setpoint	nvoflowcontrol	RW	cfm	SNVT_flow
Damper Position	nvomotorposition	RO	%	SNVT_lev_percent
Supply Air Temp	SA_T	RO	°F	SNVT_temp_p
RTU/DX Split System				
Discharge Air Temp	nvodischairtemp	RO	°F	SNVT_temp_p
Fan Status	nvounit status	RO	-	SNVT_hvac_status
Space Temp	nvospacetemp	RO	°F	SNVT_temp_p
Also Acceptable				
Discharge Air Temp	DA_T	RO	°F	SNVT_temp_p
Fan Status	SAF_RI	RO	-	SNVT_switch (state)
Space Temp	SP_T	RO	°F	SNVT_temp_p
CHW SYS				
Chilled Water Pump 1 Run Indication	CHWP1_RI	RO	-	SNVT_switch (state)
Chiller 1 Command	CH1_CMD	RO	-	SNVT_switch (state)
Chiller 1 Run Indication	CH1_RI	RO	-	SNVT_switch (state)
Chilled Wtr. Supply Temp	CHWS_T	RO	°F	SNVT_temp_p
Chilled Wtr. Return Temp	CHWR_T	RO	°F	SNVT_temp_p
Chiller 1 Hand-Off-Auto	CH1_HOA	RW	-	SNVT_count
Chiller Alarm	CH1_ALM	RO	-	SNVT_switch (state)
CW SYS				
Condenser Water Pump 1 Run Indication	CWP1_RI	RO	-	SNVT_switch (state)
Condenser Water Supply Temp	CWS_T	RO	°	SNVT_temp_p

			F	
Condenser Water Return Temp	CWR_T	RO	°F	SNVT_temp_p
COOLING TOWER				
Cooling Tower Fan Run Indication	CTF1_RI	RO	-	SNVT_switch (state)
STM SYS				
Boiler 1 Command	B1_CMD	RO	-	SNVT_switch (state)
Boiler 1 Run Indication	B1_RI	RO	-	SNVT_switch (state)
Boiler 1 Hand-Off-Auto	B1_HOA	RW	-	SNVT-count
FCU/UV				
Setpoint	nvisetpoint	RW	oF	SNVT_temp_p
Setpoint Offset	nvisetpntoffset	RW	oF	SNVT_temp_p
Discharge Air Temp	nvodischairtemp	RO	oF	SNVT_temp_p
Fan Status	nvounitstatus	RO	-	SNVT_hvac_status
Effective Occupancy	nvoeffectoccup	RO	-	SNVT_occupancy
Effective Setpoint	nvoeffectsetpt	RO	oF	SNVT_temp_p
Space Temp	nvospacetemp	RO	oF	SNVT_temp_p
Terminal Load	nvoterminalload	RO	%	SNVT_lev_percent
Unit Status	nvounitstatus	RO	-	SNVT-hvac-status
Occupancy Command	nvimanocccmd	RW	-	SNVT_occupancy
HW SYS				
Boiler 1	B1_CMD	RO	-	SNVT_switch (state)
Boiler 1 Run Indication	B1_RI	RO	-	SNVT_switch (state)
Boiler 2	B2_CMD	RO	-	SNVT_switch (state)
Boiler 1 Run Indication	B2_RI	RO	-	SNVT_switch (state)
Hot Water Pump 1 Command	HWP1_CMD	RO	°F	SNVT_switch (state)
Hot Water Pump 1 Run Indication	HWP1_RI	RW	-	SNVT_switch (state)
Hot Water Pump 2 Command	HWP2_CMD	RO	°F	SNVT_switch (state)
Hot Water Pump 2 Run Indication	HWP2_RI	RW	-	SNVT_switch (state)
Hot Water Supply Temp	HWS_T	RO	°F	SNVT_temp_p
Hot Water Supply Temp Setpoint	HWS_T_SP	RW	°F	SNVT_temp_p
Hot Water System Hand-Off-Auto	HW_SYS_HOA	RW	-	SNVT_count
Boiler 1 Hand-Off Auto	B1_HOA	RW	-	SNVT_count
Boiler 2 Hand-Off Auto	B2_HOA	RW	-	SNVT_count
Hot Water Pump 1 Hand-Off-Auto	HWP1_HOA	Rw	-	SNVT_count
Hot Water Pump 2 Hand-Off-Auto	HWP2_HOA	RW	–	SNVT_count

D. The following are sequences of operations which will be accomplished by the BMCS. Coordinate with Owner in operating equipment to maximize comfort and economy. All points required to accomplish the sequences will be provided and connected to the BMCS.

3.2 SEQUENCE OF OPERATIONS (GENERAL)

A. Chilled Water Runaround – When outside air temperature is below 35°F. (adjustable), the chilled water pump will start and run continuously through a District installed device (stand alone mechanical thermostat). If the District installed device is not present then the BMCS Contractor shall enable the chilled water pump when the temperature is below 35°F. BMCS Contractor shall open all chilled water valves to 30%. All valves must *FAIL OPEN* with loss of controller power.

B. Hot Water Heating System - When outside air temperature is below 35°F. (adjustable), the hot water system will be enabled to the occupied or night setback mode outside of normal time schedule. Based on DISD board standards the custodian will man the facility and manually open the gas valves and turn the boilers switch from off to on. The BMCS will have this enabled and ready for the custodians arrival. The hot water system will transfer to occupied mode during regular time schedule regardless if outside air temperature is below are above 35°F. (adjustable). The BMCS Contractor shall open all hot water or steam valves to 30%. All valves must *FAIL OPEN* with loss of controller power.

C. Single Zone Packaged DX Rooftop Units and Split Systems (all sizes) – A standalone programmable thermostat shall be provided for each unit by the unit manufacturer. The thermostat shall be a Honeywell 6000 or equal. The BMCS Contractor shall monitor the points shown in the Master SNVT list only (Fan Status, Room Temperature and Discharge Air Temperature). One BMCS programmable controller can be used to monitor multiple units.

D. Chilled Water Systems – The BMCS Contractor shall enable/disable the chiller(s). The corresponding chilled water and condenser water pumps shall be enabled by the chiller and not by the BMCS. All other points in the Master SNVT list shall be provided for monitoring purposes only including pump status, fan status, temperatures, general alarm, etc.

E. Cooling Towers – Cooling tower fans shall be enabled by the chiller control panel and not by the BMCS. No cooling tower 3-way bypass valves shall be utilized as condenser water loop temperature is maintained through a control valve within the chiller. Cooling tower fan status shall be monitored by the BMCS as shown in the Master SNVT list.

F. Dry Bulb Economizers – When an economizer is specified, it shall be a dry bulb type economizer. No enthalpy economizers shall be utilized.

G. Demand Control Ventilation – The use of carbon dioxide sensors for demand control ventilation is an encouraged energy saving strategy. The Design Engineer shall consider this strategy when selecting system components.

H. Fans – Only fans that are necessary for the operation of the HVAC system (i.e. crawlspace exhaust and building relief fans) shall be under BMCS control. All other fans shall be controlled through local switch.

3.3 SOFTWARE INTERFACES BETWEEN THE BMCS AND OTHER SYSTEMS

A. Provide a software interface to the chillers for monitoring purposes only. Chiller enable shall be accomplished through a hardwired point through a relay. Provide a LonWorks

interface between the BMCS and the chiller controller units. Monitor up to 30 points per interface and make available for display on graphics through a CMCS matrix.

B. Provide a software interface to Variable Frequency Drives on pumps for monitoring purposes only. VFDs shall be hardwired for start/stop, run indication, speed command and alarm. Start/stop shall be hardwired through a relay. Monitor up to 10 additional points per interface and make available for display on graphics through a CMCS matrix.

3.4 TRAINING

A. The Contractor shall provide a minimum of sixteen hours of on-site training to discuss the specifics of the installed system. This training shall occur within thirty days of completion of the work. Price lists for additional factory training shall be made available to the owner upon request. After six (6) months of first installation completion, Contractor shall spend one (1) day on-site for training update.

B. Documentation per Section 1.13 shall be provided directly to Dallas ISD Maintenance Department at or prior to training session. Deliver directly to HVAC Department with transmittal to Program Manager. Requirements of record documentation per 1.13 will still need to be issued as part of the closeout requirements.

3.5 COORDINATION

A. For construction project installations where electrical and mechanical contractors are responsible for their respective trade, the electrical contractor is to provide line voltage to required equipment and the mechanical contractor is to install any devices that are to be included in piping systems. It is the controls contractor responsibility to provide all devices with diagrams for location and coordinate with mechanical contractor prior to mechanical contractor starting installations. For installations where controls only, work is provided, all necessary work shall be performed by the controls contractor. Controls Contractor shall coordinate and provide all interface with smoke detectors and fire alarm.

3.6 OTHER REQUIREMENTS

A. Provide wire mold where wiring must run exposed. Obtain advance approval from Architect and Owner before running exposed. Coordinate with Owner and Architect.

B. For all wiring, provide numbering on all terminations (both ends).

C. Label all panels, cans, enclosures, DCU's, and correlate with air conditioning units served. Labeling shall relate to shop drawings and equipment served. Provide wiring diagram inside each enclosure.

D. Provide a rain-tight enclosure for each rooftop unit DCU.

E. This Contractor shall provide a Project Manager with a minimum of 3 years experience with installation and set-up of the equipment of the Bidder/Manufacturer they represent.

F. Locate outdoor air sensors shielded and on northern exposure.

3.7 INSTALLATION REQUIREMENTS

A. Any panels associated with the control system shall be furnished and installed under this section of the work. Panel wiring shall be terminated by connecting to numbered terminals

strips. Wire nut connections shall not be allowed. All wiring shall be color coded and shall be tagged for future identification.

B. Unless otherwise specified, all devices, panels, etc., furnished and/or installed by the Contractor shall be located where they can be calibrated and maintained from the floor without use of a ladder. These items shall be identified by means of plates made of plastic suitably engraved, embossed or punched, plastic tape will not be acceptable. At completion of job, the Contractor shall submit record drawings of any changes made during construction. This submittal shall be a condition of final payment.

C. Any conduit on roof shall be absolute minimum and shall have prior written approval.

D. All conduit used indoor and outdoor shall be metal and shall be of type and fittings to minimize corrosion and moisture entry.

E. Any unit that is mounted on the roof must have the controller panel attached to it or located in a mechanical room. Mounting controllers above ceiling is not acceptable.

3.8 CABLE INSTALLATION AND ATTACHMENTS

A. Control System wiring and equipment installation shall be in accordance with good engineering practices as established by the TIA/EIA and the NEC. Wiring shall meet all state and local electrical codes. All wiring shall test free from all grounds and shorts. All cable shall be supported from the building structure and bundled.

B. The support system shall provide a protective pathway to eliminate stress that could damage the cabling. The cable shall not be crushed, deformed, skinned, crimped, twisted, or formed into tight radius bends that could compromise the integrity of the cabling. Controls cables shall not be run loose on ceiling grid or ceiling tiles. Support shall be provided by mounting appropriate fasteners which may be loaded with multiple cables. Provided that the weight load is carried by the support rod or wire, the support assembly may attach to the ceiling grid for lateral stabilization. The required support wires for the ceiling grid or light fixtures shall not be utilized. Any fastener attached to the ceiling grid shall not interfere with inserting or removing ceiling tiles. All cabling and supports must be positioned at least 12 inches above the ceiling grid.

C. Controls cables shall be run in bundles above accessible ceilings and supported from building structure. Cabling shall be loosely bundled with wire wraps randomly spaced at 30 to 48 inches on center, wire wraps shall not be tight enough to deform cabling and shall not be used to support the cabling.

D. Attachments for cabling support shall be spaced at 48 to 60 inches on center. The cable bundle shall not be allowed to sag more that 12 inches mid-span between attachments. Attachments shall be sized as follows:

Bundles up to 1/2" dia. (Ten 1/4" cables)	2" bridle ring, Caddy #4BRT32 or equivalent
Bundles up to 3/4" dia. (Sixteen 1/4" cables)	3/4" J-Hook, Caddy #CAT12 or equivalent
Bundles up to 1-5/16" dia. (Fifty 1/4" cables)	1-5/16" J-Hook, Caddy #CAT21 or equivalent
Bundles up to 2" dia. (Eighty 1/4" cables)	2" J-Hook, Caddy #CAT21 or equivalent

Split bundles greater that 2" dia. or provide cable tray.

E. Do not mix different signal strength cables on the same J-Hook (i.e. fire alarm, 25 volt speaker cable). Multiple J-Hooks can be on the same attachment point up to the rated weight of the attachment device.

F. Controls cables shall be run in conduit stubs, where stubs are provided, from wall mounted devices to above accessible ceilings. Conduit shall be required only within walls and concealed spaces to provide access. Provide a plastic snap bushing or sleeve on the end of each conduit stub such as Thomas & Betts Catalog no. 443 - 3/4", 424 - 1", 425 - 1 1/4", 427 - 2" or equivalent.

G. Conduit, duct or track shall be used for controls cable in exposed areas.

H. All conduit, ducts, track and raceways shall be supported from the structure at industry standard intervals for the size specified, utilizing proper anchoring devices and techniques for each type of cable used.

I. All penetrations through fire rated walls or floors shall feature a short length of metal conduit. The hole shall be neatly cut, not oversize or irregular. Seal the interior of the conduit sleeve around the cables and around the outside of the sleeve on each side of the penetration with fire-stop caulk or putty, such as Minnesota Mining & Mfg. Co. (3M) - CP 25WB+ caulk, MPS2+ putty, or equivalent. Install according to the manufacturers' instructions.

J. All cabling and equipment shall be located and installed as follows:
   1. All cable shall have a label on both ends utilizing self-laminating, flexible vinyl film and non-smear nylon marking pens. Utilize Tyton Corporation Part No. RO175 Rite-On labels and Part No. FTP1 nylon marking pens or equivalent.
   2. Each cable run shall include a three foot service loop with wire tie located in the ceiling above the control unit panel. This is to allow for future re-termination or repair.
   3. No terminations or splices shall be installed in or above ceilings. Cable shall be continuous from one device termination to the next.
   4. Mount all equipment firmly in place. Route cable in a professional, neat and orderly installation.
   5. All cabling shall be placed with regard to the environment, EMI/RFI (interference) and its effect on communication signal transmission.
   6. Do not route any controls cable within two feet of any light fixture, HVAC unit service access area, electric panel, or any device containing a motor or transformer.
   7. Low voltage controls cable will not be installed in the same conduit, duct or track with line voltage electrical cable.
   8. Maximum pulling tension should not exceed 25 lb/ft. or manufactures recommendation, whichever is less.
   9. Any pulling compounds utilized must be approved by the cable manufacturer and shall not degrade the strength or electrical characteristics of the cable.
   10. Cable bends shall not exceed the manufacturers' suggested bend radius.
   11. Provide for adequate ventilation in all equipment panels.

K. Termination practices:
   1. Strip back only as much cable jacket as required to terminate.
   2. Preserve wire twists as closely as possible to point of termination (0.5" maximum) to keep signal impairment to a minimum.
   3. Avoid twisting cable during installation.

3.9 PROGRAMMING

A. Prior to completion of the control installation, schedule time with Owner's designated representatives to evaluate and select programming options and requirements. Contractor shall provide engineer for such meetings and consultations on an as-needed basis. Preparation time for the conference shall be in addition to the "in conference” time and shall be provided on an as-needed basis without additional cost to the Owner.

B. The Contractor shall also provide additional coordination as needed with the Owner's representative and Engineer to formulate and determine functions, reports, graphics, and alarms most desirable and suitable for the school district and writing the software capability. Programming of these items shall be provided. The Contractor shall program the system using coordinated Owner provided schedules for time of day and holidays.

C. No hardware change shall be required for program changes.

3.9.1.2 HVAC SYSTEM SEQUENCE OF OPERATION

A. These requirements shall apply to all primary HVAC systems unless modified herein. The sequences describe the actions of the control system for one direction of change in the HVAC process analog variable, such as temperature, humidity or pressure. The reverse sequence shall occur when the direction of change is reversed.

B. Supply Fan Operating
   1. HVAC system outside air, return air, and relief air dampers shall function as described for specific modes of operation unless control of the dampers is assumed by the fire and smoke control system. Smoke dampers shall open before fans are allowed to start. Interlocked exhaust fans shall be stopped in the unoccupied and ventilation-delay modes and their dampers shall be closed. Interlocked exhaust fans shall run in the occupied mode, and their dampers shall open.

C. Supply Fan Not Operating
   1. When an HVAC system is stopped, all interlocked fans shall stop, the dampers shall close, the outside air and relief air dampers shall close, the return air damper shall open, all cooling shall stop, all heating shall stop, the system shall pump down if it has a pump down cycle, and all humidification shall stop.

D. Hydronic Heating - Distribution Pump Operating
   1. Hydronic heat-exchanger valves shall be under control.

E. Hydronic Heating - Distribution Pump Not Operating Hydronic heat-exchanger valves shall close.

3.9.1.3 ALL-AIR SMALL PACKAGE UNITARY SYSTEM

A. Microprocessor-based room thermostat with "HEAT-OFF-COOL" and "AUTO-ON" switches shall control the system. The system fan shall run continuously during occupied periods. Heating Mode - Cooling unit shall be off, and heating shall be active. The thermostat shall operate the heater to maintain the setpoints. Cooling Mode - Heating unit shall be off. The thermostat shall operate the condensing unit to maintain the setpoint. Off Mode - The system shall be off.

3.9.1.4 FAN-COIL UNIT

A. Thermostat shall cycle the fan to maintain the setpoint as shown. When the fan is on, the control valve shall modulate the open position to the coil. When the fan is off, the control valve shall close.

3.9.1.5 VARIABLE AIR VOLUME CONTROL SEQUENCE WITHOUT RETURN FAN

A. Air Handling Unit provides either cooling or heating as determined by the DISD Maintenance Department. In the cooling mode the heating system is commanded "OFF", and the cooling

system consisting of a chiller, chilled and condensing water pumps and a cooling tower, is commanded “ON”. In the heating mode a reverse will occur.

B. Supply Fan Control
   1. Occupied - Supply fan shall start, and operate continuously.
   2. Unoccupied Mode - The supply fan shall cycle according to the night setback schedule. The fan shall start and stop at the setpoints as shown.

C. Supply Duct Pressurization Control
   1. When the supply fan starts, the DDC system shall modulate the VFD from the signal of a static pressure sensing element and transmitter to maintain the setpoint as shown. A high limit static pressure switch in the fan discharge shall stop the supply fan and initiate a high static alarm when the static pressure exceeds the setpoint.

D. Filters
   1. A differential pressure switch across each filter shall initiate a filter alarm when the pressure drop across the filter reaches the setpoint as shown.

E. Freeze Protection
   1. A freezestat, located as shown, shall stop the supply fan, cause the outside air, return air, and relief air dampers to return to their normal position, and shall initiate a low temperature alarm if the temperature drops below the freezestat's setpoint as shown. The DDC system shall monitor the freezestat through auxiliary contacts and shall indicate an alarm condition when the freezestat trips.

F. Cooling Coil
   1. Occupied Modes - The cooling coil control valve shall be modulated by the DDC system from the signal of a temperature sensing element and transmitter located in the coil discharge air to maintain the setpoint as shown.
   2. Unoccupied Mode - The cooling coil control valve shall remain closed.

G. Minimum Outside Air Flow Control
   3. Occupied Mode - The minimum outside air damper shall be modulated to maintain the minimum outside air flow at setpoint, as sensed by an air flow measurement station located in the minimum outside air duct.
   4. Unoccupied Modes - The minimum outside air damper shall remain closed.

H. Pressure Independent Terminal VAV Box with Velocity Controller
   1. All Modes - The primary air control damper of the VAV box shall modulate in response to the signal from a flow sensing element at the discharge or inlet of the VAV box to a microprocessor based VAV box velocity controller. The velocity controller shall control the box damper from the minimum flow position to the full flow position from the signal of a space temperature sensing element located as shown. When the space temperature decreases, the damper shall gradually close to the minimum flow position to maintain the cooling setpoint as shown.
   2. Occupied Mode: During this the primary air damper will modulate to maintain the space temperature setpoint On a rise in zone temperature above the cooling setpoint, the primary air damper will increase the CFM. On drop in zone temperature below the heating setpoint, the primary damper will also modulate open to provide a required CFM.
   3. Unoccupied (Night Setback) Mode: When the air handling unit shuts down, all of the VAV box controllers are indexed to unoccupied mode.
   4. The unit shall start a 6.00 AM or as scheduled by the DISD. The primary air damper will be at the minimum CFM. On a rise of a zone temperature above the unoccupied cooling setpoint, the primary air damper will increase the CFM.

3.9.1.6 HYDRONIC HEATING WITH HOT WATER BOILER

A. All Modes
   1. The DDC system shall accept a signal from a sun shielded outside air temperature sensing element and transmitter. The DDC system shall start and stop distribution pump and boiler at the outside air temperatures shown. The DDC system shall reset the hydronic heating supply temperature setpoint in a linear schedule based on the outside air temperature as shown. The DDC system shall accept a signal from a temperature sensing element and transmitter located in the hydronic heating supply line and the DDC system output shall modulate the hydronic heating system control valve to maintain the reset schedule setpoint in the hydronic heating supply line.

B. Occupied Mode
   1. When the system time schedule places the system in the “occupied” mode, a space temperature sensing element and transmitter shall signal the DDC system, which shall maintain the space temperature setpoint by modulating the chilled and heating water coil valves, and primary VAV box dampers.

C. Unoccupied Mode
   1. When the system time schedule places the system in the “unoccupied” mode. The air handling units will shuts down. All of the VAV box controllers will be indexed to unoccupied mode. When the zone temperature is between the unoccupied heating and cooling setpoints, the primary air damper will be at the minimum CFM, the hot water control valve will modulate close. On a of a rise zone temperature above the unoccupied cooling setpoint, the VAV’s primary air damper will increase the air flow., the hot water coil control valve will modulate close On a drop of zone temperature below the unoccupied heating setpoint, the hot water control valve will modulate open, the primary damper primary will modulate open, increasing the air flow.

3.9.1.7 UNIT VENTILATOR

A. An integral thermostat with "HEAT-OFF-COOL" and "AUTO-ON" switches shall control the unit. The fan shall run continuously during occupied periods. Heating Mode – chilled water control valve shall be closed, and heating valve shall be active. The thermostat shall operate the heating water control valve to maintain the setpoints. Cooling Mode – Heating control valve shall be closed. The thermostat shall operate the cooling control valve to maintain the setpoint. Off Mode - The system shall be off as scheduled by DDC system.

3.10 COMMISSIONING

A. The BMCS Contractor shall provide the following items as part of their scope of work to assist the Commissioning Authority (CxA).
   1. Fill out and sign completed construction and startup checklists that will provided by the CxA for each type of HVAC system. Provide completed checklists to CxA.
   2. Provide personnel to assist CxA in the verification of a sample of the checklists. This will include accompanying the CxA for onsite observation and providing access to the necessary programming and graphics during the testing.
   3. Provide personnel to demonstrate that existing systems at the campus are correctly interfaced with the new system.
   4. Provide personnel to assist CxA in the resolution of deficiency items that are identified in the Issues Log as created by the CxA.
   5. Provide an electronic file of the LNS database and a printed xif file to the CxA for coordination with the CMCS Contractor.

6. Provide personnel to attend coordination meeting with CMCS contractor, Engineer, Owner and CxA to coordinate interface with CMCS. This will include at least 1 meeting per campus.
7. Provide list of defined SNVTS that were implemented on the project and additional to the Echelon Standard SNVT guide.

B. The CMCS Contractor shall provide the following items as part of their scope of work to assist the Commissioning Authority (CxA).
1. Provide onsite access to the CMCS, including laptop, to verify the operation of HVAC systems while being manipulated from the CMCS graphical interface.
2. Fill out and sign completed input/output checklists that will provided by the CxA for each type of HVAC system. Provide completed checklists to CxA. The checklists will verify that inputs and outputs from each HVAC system are being passed from the BMCS to the CMCS.
3. Provide personnel to assist CxA in the verification of a sample of the checklists. This will include accompanying the CxA for onsite observation and providing access to the necessary programming and graphics during the testing.
4. Provide personnel to demonstrate that existing systems at the campus are correctly interfaced with the new system.
5. Provide personnel to assist CxA in the resolution of deficiency items that are identified in the Issues Log as created by the CxA.
6. Provide personnel to attend coordination meeting with CMCS contractor, Engineer, Owner and CxA to coordinate interface with CMCS. This will include at least 1 meeting per campus.

COMMISSIONING PROCEDURES

3.10.1.2 EVALUATIONS

A. The Contractor shall make the observations, adjustments, calibrations, measurements, and tests of the control systems, set the time schedule, and make any necessary control system corrections to ensure that the systems function as described in the sequence of operation.

B. Item Check
1. Signal levels shall be recorded for the extreme positions of each controlled device. An item-by-item check of the sequence of operation requirement shall be performed using Steps 1 through 4 in the specified control system commissioning procedures. Steps 1, 2, and 3 shall be performed with the HVAC system shut down; Step 4 shall be performed after the HVAC systems have been started. External input signals to the DDC panel (such as starter auxiliary contacts, and external systems) may be simulated in steps 1, 2, and 3. With each operational mode signal change, DDC panel output relay contacts shall be observed to ensure that they function.

C. Weather Dependent Test Procedures
1. Weather dependent test procedures that cannot be performed by simulation shall be performed in the appropriate climatic season. When simulation is used, the actual results shall be verified in the appropriate season.

D. Two-Point Accuracy Check
1. A two-point accuracy check of the calibration of each HVAC control system sensing element and transmitter shall be performed by comparing the DDC panel readout to the actual value of the variable measured at the sensing element and transmitter or airflow measurement station location. Digital indicating test instruments shall be used, such as digital thermometers, motor-driven psychrometers, and tachometers. The test instruments shall be at least twice as accurate as the specified sensing element-to-DDC panel readout accuracy. The calibration of the test instruments shall be traceable to

National Institute Of Standards And Technology standards. The first check point shall be with the HVAC system in the shutdown condition, and the second check point shall be with the HVAC system in an operational condition. Calibration checks shall verify that the sensing element-to-DDC panel readout accuracies at two points are within the specified product accuracy tolerances. If not, the device shall be recalibrated or replaced and the calibration check repeated.

E. Insertion Temperatures
   1. Insertion temperature sensing elements and transmitter-to-DDC panel readout calibration accuracy shall be checked at one physical location along the axis of the sensing element.

F. Averaging Temperature
   1. Averaging Temperature

3.10.1.3 ALL-AIR SMALL PACKAGED UNITARY

A. The schedules shall be manually entered for day temperature and night temperature setpoints as shown. The fan "AUTO/ON" switch shall be set to "ON." The time shall be manually entered as "DAY." The heating-cooling switch shall be raised to "HEATING" and it shall be ensured that cooling is off. The temperature setpoint shall be raised and it shall be ensured that heating starts. The heating/cooling switch shall be set to "COOLING" and it shall be ensured that heat is off. The temperature setpoint shall be lowered and it shall be ensured that cooling starts. The fan "AUTO/ON" switch shall be set to "AUTO" and the foregoing procedure repeated. The fan shall start and stop automatically with the starting and stopping of heating and cooling. The time shall be manually entered as "NIGHT." The foregoing procedures shall be repeated. When the system is verified as operational, the correct "DAY" and "NIGHT" temperature settings shall be restored and the correct time restored. The power to the thermostat shall be shut off and it shall be verified that the thermostat clock keeps time. The results of testing of one of each type of unit shall be logged.

3.10.1.4 SINGLE ZONE AND VAV SYSTEM

A. Steps for installation shall be as follows:
   1. Step 1 - System Inspection: The HVAC system shall be verified in its shutdown condition. The system shall be checked to see that power and main air are available where required.
   2. Step 2 - Calibration Accuracy Check with HVAC System Shutdown: Readings shall be taken with a digital thermometer at each temperature sensing elements location. Each temperature shall be read at the DDC panel, and the thermometer and DDC panel display readings logged. The calibration accuracy of the sensing element-to-DDC panel readout for outside air, return air, mixed-air, and cooling-coil discharge-air temperatures shall be checked. A motor-driven psychrometer shall be used to check the wet-bulb and dry-bulb temperatures of the discharge air and of the air in the space, and the DDC panel display, the psychrometer, and DDC panel display readings shall be read and logged.
   3. Step 3 - Actuator Range Adjustments: A signal shall be applied to the actuator, through an operator entered value at the DDC panel. The proper operation of the actuators and positioners for all dampers shall be visually verified. The signal shall be varied from live zero to full range, and the actuators travel shall be verified from zero stroke to full stroke within the signal range. It shall be verified that all sequenced and parallel operated actuators move from zero stroke to full stroke in the proper direction, and move the connected device in the proper direction from one extreme position to the other.
   4. Step 4 - Control-System Commissioning:
      a. The two-point calibration accuracy check of sensing element-to-DDC panel readout for the coil discharge air shall be performed. The setpoint for the coil discharge air

temperature shall be set as shown. A change shall be simulated in the coil discharge air temperature through an operator entered value and it shall be verified that the preheater control valve is modulated.

b. The calibration accuracy check for sensing element-to-DDC panel readout for the space temperature shall be performed. Setpoint shall be 70 degrees F at midpoint, 55 degrees F at the low end, and 85 degrees F at the high end. Proper operation of the temperature setpoint device at the space temperature sensing element and transmitter location shall be verified.

c. With the HVAC system running, a filter differential pressure switch input signal shall be simulated at the device. It shall be verified that the filter alarm is initiated. The differential pressure switch shall be set at the setpoint.

d. With the HVAC system running, a smoke detector trip input signal shall be simulated at each detector, and control device actions and interlock functions as described in the Sequence of Operation shall be verified. Simulation shall be performed without false alarming any Life Safety systems. It shall be verified that the HVAC system shuts down and that the smoke detector alarm is initiated. The detectors shall be reset. The HVAC system shall be restarted by manual reset, and it shall be verified that the alarm returns to normal.

3.10.1.5 HYDRONIC HEATING WITH HOT WATER BOILER

A. Steps for installation shall be as follows:

1. Step 1 - System Inspection: The HVAC system shall be observed in its shutdown condition. It shall be verified that power and main air are available where required.
2. Step 2 - Calibration Accuracy Check with HVAC System Shutdown: Readings shall be taken with a digital thermometer at each temperature sensing element location. Each temperature shall be read at the DDC controller, and the thermometer and DDC system readings logged. The calibration accuracy of the sensing element-to-DDC system readout for outside air temperature and system supply temperature shall be checked.
3. Step 3 - Actuator Range Adjustments: A signal shall be applied to the actuator through an operator entered value to the DDC system. The proper operation of the actuators and positioners for all valves shall be verified visually. The signal shall be varied from live zero to full range, and it shall be verified that the actuators travel from zero stroke to full stroke within the signal range. It shall be verified that all sequenced actuators move from zero stroke to full stroke in the proper direction, and move the connected device in the proper direction from one extreme position to the other.
4. Step 4 - Control System Commissioning:
   a. The two-point calibration sensing element-to-DDC system readout accuracy check for the outside air temperature shall be performed. Any necessary software adjustments to setpoints or parameters shall be made to achieve the outside air temperature schedule.
   b. The outside air temperature shall be simulated through an operator entered value to be above the setpoint. It shall be verified that pumps and boiler stop. A value shall be entered to simulate that the outside air temperature is below the setpoint as shown. It shall be verified that pumps start and boiler operates.
   c. The two-point calibration accuracy check of the sensing element-to-DDC system readout for the hydronic system supply temperature shall be performed. The supply temperature setpoint shall be set for the temperature schedule as shown. Signals of 8 ma and 16 ma shall be sent to the DDC system from the outside air temperature sensor, to verify that the supply temperature setpoint changes to the appropriate values.
   d. The control system shall be placed in the occupied mode. The calibration accuracy check of sensing element-to-DDC system readout shall be performed for each space temperature sensor and the values logged. Each space temperature setpoint shall be set as shown. The control system shall be placed in the unoccupied mode, and

it shall be verified that each space temperature setpoint changes to the unoccupied mode setting.

VAV AIR HANDLING UNITS WITH HOT WATER HEATING AND CHILLED WATER COOLING (WITH VFD)

3.10.1.6 SYSTEM OFF - WHEN THE SYSTEM IS OFF:

A. The unit outside air damper will be closed.

B. The supply air fan will be off.

C. The cooling/heating coil valve will be closed.

D. All control loops will be disabled.

3.10.1.7 INITIATION OF SYSTEM START-UP - SYSTEM START-UP WILL BE INITIATED:

A. By an operator manually entered command at the Building Management Control System (BMCS).

B. Automatically by the BMCS based on optimal start, night setup, time schedule, restart following a fire alarm, or restart following a power failure.

3.10.1.8 SYSTEM OPERATION - WHEN SYSTEM START-UP HAS BEEN INITIATED, THE FOLLOWING SEQUENCES WILL BE IMPLEMENTED:

A. The variable speed supply air fans will be controlled as follows:
   1. The variable speed supply air fan will start at its minimum speed. Following an operator assigned time delay, the supply fan speed will be modulated to maintain the duct static pressure setpoint. The speed of the fan will not be adjusted by more than 20 percent of its maximum speed in any one (1) minute period.
   2. The static pressure setpoint will be reset downwards via a control algorithm to optimize the energy usage. The static pressure setpoint will be reset down in operator defined increments at operator defined intervals until such time as the primary air flowrate to one of the associated fan powered terminal units has been below the required value for more than an operator established period of time which will be set initially at one minute (adj.). If the primary air flowrate has been below the required value for more than the operator established period of time, then the static pressure setpoint will be reset up in operator defined increments at operator defined intervals until such time as the required primary air flowrate to all of the associated fan powered terminal units has been achieved.

B. The outside air damper will open to the minimum position once the unit is operating during normal occupied time periods.

C. The chilled water/heating water control valve will be modulated to maintain the required supply air temperature setpoint.

D. If the outside air temperature is between operator-defined limits, then the unit will operate in economizer mode. The outside air damper will be modulated to maintain the supply air temperature setpoint. If the outside air damper is fully open and the supply air temperature cannot be maintained, then the chilled water valve will be modulated to maintain the supply air temperature setpoint.

3.10.1.9 SETPOINTS - THE SETPOINTS FOR THE SYSTEM WILL BE DETERMINED AS FOLLOWS:

A. The supply air temperature setpoint will be set manually by the operator and will be set initially at 55°F.

B. The duct static pressure setpoint will be set by the operator and will be set initially at 0.75 inches w.g. and will have reset limits of 0.25 to 1.0 inches w.g.

C. The time delay for VFD control will be set initially at two (2) minutes.

D. The setpoint for high static shutdown will be set initially at 2.0 inches w.g.

E. The time delay for static pressure reset down will be initially set at 10 minutes.

F. The time delay for static pressure reset up will be initially set at 5 minutes.

G. The static pressure reset down interval will be initially set at 0.05 inches. w.g.

H. The static pressure reset up interval will be initially set at 0.1 inches w.g.

I. Freezestat setpoint will be set at the device for 35°F.

3.10.1.10 INITIATION OF SYSTEM SHUTDOWN - SYSTEM SHUTDOWN WILL BE INITIATED:

A. By operator entered manual command.

B. Automatically by the BMCS when there are no terminal units requiring primary air.

C. High static pressure shut down.

3.10.1.11 ALARMS - THE BMCS WILL GENERATE AN ALARM:

A. If the duct static pressure is outside the operator established low and high alarm limits, initially set at 0.1 and 1.2 inches w.g.

B. If the supply air temperature is outside the operator established low and high limits, which will be set at + or - 4°F. around the current setpoint.

C. All alarms, except the space temperature alarms, will be inhibited when the supply fan is not operating. The alarms, except the fan failure to start and failure in service alarms and the space temperature alarms, will remain inhibited following start-up of the unit for an operator determined period of time initially set at two minutes (adj.).

3.10.1.12 FAILURE POSITIONS - WHEN A BMCS COMPONENT OR POWER FAILURE OCCURS:

A. Supply fan will remain in the last commanded state.

B. The cooling coil/heating coil valve will remain in the last commanded position.

C. The outside air dampers will remain in the last commanded positions.

3.10.1.13 SYSTEM OFF - WHEN THE SYSTEM IS OFF:

A. The primary air damper will be closed.

3.10.1.14 SYSTEM START-UP WILL BE INITIATED:

A. Manually by an operator entered command at the Building Management Control System (BMCS).

B. Automatically when the optimized scheduling program calls for the start-up of a terminal unit.

C. Automatically by the BMCS upon a restart when a fire alarm reset command has been implemented.

D. Automatically by the BMCS upon a restart when a power failure reset has been implemented.

3.10.1.15 WHEN THE TERMINAL UNIT IS IN THE OCCUPIED MODE OF OPERATION:

A. The primary air damper will be sequenced to maintain the occupied space temperature cooling setpoint within + or – 0.5ºF of setpoint.

B. When in a cooling mode, i.e. the space temperature is above the occupied cooling temperature setpoint:
1. The primary air will be modulated between the minimum and maximum primary air flow rates, as detailed on the mechanical documents, using an appropriate control algorithm based on the deviation of the monitored space temperature from the space temperature cooling setpoint. The minimum primary airflow rate will be set to an operator-defined percentage of the maximum primary airflow rate, initially set at 30%.

C. When in a heating mode, i.e. the space temperature is below the occupied heating temperature setpoint:
1. The primary air damper will be positioned to the heating flow rate setpoint.

3.10.1.16 WHEN THE TERMINAL UNIT IS OFF:

A. The primary air damper will be closed.

3.10.1.17 THE SETPOINTS FOR THE TERMINAL UNIT CONTROL WILL BE INITIALLY AS FOLLOWS:

A. The occupied cooling space temperature setpoint will be set initially at 74ºF.

B. The occupied heating space temperature setpoint will be set initially at 71ºF.

C. The unoccupied cooling space temperature setpoint will be set initially at 10ºF. above the occupied cooling space temperature setpoint.

D. The unoccupied heating space temperature setpoint will be set initially at 10ºF. below the occupied cooling space temperature setpoint.

E. The maximum and minimum primary airflow rates will set initially at the values given in the Mechanical Drawings.

F. The unoccupied high and low limits will be set initially at 15ºF. above the cooling space temperature setpoint.

G. A VAV AHU will not be started unless there is a minimum of 5 terminal units operating.

3.10.1.18 THE BMCS WILL GENERATE AN ALARM:

A. If the space temperature in the occupied mode is outside the operator established high/low alarm limit, which will be set initially at +/- 3ºF. around the space temperature setpoint.

END OF SECTION 23 09 24

SECTION 23 31 14 - METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes rectangular, round, and flat-oval metal ducts and plenums for heating, ventilating, and air-conditioning systems in pressure classes from minus 2- to plus 10-inch wg.

B. Related Sections include the following:
1. Division 7 Sections for fire-resistant sealants for use around duct penetrations and fire damper installations in fire-rated floors, partitions, and walls.
2. Division 8 Sections for wall- and ceiling-mounted access doors for access to concealed ducts.
3. Division 10 Sections for intake and relief louvers and vents connected to ducts and installed in exterior walls.
4. Division 23 Section 23 07 13"Thermal Insulation for Ducting" for duct insulation.
5. Division 23 Section "Air Duct Accessories" for dampers, sound-control devices, duct mounted access doors and panels, turning vanes, and flexible ducts.
6. Division 23 Section 23 33 00 "Air Duct Accessories" for constant-volume and variable-air-volume control boxes and reheat boxes.
7. Division 23 Section "Diffusers, Registers, and Grilles."
8. Division 23 Section 23 09 24 "Building Management Control Systems" for automatic volume-control dampers and operators.
9. Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for air balancing and final adjusting of manual-volume dampers.

1.3 DEFINITIONS

A. Thermal Conductivity and Apparent Thermal Conductivity (k-Value): As defined in ASTM C 168. In this Section, these values are the result of the formula Btu x in./h x sq. ft. x deg F or W/m x K at the temperature differences specified. Values are expressed as Btu or W.

1.4 SYSTEM DESCRIPTION

A. Duct system design, as indicated, has been used to select and size air-moving and -distribution equipment and other components of air system. Changes to layout or configuration of duct system must be specifically approved in writing by Architect.

1.5 SUBMITTALS

A. Product Data: For duct liner and sealing materials.

B. Shop Drawings: Show details of the following:
1. Duct layout indicating pressure classifications and sizes on plans.
2. Fittings.
3. Penetrations through fire-rated and other partitions.

C. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:
   1. Ceiling- and wall-mounted access doors and panels required to provide access to dampers and other operating devices.
   2. Coordination with ceiling-mounted items, including lighting fixtures, diffusers, grilles, speakers, sprinkler heads, access panels, and special moldings.

D. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

E. Record Drawings: Indicate actual routing, fitting details, reinforcement, support, and installed accessories and devices.

1.6 QUALITY ASSURANCE

A. Welding Standards: Qualify welding procedures and welding personnel to perform welding processes for this Project according to AWS D1.1, "Structural Welding Code--Steel," for hangers and supports; AWS D1.2, "Structural Welding Code--Aluminum," for aluminum supporting members; and AWS D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

B. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," unless otherwise indicated.

C. Comply with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems," unless otherwise indicated.

D. Comply with NFPA 96, "Ventilation Control and Fire Protection of Commercial Cooking Operations," Chapter 3, "Duct System," for range hood ducts, unless otherwise indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver sealant and firestopping materials to site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multicomponent materials.

B. Store and handle sealant and firestopping materials according to manufacturer's written recommendations.

C. Deliver and store stainless-steel sheets with mill-applied adhesive protective paper maintained through fabrication and installation.

D. Deliver and store all ductwork with protective material until installation. Any material left exposed to moisture and/or particulates shall be removed and replaced.

E. Any installed ductwork or piping system left temporarily incomplete shall be covered with protective material until final connections can be installed.

F. All ductwork and/or liner insulation to be wrapped with protective material until installation. Any ductwork or insulation left exposed to the environment or contaminating particulate matter shall be replaced at the contractor’s expense.

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS

A. Galvanized, Sheet Steel: Lock-forming quality; ASTM A 653/A 653M, G90 (Z275) coating designation; mill-phosphatized finish for surfaces of ducts exposed to view.

B. Reinforcement Shapes and Plates: Galvanized steel reinforcement where installed on galvanized, sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

C. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for 36-inch length or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.2 DUCT LINER

A. General: Comply with NFPA 90A or NFPA 90B and NAIMA's "Fibrous Glass Duct Liner Standard."

B. Materials: ASTM C 1071, ASTM C 665, ASTM G 21 and G22 with coated or composite, abrasion-resistant, cleanable moisture and fire-resistant surface exposed to airstream to prevent erosion of glass fibers and shall be antimicrobial biocide treated to minimize growth of fungus or bacteria.
   1. Thickness/Density: 1 inch, 1-1/2 lb.
   2. Thermal Conductivity (k-Value): 0.26 at 75 deg F mean temperature.
   3. Fire-Hazard Classification: Comply with NFPA 90A and NFPA 90B, maximum flame spread rating of 25 and smoke-developed rating of 50, when tested according to ASTM C 411.
   4. Liner Adhesive: Comply with ASTM C 916.
   5. Mechanical Fasteners: Galvanized steel, suitable for adhesive attachment, mechanical attachment, or welding attachment to duct without damaging liner when applied as recommended by manufacturer and without causing leakage in duct. Mechanical fasteners shall be used assuring no greater than 10% compression of the liner thickness.
      a. Tensile Strength: Indefinitely sustain a 50-lb- tensile, dead-load test perpendicular to duct wall.
      b. Fastener Pin Length: As required for thickness of insulation and without projecting more than 1/8 inch into airstream.
      c. Adhesive for Attaching Mechanical Fasteners: Comply with fire-hazard classification of duct liner system.

C. Minimum sound absorption shall comply with ASTM C423 using Type ‘A’ mounting per ASTM E 795 for 1-inch-thick liner as follows:

Octave Band Frequencies	125	250	500	1000	2000	4000
Absorption Coefficient	0.10	0.28	0.50	0.70	0.82	0.83

Product shall have a minimum NRC value for 1-inch thickness of 0.60.

All fabrication, installation, and application steps shall be in accordance with the requirements of the NAIMA Fibrous Glass Liner Standard, SMACNA HVAC Duct Construction Standard, and in strict accordance with Manufacturer’s recommendations.

D. Product shall be Toughguard Ductliner by CertainTeed or approved equal.

2.3 SEALANT MATERIALS

A. Joint and Seam Sealants, General: The term "sealant" is not limited to materials of adhesive or mastic nature but includes tapes and combinations of open-weave fabric strips and mastics.

1. Joint and Seam Sealant: One-part, non-sag, solvent-release-curing, polymerized butyl sealant, formulated with a minimum of 75 percent solids.
2. Flanged Joint Mastics: One-part, acid-curing, silicone, elastomeric joint sealants, complying with ASTM C 920, Type S, Grade NS, Class 25, Use O.

2.4 HANGERS AND SUPPORTS

A. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for building materials.
   1. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick. Provide letter of approval from structural engineer prior to use.
   2. Exception: Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.

B. Hanger Materials: Galvanized, sheet steel or round, threaded steel rod.
   1. Hangers Installed in Corrosive Atmospheres: Electrogalvanized, all-thread rod or galvanized rods with threads painted after installation.
   2. Straps and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards-Metal and Flexible" for sheet steel width and thickness and for steel rod diameters.

C. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

D. Trapeze and Riser Supports: Steel shapes complying with ASTM A 36/A 36M.
   1. Supports for Galvanized-Steel Ducts: Galvanized steel shapes and plates.

2.5 RECTANGULAR DUCT FABRICATION

A. General: Fabricate ducts, elbows, transitions, offsets, branch connections, and other construction with galvanized, sheet steel, according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible." Comply with requirements for metal thickness, reinforcing types and intervals, tie-rod applications, and joint types and intervals.
   1. Lengths: Fabricate rectangular ducts in lengths appropriate to reinforcement and rigidity class required for pressure classification.
   2. Materials: Free from visual imperfections such as pitting, seam marks, roller marks, stains, and discolorations.

B. Fabricate range hood exhaust ducts with 0.0598-inch- thick, carbon-steel sheet for concealed ducts and 0.0500-inch-thick stainless steel for exposed ducts. Weld and flange seams and joints. Comply with NFPA 96.

C. Fabricate dishwasher hood exhaust ducts with 0.0500-inch- thick stainless steel. Weld and flange seams and joints.

D. Static-Pressure Classifications: Unless otherwise indicated, construct ducts to the following:
   1. Supply Ducts: 3-inch wg.
   2. Return Ducts: 2-inch wg, negative pressure.
   3. Exhaust Ducts: 2-inch wg, negative pressure.

E. Cross Breaking or Cross Beading: Cross break or cross bead duct sides 19 inches and larger and 0.0359 inch thick or less, with more than 10 sq. ft. of unbraced panel area, unless ducts are lined.

2.6 SHOP APPLICATION OF LINER IN RECTANGULAR DUCTS

A. Adhere a single layer of indicated thickness of duct liner with 90 percent coverage of adhesive at liner contact surface area. Multiple layers of insulation to achieve indicated thickness are prohibited.

B. Apply adhesive to liner facing in direction of airflow not receiving metal nosing.

C. Butt transverse joints without gaps and coat joint with adhesive.

D. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted edge overlapping.

E. Do not apply liners in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and standard liner product dimensions make longitudinal joints necessary.

F. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm.

G. Secure liner with mechanical fasteners 4 inches from corners and at intervals not exceeding 12 inches transversely around perimeter; at 3 inches from transverse joints and at intervals not exceeding 18 inches longitudinally.

H. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profile or are integrally formed from duct wall. Fabricate edge facings at the following locations:
   1. Fan discharge.
   2. Intervals of lined duct preceding unlined duct.
   3. Upstream edges of transverse joints in ducts.

I. Terminate liner with duct buildouts installed in ducts to attach dampers, turning vane assemblies, and other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to duct wall with bolts, screws, rivets, or welds. Terminate liner at fire dampers at connection to fire-damper sleeve.

2.7 DOUBLE-WALL DUCT AND FITTING FABRICATION

A. Manufacturers:
   1. Lindlab Inc.
   2. McGill AirFlow Corporation.
   3. SPOT.
   4. GAP.

B. Ducts: Fabricate double-wall (insulated) ducts with an outer shell and an inner duct. Dimensions indicated are for inner ducts.
   1. Outer Shell: Base metal thickness on outer-shell dimensions. Fabricate outer-shell lengths 2 inches longer than inner duct and insulation and in metal thickness specified for single-wall duct.
   2. Insulation: 1-inch-thick fibrous glass, unless otherwise indicated. Terminate insulation where double-wall duct connects to single-wall duct or uninsulated components and reduce outer shell diameter to inner duct diameter.
      a. Thermal Conductivity (k-Value): 0.26 at 75 deg F mean temperature.
   3. Solid Inner Ducts: Use the following sheet metal thicknesses and seam construction:
      a. Ducts 3 to 8 Inches in Diameter: 0.019 inch with standard spiral-seam construction.
      b. Ducts 9 to 42 Inches in Diameter: 0.019 inch with single-rib spiral-seam construction.

c. Ducts 44 to 60 Inches in Diameter: 0.022 inch with single-rib spiral-seam construction.
d. Ducts 62 to 88 Inches in Diameter: 0.034 inch with standard spiral-seam construction.

4. Maintain concentricity of inner duct to outer shell by mechanical means. Prevent dislocation of insulation by mechanical means.

C. Fittings: Fabricate double-wall (insulated) fittings with an outer shell and an inner duct.
1. Solid Inner Ducts: use the following sheet metal thickness:
a. Ducts 3 to 34 Inches in Diameter: 0.028 inch.
b. Ducts 35 to 58 Inches in Diameter: 0.034 inch.
c. Ducts 60 to 88 Inches in Diameter: 0.040 inch.

2.8 ROUND SUPPLY AND EXHAUST FITTING FABRICATION

A. 90-Degree Tees and Laterals and Conical Tees: Fabricate to comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," with metal thicknesses specified for longitudinal seam straight duct.

B. Diverging-Flow Fittings: Fabricate with a reduced entrance to branch taps with no excess material projecting from body onto branch tap entrance.

C. Elbows: Fabricate in die-formed, gored, pleated, or mitered construction. Fabricate bend radius of die-formed, gored, and pleated elbows one and one-half times elbow diameter. Unless elbow construction type is indicated, fabricate elbows as follows:
1. Mitered-Elbow Radius and Number of Pieces: Welded construction complying with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," unless otherwise indicated.
2. Round Mitered Elbows: Welded construction with the following metal thickness for pressure classes from minus 2- to plus 2-inch wg:
a. Ducts 3 to 26 Inches in Diameter: 0.028 inch.
b. Ducts 27 to 36 Inches in Diameter: 0.034 inch.
c. Ducts 37 to 50 Inches in Diameter: 0.040 inch.
d. Ducts 52 to 60 Inches in Diameter: 0.052 inch.
e. Ducts 62 to 84 Inches in Diameter: 0.064 inch.
3. Round Mitered Elbows: Welded construction with the following metal thickness for pressure classes from 2- to 10-inch wg:
a. Ducts 3 to 14 Inches in Diameter: 0.028 inch.
b. Ducts 15 to 26 Inches in Diameter: 0.034 inch.
c. Ducts 27 to 50 Inches in Diameter: 0.040 inch.
d. Ducts 52 to 60 Inches in Diameter: 0.052 inch.
e. Ducts 62 to 84 Inches in Diameter: 0.064 inch.
4. 90-Degree, Two-Piece, Mitered Elbows: Use only for supply systems, or exhaust systems for material-handling classes A and B; and only where space restrictions do not permit using 1.5 bend radius elbows. Fabricate with single thickness turning vanes.
5. Round Elbows, 8 Inches and Smaller: Fabricate die-formed elbows for 45- and 90-degree elbows and pleated elbows for 30, 45, 60, and 90 degrees only. Fabricate nonstandard bend-angle configuration or nonstandard diameter elbows with gored construction.
6. Round Elbows, 9 through 14 Inches: Fabricate gored or pleated elbows for 30, 45, 60, and 90 degrees, unless space restrictions require a mitered elbow. Fabricate nonstandard bend-angle configuration or nonstandard diameter elbows with gored construction.
7. Round Elbows, Larger Than 14 Inches: Fabricate gored elbows, unless space restrictions require a mitered elbow.
8. Die-Formed Elbows for Sizes through 8 Inches and All Pressures: 0.040 inch thick with two-piece welded construction.

9. Round Gored-Elbow Metal Thickness: Same as non-elbow fittings specified above.
10. Pleated Elbows for Sizes through 14 Inches and Pressures through 10-Inch wg: 0.022 inch.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION, GENERAL

A. Duct installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of ducts, fittings, and accessories.

B. Construct and install each duct system for the specific duct pressure classification indicated.

C. Install round ducts in lengths not less than 10 feet, unless interrupted by fittings.

D. Install ducts with fewest possible joints.

E. Install fabricated fittings for changes in directions, changes in size and shape, and connections.

F. Install couplings tight to duct wall surface with a minimum of projections into duct.

G. Install ducts, unless otherwise indicated, vertically and horizontally, parallel and perpendicular to building lines; avoid diagonal runs.

H. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

I. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.

J. Conceal ducts from view in finished spaces. Do not encase horizontal runs in solid partitions, unless specifically indicated.

K. Coordinate layout with suspended ceiling, fire- and smoke-control dampers, lighting layouts, and similar finished work.

L. Electrical Equipment Spaces: Route ductwork to avoid passing through transformer vaults and electrical equipment spaces and enclosures.

M. Non-Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls, and are exposed to view, conceal space between construction opening and duct or duct insulation with sheet metal flanges of same metal thickness as duct. Overlap opening on four sides by at least 1-1/2 inches.

N. Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls, install appropriately rated fire damper, sleeve, and firestopping sealant. Fire and smoke dampers are specified in Division 23 Section "Air Duct Accessories." Firestopping materials and installation methods are specified in Division 7 Sections.

3.2 HANGING AND SUPPORTING

A. Install rigid round and rectangular metal duct with support systems indicated in SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."

B. Support horizontal ducts within 24 inches of each elbow and within 48 inches of each branch intersection.

C. Support vertical ducts at a maximum interval of 16 feet and at each floor.

D. Install upper attachments to structures with an allowable load not exceeding one-fourth of failure (proof-test) load.

E. Install concrete inserts before placing concrete.

F. Install powder-actuated concrete fasteners after concrete is placed and cured per Structural Engineer’s recommendation.

3.3 CONNECTIONS

A. Connect equipment with flexible connectors according to Division 23 Section "Air Duct Accessories."

B. For branch, outlet and inlet, and terminal unit connections, comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."

3.4 FIELD QUALITY CONTROL

A. Disassemble, reassemble, and seal segments of systems as required to accommodate leakage testing and as required for compliance with test requirements.

B. Conduct tests, in presence of Architect, at static pressures equal to maximum design pressure of system or section being tested. If pressure classifications are not indicated, test entire system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure. Give seven days' advance notice for testing.

C. Leakage Test: Perform tests according to SMACNA's "HVAC Air Duct Leakage Test Manual."

D. Maximum Allowable Leakage: Comply with requirements for Leakage Classification 3 for round, Leakage Classification 12 for rectangular ducts in pressure classifications less than and equal to 2-inch wg (both positive and negative pressures), and Leakage Classification 6 for pressure classifications from 2- to 10-inch wg.

E. Remake leaking joints and retest until leakage is less than maximum allowable.

3.5 ADJUSTING

A. Refer to Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for detailed procedures.

3.6 CLEANING

A. After completing system installation, including outlet fittings and devices, inspect the system. Vacuum ducts before final acceptance to remove dust and debris.

END OF SECTION 23 31 14

SECTION 23 33 00 - AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Backdraft dampers.
   2. Manual-volume dampers.
   3. Fire and smoke dampers.
   4. Turning vanes.
   5. Duct-mounted access doors and panels.
   6. Flexible ducts.
   7. Flexible connectors.
   8. Duct accessory hardware.

B. Related Sections include the following:
   1. Division 8 for wall- and ceiling-mounted access doors and panels.
   2. Division 23 Section "Testing Adjusting and Balancing" for constant-volume and variable-air-volume control boxes and reheat boxes.
   3. Division 23 Section "Diffusers, Registers, and Grilles."
   4. Division 23 Section 23 09 24 "Building Management Control System for electric and pneumatic damper actuators.
   5. Division 26 for duct-mounted fire and smoke detectors.

1.3 SUBMITTALS

A. Product Data: For the following:
   1. Backdraft dampers.
   2. Manual-volume dampers.
   3. Fire and smoke dampers.
   4. Duct silencers.
   5. Duct-mounted access doors and panels.
   6. Flexible ducts.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loadings, required clearances, method of field assembly, components, location, and size of each field connection. Detail the following:
   1. Special fittings and manual- and automatic-volume-damper installations.
   2. Fire- and smoke-damper installations, including sleeves and duct-mounted access doors and panels.

C. Product Certificates: Submit certified test data on dynamic insertion loss; self-noise power levels; and airflow performance data, static-pressure loss, dimensions, and weights.

1.4 QUALITY ASSURANCE

A. NFPA Compliance: Comply with the following NFPA standards:
   1. NFPA 90A, "Installation of Air Conditioning and Ventilating Systems."
   2. NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

1.5 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.
   1. Fusible Links: Furnish quantity equal to 10 percent of amount installed.

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS

A. Galvanized, Sheet Steel: Lock-forming quality; comply with all applicable ASTM Standards, G90 (Z275) coating designation; mill-phosphatized finish for surfaces of ducts exposed to view.

B. Reinforcement Shapes and Plates: Galvanized steel reinforcement where installed on galvanized, sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

C. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for 36-inch length or less; 3/8- minimum diameter for lengths longer than 36 inches.

2.2 BACKDRAFT DAMPERS

A. Description: Suitable for horizontal or vertical installations.

B. Frame: 0.052-inch- thick, galvanized, sheet steel, with welded corners and mounting flange.

C. Blades: 0.025-inch-thick, roll-formed aluminum.

D. Blade Seals: Vinyl.

E. Blade Axles: Galvanized steel.

F. Tie Bars and Brackets: Galvanized steel.

G. Return Spring: Adjustable tension

2.3 MANUAL-VOLUME DAMPERS

A. General: Factory fabricated with required hardware and accessories. Stiffen damper blades for stability. Include locking device to hold single-blade dampers in a fixed position without vibration. Close duct penetrations for damper components to seal duct consistent with pressure class.
   1. Pressure Classifications of 3-Inch wg or Higher: End bearings or other seals for ducts with axles full length of damper blades and bearings at both ends of operating shaft.

B. Standard Volume Dampers: Multiple- or single-blade, parallel- or opposed-blade design as indicated, standard leakage rating, with linkage outside airstream, and suitable for horizontal or vertical applications.
   1. Steel Frames: Hat-shaped, galvanized, sheet steel channels, minimum of 0.064 inch thick, with mitered and welded corners; frames with flanges where indicated for attaching to walls; and flangeless frames where indicated for installing in ducts.
   2. Roll-Formed Steel Blades: 0.064-inch-thick, galvanized, sheet steel.
   3. Blade Axles: Galvanized steel.
   4. Tie Bars and Brackets: Galvanized steel.

2.4 FIRE DAMPERS

A. General: Labeled to UL Standards.

B. Fire Rating: One and one-half hours.

C. Fire Rating: One and one-half and three hours.

D. Frame: SMACNA Type B with blades out of airstream; fabricated with roll-formed, 0.034-inchthick galvanized steel; with mitered and interlocking corners.

E. Mounting Sleeve: Factory- or field-installed galvanized, sheet steel.
   1. Minimum Thickness: 0.052 inch or 0.138 inch thick as indicated, and length to suit application.
   2. Exceptions: Omit sleeve where damper frame width permits direct attachment of perimeter mounting angles on each side of wall or floor, and thickness of damper frame complies with sleeve requirements.

F. Mounting Orientation: Vertical or horizontal as indicated.

G. Blades: Roll-formed, interlocking, 0.034-inch- thick, galvanized, sheet steel. In place of interlocking blades, use full-length, 0.034-inch- thick, galvanized steel blade connectors.

H. Horizontal Dampers: Include a blade lock and stainless-steel negator closure spring.

I. Fusible Link: Replaceable, 165 deg F rated as indicated.

2.5 CEILING FIRE DAMPERS

A. General: Labeled to UL Standards; comply with construction details for tested floor- and roof ceiling assemblies as indicated in all applicable UL Standards.

B. Frame: 0.040-inch-thick, galvanized, sheet steel; round or rectangular; style to suit ceiling construction.

C. Blades: 0.034-inch-thick, galvanized, sheet steel with non-asbestos refractory insulation.

D. Volume Adjustment: UL-labeled, fusible volume-control adjustment.

E. Fusible Link: Replaceable, 165 deg F rated.

2.6 SMOKE DAMPERS

A. General: Labeled to UL Standards. Combination fire and smoke dampers shall be labeled for one-and-one-half-hour rating to UL Standards.

B. Fusible Link: Replaceable, 165 deg F rated as indicated.

C. Frame and Blades: 0.064-inch-thick, galvanized, sheet steel.

D. Mounting Sleeve: Factory-installed, 0.052-inch-thick, galvanized, sheet steel; length to suit wall or floor application.

E. Damper Motors: Provide for modulating or two-position action.
   1. Permanent-Split-Capacitor Motors: With oil-immersed and sealed gear trains.
   2. Spring-Return Motors: Equip with an integral spiral-spring mechanism where indicated. Enclose entire spring mechanism in a removable housing designed for service or adjustments. Size for running torque rating of 150 in. x lbf and breakaway torque rating of 150 in. x lbf.
   3. Outdoor Motors and Motors in Outside-Air Intakes: Equip with O-ring gaskets designed to make motors weatherproof. Equip motors with internal heaters to permit normal operation at minus 40 deg F.
   4. Non-spring-Return Motors: For dampers larger than 25 sq. ft., size motor for running torque rating of 150 in. x lbf and breakaway torque rating of 300 in. x lbf.
   5. Two-Position Motor: 115 V, single phase, 60 Hz.

2.7 TURNING VANES

A. Fabricate to comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."

B. Manufactured Turning Vanes: Fabricate of 1-1/2-inch-wide, curved blades set 3/4 inch o.c.; support with bars perpendicular to blades set 2 inches o.c.; and set into side strips suitable for mounting in ducts.

C. Acoustic Turning Vanes: Fabricate of airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.

2.8 DUCT-MOUNTED ACCESS DOORS AND PANELS

A. General: Fabricate doors and panels airtight and suitable for duct pressure class.

B. Frame: Galvanized, sheet steel, with bend-over tabs and foam gaskets.

C. Door: Double-wall, galvanized, sheet metal construction with insulation fill and thickness, and number of hinges and locks as indicated for duct pressure class. Include vision panel where indicated. Include 1-by-1-inch butt or piano hinge and cam latches.

D. Seal around frame attachment to duct and door to frame with neoprene or foam rubber.

E. Insulation: 1-inch-thick, fibrous-glass or polystyrene-foam board.

2.9 FLEXIBLE CONNECTORS

A. General: Flame-retarded or noncombustible fabrics, coatings, and adhesives complying with UL Standards.

B. Standard Metal-Edged Connectors: Factory fabricated with a strip of fabric 3-1/2 inches wide attached to two strips of 2-3/4-inch-wide, 0.028-inch-thick, galvanized, sheet steel or 0.032-inch aluminum sheets. Select metal compatible with connected ducts.

C. Transverse Metal-Edged Connectors: Factory fabricated with a strip of fabric 3-1/2 inches wide attached to two strips of 4-3/8-inch-wide, 0.028-inch-thick, galvanized, sheet steel or 0.032-inch aluminum sheets. Select metal compatible with connected ducts.

D. Conventional, Indoor System Flexible Connector Fabric: Glass fabric double coated with polychloroprene.
   1. Minimum Weight: 26 oz./sq. yd.
   2. Tensile Strength: 480 lbf / inch in the warp, and 360 lbf / inch in the filling.

E. Conventional, Outdoor System Flexible Connector Fabric: Glass fabric double coated with a synthetic-rubber, weatherproof coating resistant to the sun's ultraviolet rays and ozone environment.
   1. Minimum Weight: 26 oz./sq. yd.
   2. Tensile Strength: 530 lbf / inch in the warp, and 440 lbf / inch in the filling.

2.10 FLEXIBLE DUCTS

A. General: Comply with all applicable UL Standards.

B. Flexible Ducts, Insulated: Factory-fabricated, insulated, round duct, with an outer jacket enclosing 1-1/2-inch-thick, glass-fiber insulation around a continuous inner liner.
   1. Reinforcement: Steel-wire helix encapsulated in inner liner.
   2. Outer Jacket: Polyethylene film.
   3. Inner Liner: Polyethylene film.

C. Pressure Rating: 6-inch wg positive, 1/2-inch wg negative.

2.11 ACCESSORY HARDWARE

A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments, and length to suit duct insulation thickness.

B. Splitter Damper Accessories: Zinc-plated damper blade bracket; 1/4-inch, zinc-plated operating rod; and a duct-mounted, ball-joint bracket with flat rubber gasket and square-head set screw.

C. Flexible Duct Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action, in sizes 3 to 18 inches to suit duct size.

D. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install duct accessories according to applicable details shown in SMACNA's "HVAC Duct Construction Standards-Metal and Flexible" for metal ducts.

B. Install volume dampers in lined duct; avoid damage to and erosion of duct liner.

C. Provide test holes at fan inlet and outlet and elsewhere as indicated.

D. Install fire and smoke dampers according to manufacturer's UL-approved written instructions.
   1. Install fusible links in fire dampers.

E. Install duct access panels for access to both sides of duct coils. Install duct access panels downstream from volume dampers, fire dampers, turning vanes, and equipment.
   1. Install duct access panels to allow access to interior of ducts for cleaning, inspecting, adjusting, and maintaining accessories and terminal units.
   2. Install access panels on side of duct where adequate clearance is available.

F. Label access doors according to Division 23 Section "Basic Material and Methods"

G. Provide flexible duct clamps for both inner liner and outer jacket on all flexible ductwork connections to diffusers, terminal units, and metal ductwork.

3.2 ADJUSTING

A. Adjust duct accessories for proper settings.

B. Adjust fire and smoke dampers for proper action.

C. Final positioning of manual-volume dampers is specified in Division 23 Section "Testing, Adjusting, and Balancing for HVAC."

END OF SECTION 23 33 00

SECTION 23 37 13 - DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes ceiling- and wall-mounted diffusers, registers, and grilles.

B. Related Sections include the following:
1. Division 10 for fixed and adjustable louvers and wall vents, whether or not they are connected to ducts.
2. Division 23 Section "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers, registers, and grilles.
3. Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for balancing diffusers, registers, and grilles.

1.3 DEFINITIONS

A. Diffuser: Circular, square, or rectangular air distribution outlet, generally located in the ceiling and comprised of deflecting members discharging supply air in various directions and planes and arranged to promote mixing of primary air with secondary room air.

B. Grille: A louvered or perforated covering for an opening in an air passage, which can be located in a sidewall, ceiling, or floor.

C. Register: A combination grille and damper assembly over an air opening.

1.4 SUBMITTALS

A. Product Data: For each model indicated, include the following:
1. Data Sheet: For each type of air outlet and inlet, and accessory furnished; indicate construction, finish, and mounting details.
2. Performance Data: Include throw and drop, static pressure drop, and noise ratings for each type of air outlet and inlet.
3. Schedule of diffusers, registers, and grilles indicating drawing designation, room location, quantity, model number, size, and accessories furnished.
4. Assembly Drawing: For each type of air outlet and inlet; indicate materials and methods of assembly of components.

B. Coordination Drawings: Reflected ceiling plans and wall elevations drawn to scale to show locations and coordination of diffusers, registers, and grilles with other items installed in ceilings and walls.

1.5 QUALITY ASSURANCE

A. NFPA Compliance: Install diffusers, registers, and grilles according to NFPA 90A, "Standard for the Installation of Air-Conditioning and Ventilating Systems."

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Diffusers, registers, and grilles are scheduled on Drawings.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Kruger.
   2. Titus.
   3. Carnes.
   4. Hart & Cooley.

2.2 SOURCE QUALITY CONTROL

A. Testing: Test performance according to ASHRAE Standards, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install diffusers, registers, and grilles level and plumb, according to manufacturer's written instructions, Coordination Drawings, original design, and referenced standards.

B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practicable. Coordinate device locations with ceiling grid, sprinklers, and lights. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

C. Install diffusers, registers, and grilles with airtight connection to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

3.4 CLEANING

A. After installation of diffusers, registers, and grilles, inspect exposed finish. Clean exposed surfaces to remove burrs, dirt, and smudges. Replace diffusers, registers, and grilles that have damaged finishes.

END OF SECTION 23 37 13

SECTION 23 56 71 - DX CONDENSING UNITS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:
   1. Air-cooled heat pump condensing units.

B. Related Sections include the following:
   1. Division 22 Section 22 05 23 "General Duty Valves for Plumbing and Piping" for valves and accessories for piping connections to units.

1.03 SUBMITTALS

A. Product Data: Include rated capacities; shipping, installed, and operating weights; dimensions; required clearances; methods for assembling components; furnished specialties; accessories; and installation and startup instructions for each model indicated.

B. Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer-installed and field-installed wiring.

C. Maintenance Data: For each condensing unit to include in the maintenance manuals specified in Division 1.
   1. Include a parts list for each condensing unit, control, and accessory; troubleshooting maintenance guide; and servicing and preventive maintenance procedures and schedule.

D. Warranties: Special warranties specified in this Section.

1.04 QUALITY ASSURANCE

A. Listing and Labeling: Provide electrically operated equipment specified in this Section that is listed and labeled.
   1. The Terms "Listed" and "Labeled": As defined in NFPA 70, Article 100.

B. Fabricate and label refrigeration system according to ASHRAE 15, "Safety Code for Mechanical Refrigeration."

C. Comply with NFPA 70.

D. Comply with UL standards.

1.05 COORDINATION

A. Coordinate size and location of concrete housekeeping bases. Cast anchor-bolt inserts into pad. Concrete, reinforcement, and formwork requirements are specified in Division 3.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. Roof specialties are specified in Division 7.

1.06 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Warranty: A written warranty, executed by Contractor and signed by manufacturer, agreeing to replace components that fail in materials and workmanship within the specified warranty period, provided manufacturer's written instructions for installation, operation, and maintenance have been followed.
   1. Warranty Period: Manufacturers standard, but not less than 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide condensing units by one of the following:
   1. Condensing Units, Air Cooled, 1 to 5 Tons:
      a. Carrier Corp.; Carrier Air Conditioning Div.
      b. Trane Co. (The); North American Commercial Group.
      c. York International Corp.

2.02 CONDENSING UNITS, AIR COOLED, 1 TO 5 TONS

A. Description: Factory assembled and tested, air cooled; consisting of compressors, condenser coils, fans, motors, refrigerant reservoirs, and operating controls.

B. Compressor: Hermetically sealed and isolated for vibration.
   1. Motor: Include thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.

C. Condenser: Copper-tube, aluminum-fin coil, with liquid subcooler.

D. Condenser Fan: Direct-drive, aluminum propeller fan; with permanently lubricated fan motor with thermal-overload protection.

E. Accessories include the following:
   1. Low-voltage thermostat and subbase to control condensing unit and evaporator fan.
   2. Pre-charged and insulated suction and liquid tubing. (Provide for installations of 50’ or less.)
   3. Low ambient kit to permit operation down to 45 deg F.
   4. Crankcase heater.
   5. Automatic reset timer to prevent compressor rapid cycle.
   6. Switchover valve.
   7. Outdoor temperature sensor shall provide staging control of electric heaters based on a set outdoor temperature.
   8. Controls to prevent supplementary head operation when the heat pump can meet the heating load.

F. Casing: Steel, finished with baked enamel; with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Mount service valves, fittings, and gage ports on exterior of casing.

2.03 OPTIONS AND ACCESSORIES

A. The following options are to be available, as may be required, and shall be factory supplied and mounted:
1. Hot gas bypass.
2. Electronic condenser fan speed control for low ambient operation to 0 F.

2.04 MOTORS

A. Refer to Division 23 Section 23 05 13 "Common Motor Requirements for HVAC" for general requirements for factory-installed motors.

B. Motor Construction: NEMA MG 1, general purpose, continuous duty, Design B.

2.05 SOURCE QUALITY CONTROL

A. Verification of Performance: Rate condensing units according to ARI Standards.
1. Coefficient of Performance: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."

B. Testing Requirements: Factory test sound-power-level ratings according to ARI Standards.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install condensing units according to manufacturer's written instructions.

B. Install units level and plumb, firmly anchored in locations indicated; maintain manufacturer's recommended clearances.

C. Install ground-mounted units on 4-inch-thick, reinforced concrete base, 4 inches larger than condensing unit on each side. Concrete, reinforcement, and formwork requirements are specified in Division 3. Coordinate installation of anchoring devices.

D. Install roof-mounted units on equipment supports specified in Division 7. Anchor unit to supports with removable fasteners.

3.02 CONNECTIONS

A. Connect pre-charged refrigerant tubing to unit's quick-connect fittings. Install tubing so it does not interfere with access to unit. Install furnished accessories.

B. Connect refrigerant piping to air-cooled condensing units; maintain required access to unit. Install furnished field-mounted accessories.

C. Ground equipment.
1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL Standards.

D. Verify that units are installed and connected according to the Contract Documents.

E. Complete installation and startup checks according to manufacturer's written instructions and do the following:
   1. Inspect for physical damage to unit casing.
   2. Verify that access doors move freely and are weathertight.
   3. Clean units and inspect for construction debris.
   4. Check that all bolts and screws are tight.
   5. Verify that controls are connected and operational.

F. Lubricate bearings on fans.

G. Verify that fan wheel is rotating in the correct direction and is not vibrating or binding.

H. Adjust fan belts to proper alignment and tension.

I. Start unit according to manufacturer's written instructions.

3.03 FIELD QUALITY CONTROL

A. Leak Test: After installation, charge systems with refrigerant and oil and test for leaks. Repair leaks and replace lost refrigerant and oil.

B. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation, product capability, and compliance with requirements.
   1. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Remove and replace malfunctioning units with new units and retest.

3.04 CLEANING

A. After completing system installation, including outlet fittings and devices, inspect exposed finish. Clean units to remove dirt and construction debris and repair damaged finishes.

3.05 DEMONSTRATION

A. Startup Services: Engage a factory-authorized service representative to train Owner's maintenance personnel as specified below:
   1. Train Owner's maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing, and preventive maintenance.
   2. Review data in the maintenance manuals. Refer to Division 1.
   3. Schedule training with Owner, through Architect, with at least 7 days' advance notice.

END OF SECTION 23 56 71

SECTION 23 58 33 - POWER VENTILATORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Ceiling-Mounted Ventilators.
2. Attic Ventilators
3. Motors
4. Factory Finishes
5. Quality Control

B. Related Sections:
1. Section 22 05 48 “Vibration and Seismic Control for Plumbing and HVAC Piping”.
2. Section 23 05 13 “Common Motors Requirements for HVAC Equipment”
3. Section 23 05 93 “Testing, Adjusting, and Balancing for HVAC”
4. Section 26 29 13 “Enclosed Controllers” For motor starters.

1.2 PERFORMANCE REQUIREMENTS

A. Project Altitude: Base air ratings on actual site elevations.

B. Operating Limits: Classify according to AMCA 99.

C. Fan Schedule: The following information is described in an equipment schedule on the Drawings.
1. Fan performance data including capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.
2. Fan arrangement including wheel configuration, inlet and discharge configurations, and required accessories.

1.3 SUBMITTALS

A. Submit “Letter of Conformance” in accordance with Section 01 33 00 “Submittal Procedures” specified items
selected for use in Project with the following supporting data:
1. Product Data including rated capacities of each unit, weights (shipping, installed, and operating), furnished specialties, accessories, and the following:
a. Certified fan performance curves with system operating conditions indicated.
b. Certified fan sound power ratings.
c. Motor ratings and electrical characteristics plus motor and electrical accessories.
d. Material gages and finishes, including color charts.
e. Dampers, including housings, linkages, and operators.
2. Shop Drawings from manufacturer detailing equipment assemblies and indicating dimensions, weights, loadings, required clearances, method of field assembly, components, and location and size of each field connection.
3. Wiring diagrams detailing wiring for power and control systems and differentiating clearly between manufacturer-installed and field-installed wiring.
4. Maintenance data for power ventilators to include in the operation and maintenance manual specified in Division 1 and in Division 23 Section 23 00 50 "Basic Mechanical Materials and Methods."

1.4 QUALITY ASSURANCE

A. Electrical Component Standard: Provide components that comply with NFPA 70 and that are listed and labeled by UL where available.

B. Listing and Labeling: Provide electrically operated fixtures specified in this Section that are listed and labeled.
   1. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.

C. AMCA Compliance: Provide products that meet performance requirements and are licensed to use the AMCA Seal.

D. NEMA Compliance: Provide components required as part of fans that comply with applicable NEMA standards.

E. UL Standard: Provide power ventilators that comply with UL 705.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions by field measurements. Verify clearances.

B. Do not operate fans until ductwork is clean, filters are in place, bearings are lubricated, and fans have been commissioned.

1.6 COORDINATION AND SCHEDULING

A. Coordinate the size and location of structural steel support members.

B. Coordinate the installation of roof curbs, equipment supports, and roof penetrations. Roof specialties are specified in Division 7 Sections.

1.7 EXTRA MATERIALS

A. Furnish extra materials described in Section 01 31 00 “Project Management and Coordination” for Spare Parts and Materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Approved Manufacturers:
   1. Centrifugal Roof Ventilators:
      a. Carnes Co. 9608-845-6411)
      b. Cook (Loren) Co. (417-869-6474)
      c. Greenheck Fan Corp. (715-359-6171)
   2. Attic Ventilators:
      a. Carnes Co. (608-845-6411)
      b. Cook (Loren) Co. (417-869-6474)
      c. Greenheck Fan Corp. (715-359-6171)
   3. Ceiling-Mounted Ventilators:
      a. Carnes Co. (608-845-6411)
      b. Cook (Loren) Co. (417-869-6474)
      c. Greenheck Fan Corp. (715-359-6171)

d. Broan-Nutone (800-548-0790)
e. Matsushita Electric Corp. of America, Panasonic (201-348-7000)

2.2 CENTRIFUGAL ROOF VENTILATORS

A. Description: Belt-driven or direct-drive centrifugal fans, as indicated, consisting of housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, curb base, and accessories.

B. Housing: Removable, spun-aluminum, dome top and outlet baffle; square, one-piece, aluminum base with venturi inlet cone.

C. Fan Wheels: Aluminum hub and wheel with backward-inclined blades.

D. Belt-Driven Drive Assembly: Resiliently mounted to the housing, with the following features:
1. Fan Shaft: Turned, ground, and polished steel drive shaft keyed to wheel hub.
2. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
3. Pulleys: Cast-iron, adjustable-pitch motor pulley.
4. Fan and motor isolated from exhaust air stream.

E. Accessories: The following items are required as indicated:
1. Variable-Speed Controller: Solid-state control to reduce speed from 100 percent to less than 50 percent. (Direct drive fans only).
2. Disconnect Switch: Non-fusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.
3. Bird Screens: Removable 1/2-inch mesh, aluminum or brass wire.
4. Dampers: Counterbalanced, parallel-blade, backdraft dampers mounted in curb base; factory set to close when fan stops.
5. Roof Curbs: Galvanized steel; mitered and welded corners; 2-inch- thick, rigid, fiberglass insulation adhered to inside walls; and 2-inch wood nailer. Size as required to suit roof opening and fan base.
6. Configuration: Built-in cant and mounting flange.
7. Overall Height: 12 inches. Minimum.

2.3 CEILING-MOUNTED VENTILATORS

A. Description: Centrifugal fans designed for installing in ceiling or wall, or for concealed in-line applications.

B. Housing: Galvanized steel lined with acoustical insulation.

C. Fan Wheel: Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel shall be removable for service.

D. Grille: Steel, louvered grille with flange on intake and thumbscrew attachment to fan housing.

E. Electrical Requirements: Junction box for electrical connection on housing and receptacle for motor plug-in.

F. Variable-Speed Controller Mounted on Fan Housing: Solid-state control to reduce speed from 100 percent to less than 50 percent.

G. Sound Level: Maximum of 1.5 Sones in Guestroom Toilets

H. Accessories: Manufacturer's standard roof jack or wall cap, and transition fittings.

2.4 ATTIC VENTILATORS

A. Description: Wall mounted, direct drive, propeller fan consisting of housing, wheel, motor drive, thermostat.

B. Housing: Heavy gauge aluminum dome with insect screen, splash guard, heavy gauge aluminum flashing.

C. Motor Drive: Thermally protected, permanently protected motor.

D. Wheel: Aluminum propeller and hub construction.

E. Thermostat: Single stage line voltage thermostat with 55° to 130° F. range, bimetal actuated.

2.5 MOTORS

A. Refer to Section 15090 "Motors" for general requirements for factory-installed motors.

B. Motor Construction: NEMA MG 1, general purpose, continuous duty, Design B.

C. Enclosure Type: The following features are required as indicated:
1. Open drip proof motors where satisfactorily housed or remotely located during operation.

2.6 FACTORY FINISHES

A. Sheet Metal Parts: Prime coat before final assembly.

B. Exterior Surfaces: Baked-enamel finish coat after assembly.

C. Aluminum Parts: No finish required.

2.7 SOURCE QUALITY CONTROL

A. Testing Requirements: The following factory tests are required as indicated:
1. Sound Power Level Ratings: Comply with AMCA 301, "Methods for Calculating Fan Sound Ratings From Laboratory Test Data." Test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Label fans with the AMCA Seal.
2. Fan Performance Ratings: Establish flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests and ratings according to AMCA 210, "Laboratory Methods of Testing Fans for Rating."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions for compliance with requirements of installation tolerances and other conditions affecting performance of the power ventilators. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install power ventilators according to manufacturer's written instructions.

B. Support units using the vibration-control devices indicated. Vibration-control devices are specified in Section 22 05 48 "Vibration and Seismic Controls for Plumbing and HVAC Piping."

1. Secure roof-mounted fans to roof curbs with cadmium-plated hardware.
   a. Installation of roof curbs is specified in Division 7 Sections.
2. Suspend units from structural steel support frame using threaded steel rods and vibration isolation springs.
3. Ceiling Units: Suspend units from structure using steel wire or metal straps.

C. Install units with clearances for service and maintenance.

D. Label units according to requirements specified in Section 01 31 00 "Project Management and Coordination."

3.3 CONNECTIONS

A. Duct installation and connection requirements are specified in other Division 15 Sections. Drawings indicate the general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors.

B. Electrical: Conform to applicable requirements in Division 26 Sections.

C. Grounding: Ground equipment. Tighten electrical connectors and terminals, including grounding connections, according to manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Provide services of a factory-authorized service representative to supervise the field assembly of components and installation of fans, including duct and electrical connections, and to report results in writing.

3.5 ADJUSTING

A. Adjust damper linkages for proper damper operation.

B. Adjust belt tension.

C. Lubricate bearings.

3.6 CLEANING

A. After completing installation, inspect exposed finish. Remove burrs, dirt, and construction debris, and repair damaged finishes including chips, scratches, and abrasions.
B. Clean fan interiors to remove foreign material and construction debris. Vacuum clean fan wheel and cabinet.

3.7 COMMISSIONING

A. Final Checks before Startup: Perform the following operations and checks before startup:
   1. Verify that shipping, blocking, and bracing are removed.
   2. Verify that unit is secure on mountings and supporting devices and that connections for piping, ducts, and electrical components are complete. Verify that proper thermal overload protection is installed in motors, starters, and disconnects.
   3. Perform cleaning and adjusting specified in this Section.
   4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.

5. Lubricate bearings, pulleys, belts, and other moving parts with factory-recommended lubricants.
6. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in the fully open position.
7. Disable automatic temperature-control operators.

B. Starting procedures for fans are as follows:
1. Energize motor; verify proper operation of motor, drive system, and fan wheel. Adjust fan to indicated RPM.
2. Measure and record motor voltage and amperage.

C. Shut unit down and reconnect automatic temperature-control operators.

D. Refer to Section 23 05 93 "Testing, Adjusting, and Balancing for HVAC" for procedures for air-handling-
system testing, adjusting, and balancing.

E. Replace fan and motor pulleys as required to achieve design conditions.

3.8 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units.
1. Conduct training as specified in Section 01 79 00 "Demonstration and Training”.
2. Train Owner's maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing, and preventive.

END OF SECTION 23 58 33

SECTION 23 62 00 - PACKAGED COMPRESSOR AND CONDENSER UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following rooftop air conditioners:
   1. Cooling and heating units 7-1/2 to 20 tons.

1.3 DEFINITIONS

A. DDC: Direct-digital controls.

1.4 SUBMITTALS

A. Product Data: Include manufacturer's technical data for each model indicated, including rated capacities, dimensions, required clearances, characteristics, furnished specialties, and accessories.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
   1. Design Calculations: Calculate requirements for selecting vibration isolators and for designing vibration isolation bases.
   2. Wiring Diagrams: Power, signal, and control wiring.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For rooftop air conditioners to include in emergency, operation, and maintenance manuals.

E. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Product Options: Drawings indicate size, profiles, and dimensional requirements of rooftop air conditioners and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Code for Mechanical Refrigeration."

D. Energy-Efficiency Ratio: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."

E. Coefficient of Performance: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings." F. Comply with NFPA 54 for gas-fired furnace section.

G. ARI Certification: Units shall be ARI certified and listed.

H. ARI Compliance for Units with Capacities Less Than 135,000 Btuh: Rate rooftop air-conditioner capacity according to ARI 210/240, "Unitary Air-Conditioning and Air-Source Heat Pump Equipment."
   1. Sound Power Level Ratings: Comply with ARI 270, "Sound Rating of Outdoor Unitary Equipment."

I. ARI Compliance for Units with Capacities 135,000 Btuh and More: Rate rooftop air-conditioner capacity according to ARI 340/360, "Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment."
   1. Sound Power Level Ratings: Comply with ARI 270, "Sound Rating of Outdoor Unitary Equipment."

1.6 COORDINATION

A. Coordinate size, location, and installation of rooftop air-conditioner manufacturer's roof curbs and equipment supports with roof installer.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to replace components of rooftop air conditioners that fail in materials or workmanship within specified warranty period.
   1. Warranty Period for Compressors: Manufacturer's standard, but not less than five years from date of Substantial Completion.
   2. Warranty Period for Heat Exchangers: Manufacturer's standard, but not less than 20 years from date of Substantial Completion.
   3. Warranty Period for Control Boards: Manufacturer's standard, but not less than 5 years from date of Substantial Completion.
   4. Warranty Period for Variable-Speed Fan Motors: Manufacturer's standard, but not less than three years from date of Substantial Completion.
   5. Warranty Period for Electronic Thermostats: Manufacturer's standard, but not less than three years from date of Substantial Completion.
   6. Warranty Period for 10-ton and larger units: Manufacturer's standard, but not less than five years to include parts, labor, and refrigerant from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ROOFTOP AIR CONDITIONERS 10 TO 20 TONS

A. Available Manufacturers:
   1. Carrier Corp.
   2. Trane Company (The); North American Commercial Group.
   3. Lennox Industries Inc.

B. Description: Factory assembled and tested; designed for exterior installation; consisting of compressor, indoor and outside refrigerant coils, indoor fan and outside coil fan, refrigeration and temperature controls, filters, and dampers.

C. Casing: Galvanized-steel construction with enamel paint finish, removable panels or access doors with neoprene gaskets for inspection and access to internal parts, minimum 1/2-inch- thick thermal insulation, knockouts for electrical and piping connections, exterior condensate drain connection, and lifting lugs. All exposed vertical panels and top covers in the indoor section shall be insulated with fire-resistant, permanent, odorless, glass fiber material. The base of the downflow unit shall be insulated with a foil-faced, closed cell material.
   1. Provide double wall construction where NC30 noise levels are not to be exceeded.

D. Indoor Fan: Forward curved, centrifugal, belt driven with adjustable motor sheaves, grease-lubricated ball bearings, and motor. Unit shall have a factory installed internal condensate drain connection and sloped stainless steel drain pan.

E. Outside Coil Fan: Propeller type, directly driven by permanently lubricated motor.

F. Refrigerant Coils: Aluminum-plate fin and seamless copper tube in steel casing with equalizing type vertical distributor.

G. Compressor(s): Number as scheduled scroll compressors with integral vibration isolators, internal overcurrent and overtemperature protection, internal pressure relief. H. Refrigeration System:
   1. Compressor(s).
   2. Outside coil and fan.
   3. Indoor coil and fan.
   4. Four-way reversing valve and suction line accumulator.
   5. Expansion valves with replaceable thermostatic elements.
   6. Refrigerant dryers.
   7. High-pressure switches.
   8. Low-pressure switches.
   9. Thermostats for coil freeze-up protection during low-ambient temperature operation or loss of air.
   10. Independent refrigerant circuits.
   11. Brass service valves installed in discharge and liquid lines.
   12. Charge of refrigerant R410A
   13. Hot-Gas Bypass: Factory-installed valve.
   14. Timed Off Control: Automatic-reset control shuts compressor off after five minutes. I. Filters: 2-inch- thick, fiberglass, pleated, throwaway filters in filter rack.

J. Heat Exchanger: Stainless steel construction for natural-gas-fired burners with the following controls:
   1. Redundant dual gas valve with manual shutoff.
   2. Hot surface ignition.
   3. Electronic flame sensor.
   4. Induced-draft blower.
   5. Flame rollout switch.

K. Economizer: Return- and outside-air dampers with neoprene seals, outside-air filter, and hood.
   1. Damper Motor: Fully modulating spring return with adjustable minimum position.
   2. Control: Electronic-control system uses outside-air temperature to adjust mixing dampers.
   3. Relief Damper: Gravity actuated with bird screen and hood.

L. Power Connection: Provide for single connection of power to unit with unit-mounted disconnect switch accessible from outside unit and control-circuit transformer with built-in circuit breaker.

M. Unit Controls: Solid-state control board and components contain at least the following features:
   1. Indoor fan on/off delay.

2. Default control to ensure proper operation after power interruption.
3. Service relay output.
4. Unit diagnostics and diagnostic code storage.
5. Field-adjustable control parameters.
6. Defrost control.
7. Dehumidification control with dehumidistat.
8. Economizer control.
9. Gas valve delay between first- and second-stage firing.
10. Indoor-air quality control with carbon dioxide sensor.
11. Low-ambient control, allowing operation down to 0 deg F.
12. Minimum run time.
13. Night setback mode.
14. Smoke alarm with smoke detector installed in return air.
15. Low-refrigerant pressure control.
16. Digital display of outside temperature, supply-air temperature, return-air temperature, economizer damper position, indoor-air quality, and control parameters.
17. Variable-Air-Volume Control: Variable-frequency drive controls supply-air static pressure. Supply-air, static-pressure limit shuts unit down on high pressure.

N. DDC: Install stand-alone DDC panel. Control panel shall interface via relays to the Building Management and Control System, fan start / stop control, status monitoring, and general alarm monitoring. This requirement is applied to kitchen and gymnasium RTU only. (Refer to TAC Master Control Spec).

O. Optional Accessories:
1. Cold-Weather Kit: Electric heater maintains temperature in gas burner compartment.
2. Service Outlets: Two, 115-V, ground-fault, circuit-interrupter type with dedicated circuit only.
3. Copper condensate drain trap.
4. Dirty-filter switch.
5. Coil guards: Hail guards of steel, painted to match casing..
6. Power exhaust fan centrifugal type.
7. Vertical vent extension.

P. Roof Curb: Steel with corrosion-protection coating, gasketing, and factory-installed wood nailer; complying with NRCA standards; minimum height of 14 inches.

2.2 MOTORS

A. General requirements for motors are specified in Division 23 Section 23 05 13 "Common Motor Requirements for HVAC Equipment."

B. Motor Sizes: Minimum size as indicated; if not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

C. Controllers, electrical devices, and wiring are specified in Division 26 Sections.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units level and plumb, maintaining manufacturer's recommended clearances.

B. Curb Support: Install roof curb on roof structure, level and secure, according to ARI Guideline B. Install and secure rooftop air conditioners on curbs and coordinate roof penetrations and flashing

with roof construction. Secure units to curb support with anchor bolts. C. Isolation Curb Support: Install units on isolation curbs according to ARI Guideline B.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to machine to allow service and maintenance.
   1. Gas Piping: Comply with applicable requirements in Division 23 Section 23 05 19 "Meters and Gages for Plumbing Piping." Connect gas piping to burner, full size of gas train inlet, and connect with union and shutoff valve with sufficient clearance for burner removal and service.
   2. Hot-Water Heating Piping: Comply with applicable requirements in Division 22 Section 22 05 29 "Hangers and Support for Plumbing Piping and Equipment." Connect to supply and return coil tappings with shutoff or balancing valve and union or flange at each connection.

C. Duct installation requirements are specified in other Division 23 Sections. Drawings indicate the general arrangement of ducts. The following are specific connection requirements:
   1. Install ducts to termination in roof curb.
   2. Remove roof decking only as required for passage of ducts. Do not cut out decking under entire roof curb.
   3. Connect supply ducts to rooftop unit with flexible duct connectors specified in Division 23 Section "Air Duct Accessories."
   4. Terminate return-air duct through roof structure and insulate space between roof and bottom of unit with 2-inch- thick, acoustic duct liner.

D. Electrical System Connections: Comply with applicable requirements in Division 26 Sections for power wiring, switches, and motor controls.

E. Ground equipment according to Division 26 Section 26 05 26 "Grounding and Bonding for Electrical Systems."

F. Tighten electrical connectors and terminals according to manufacturer's published torque tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including connections. Report results in writing.

B. Perform the following field quality-control tests and inspections and prepare test reports:
   1. After installing rooftop air conditioners and after electrical circuitry has been energized, test units for compliance with requirements.
   2. Inspect for and remove shipping bolts, blocks, and tie-down straps.
   3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
   4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Remove malfunctioning units, replace with new units, and retest as specified above.

3.4 STARTUP SERVICE

A. Complete installation and startup checks according to manufacturer's written instructions and do the following:
   1. Inspect for visible damage to unit casing.
   2. Inspect for visible damage to furnace combustion chamber.
   3. Inspect for visible damage to compressor, air-cooled outside coil, and fans.
   4. Inspect internal insulation.
   5. Verify that labels are clearly visible.
   6. Verify that clearances have been provided for servicing.
   7. Verify that controls are connected and operable.
   8. Verify that filters are installed.
   9. Clean outside coil and inspect for construction debris.
   10. Clean furnace flue and inspect for construction debris.
   11. Connect and purge gas line.
   12. Adjust vibration isolators.
   13. Inspect operation of barometric dampers.
   14. Lubricate bearings on fan.
   15. Inspect fan-wheel rotation for movement in correct direction without vibration and binding.
   16. Adjust fan belts to proper alignment and tension.
   17. Start unit according to manufacturer's written instructions.
   18. Inspect and record performance of interlocks and protective devices; verify sequences.
   19. Operate unit for an initial period as recommended or required by manufacturer.
   20. Perform the following operations for both minimum and maximum firing and adjust burner for peak efficiency. Adjust pilot to stable flame.
       a. Measure gas pressure on manifold.
       b. Measure combustion-air temperature at inlet to combustion chamber.
       c. Measure flue-gas temperature at furnace discharge.
       d. Perform flue-gas analysis. Measure and record flue-gas carbon dioxide and oxygen concentration.
   21. Calibrate thermostats.
   22. Adjust and inspect high-temperature limits.
   23. Inspect outside-air dampers for proper stroke and interlock with return-air dampers.
   24. Inspect controls for correct sequencing of heating, mixing dampers, refrigeration, and normal and emergency shutdown.
   25. Simulate maximum cooling demand and inspect the following:
       a. Compressor refrigerant suction and hot-gas pressures.
       b. Short circuiting of air through outside coil or from outside coil to outside-air intake.
   26. After startup and performance testing, change filters, vacuum heat exchanger and cooling and outside coils, lubricate bearings, adjust belt tension, and inspect operation of power vents.

3.5 ADJUSTING

A. Adjust initial temperature and humidity set points.

B. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

C. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits (one for winter season and one for summer season) to site outside normal occupancy hours for this purpose, without additional cost.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain rooftop air conditioners. Refer to Division 1 Section "Closeout Procedures, Demonstration and Training."

PART 4 - SCHEDULES

AIR HANDLING UNIT SCHEDULE

MARK	SERVES	CFM	O. A.	E.S.P. W.G.	MOTOR HP	HEATER		COOLING COIL		EAT		LAT		ELECTRICAL DATA		DESIGN BASIS	MODEL NUMBER	NOTES
						V/PH	KW	TOTAL (BTUH)	SENS (BTUH)	DB (°F)	WB (°F)	DB (°F)	WB (°F)	MCA	MOCP			
AHU-5	ADMINISTRATUVE	2000	250	0.4	3/4	208/1	9.6/9.6	57.7	42.4	80	67	58	57	51/43	60/45	TRANE	GAM5B0C60M	1, 2, 3, 4, 5, 6

NOTES
1. SINGLE POINT CONNECTION
2. SEVEN-DAY PROGRAMMABLE THERMOSTAT WITH AUTOMATIC SUMMER/WINTER CHANGE-OVER WITH PLASTIC LOCKING COVER.
3. TXV EXPANSION VALVE
4. REFRIGERANT R-410A
5. DISCONNECT

ROOF TOP UNIT SCHEDULE

MARK	SERVES	EER	OA	O/A CFM	SUPPLY FAN			COMPRESSOR NUMBER	COOLING				HEATING (MBH)		ELECTRICAL				UNIT	DESIGN BASIS	MODEL	NOTES
					CFM	ESP	HP		TOTAL MBH	SENS MBH	EAT	LAT	INPUT	OUTPUT	MCA	MOCP	V/PH	WT. lbs				
SPACK-1,	COMP. LAB	14.2	105 F.	300	2000	0.5	1.0	1	57	46	80/67	55.0/54.8	60	49	12	15	460/3	1000	TRANE	YSC060E4Z	ALL	
RTU-1	COMP. RM	14.2	105 F.	300	2000	0.5	1.0	1	57	46	80/67	55/54.5	60	49	12	15	460/3	1000	TRANE	YSC060E4Z	ALL	
RTU-2	MDF RM	14.2	105 F.	300	2000			1	57	46	80/67	55/54.5	60	49	12	15	460/3	1000	TRANE	YSC060E4Z	ALL	
RTU-5	KITCHEN	12.6	105 F.	400	3000	0.5	1.5	1.5	88	65	80/67	55/54.5	120	96	19.5	30	460/3	1200	TRANE	YSC092E4Z	ALL	

NOTES:
1. FACTORY THERMOSTAT
2. PROVIDE FACTORY ROOF CURB
3. FACTORY DISCONNECT
4. ECONOMIZER

END OF SECTION 23 62 00

SECTION 26 04 99 – ELECTRICAL DEMOLITION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

A. The work required under this Section shall conform to the requirements of "Division 01, General Requirements", "Conditions of the Contract" and "Supplementary Conditions". Specific attention is called to the "Division 26 General Requirements" located in Section 26 05 00.

1.2 WORK INCLUDED

A. Furnish all labor, equipment and materials required to demolish, cap, patch, repair and dispose of the Division 26 systems no longer required as part of an active system of the Project as specified herein and as indicated on the Drawings.

1.3 SCOPE OF WORK

A. It shall be the responsibility of the Contractor to review the Division 23 and 26 Documents to determine the complete scope of work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

A. Under this Division, the Contractor shall furnish all labor, equipment, appliances, and materials to perform all operations in connection with the demolition of the Division 26 systems as indicated on the Drawings and as specified herein and/or as required by the Local Building Code. The work shall include but not be limited to the following:

1. Unless noted otherwise, all indicated existing electrical equipment within the building shall be demolished. The contractor shall review the existing conditions, and the Division 23/26 documents, to determine the complete scope of work.
2. The demolition work shall be coordinated with the engineering scope of the Project to assure proper limits of demolition.
3. Remove all existing electrical equipment, busways, conduit, raceways, light fixtures, wiring and associated equipment within the area to be demolished, whether specifically indicated or not, that is no longer required unless otherwise indicated.
4. Openings remaining in enclosures as a result of demolition shall be sealed with sheet metal cap or other approved appropriate means, unless otherwise indicated.
5. Where existing equipment is to be relocated, extreme care shall be taken to prevent damage during the removal and reinstallation. Where damage occurs, the equipment shall be replaced or repaired to the satisfaction and approval of the Engineer at no additional cost to DISD.
6. Contractor shall be responsible for cutting, patching and restoration of existing finishes.
7. Contractor shall be responsible for removal, disposal and salvage of equipment from job site.
8. Contractor shall be responsible for cleaning, testing and repair of existing equipment to be reused.

B. Where a system to be demolished must remain operational throughout the construction process until a new system that will take its place is functional, the contractor shall provide all products, services, materials, labor and supervision to maintain the operational status of the affected system.

3.2 EXISTING CONDITIONS

A. Under the scope of work, the Contractor shall perform a comprehensive field inspection of the existing conditions to thoroughly familiarize himself with the Project and determine the complete scope of new and demolition work. The Contractor shall verify in the field exact sizes, capacities, and locations of all existing equipment prior to installation of any proposed work. Proposed work shall be coordinated with existing conditions to assure proper installation. This field survey and determination of the complete scope of work shall be performed prior to the final bid. Specific attention is brought to physically larger and heavy pieces of equipment that are new to be installed or existing to be removed and the routing of such equipment with the available means and site conditions.

3.3 CONFLICTS AND DEPARTURES

A. Conflicts: The Contractor shall remove all existing electrical equipment and associated accessories whether specifically indicated or not, that are no longer required. Any equipment which must remain as part of an active system and is in conflict with the proposed work shall be relocated at no additional expense. There shall be no additional expense to DISD for this type of demolition work, unless, in the Engineer's and DISD's opinion, it is beyond the scope and intent of the Contract Documents.

B. Departures: The Contract Drawings are diagrammatic and schematic in nature and do not indicate inferred details. Any departures from the Drawings that are necessary to comply with the intent of Documents, requirements of applicable Building Codes or the Authority having jurisdiction shall be detailed in the form of shop drawing submittal data and submitted for review by the Engineer and Engineer. All demolition and any such revisions for departures shall be made in accordance with the reviewed shop drawings without increased expense to DISD. Departures shall not be made without prior written approval by the Engineer.

3.4 COOPERATION

A. The Contractor shall comply with all the requirements of the Local Authorities having jurisdiction and DISD building.

B. The Contractor shall give advance notice to the Engineer when work is to be performed.

C. The Contractor shall cooperate, and coordinate demolition of Division 26 systems as required with all of other trades. The Contractor shall supervise and assist in the removing and replacing of existing materials for installation of electrical items and items related to all other trades.

3.5 OCCUPIED AREAS

A. Normal functions of occupied areas must continue during the construction phases. Every effort shall be made to ensure such functions are not disturbed. The Contractor shall be responsible for the installation and removal of temporary systems as required to maintain the functions of occupied areas. The Contractor shall schedule any work which may be required in occupied areas during unoccupied hours.

3.6 BARRIERS

A. Where required by applicable health and safety regulations, the Contractor shall furnish and maintain safety and dust barriers. If necessary, the Contractor shall furnish and maintain temporary fencing and traffic barriers in accordance with all applicable health and safety regulations and as deemed necessary.

3.7 RESTORATION

A. Demolition shall be carried out with caution to assure that existing conditions to remain will be undamaged. Existing conditions to remain that are damaged or defaced by work under this contract shall be restored or replaced equal to the conditions at the time of award of the Contract.

B. Cut, patch, and restore all existing surfaces not receiving new finishes that have been disturbed during execution of this Contract. Materials and finishes used shall be similar, in all respect, to adjacent surfaces.

C. Existing conduit and wiring which are to remain as part of an existing or proposed active system that the Contractor determines to be defective shall be brought to the attention of the Engineer.

D. Existing equipment to be removed shall be cleaned, repaired, and reused at the discretion of the Engineer wherever applicable.

3.8 CONNECTIONS

A. Connections to existing work shall be similar, in all respects, to the existing system and conditions unless otherwise indicated. Existing work shall be altered and/or temporarily removed and replaced as required for completion of requirements of the project.

3.9 SALVAGE

A. DISD assumes no responsibility for loss or damage to materials or structures on site for the salvage value of equipment which the Contractor may have reflected in his bid.

B. All existing electrical equipment, conduit and wiring removed during construction no longer required as part of an active system and not to be reused shall be properly returned to DISD.

3.10 CLEANING

A. The Contractor shall clear away all debris and demolished material at frequent intervals. The Contractor shall not allow debris to accumulate to the extent that it will interfere with work, passage of the workmen, and the operation of the existing occupied areas.

B. It is the intent of this Specification that all work, including the inside of equipment, be left in a clean condition. All construction dirt shall be removed from material and equipment.

3.11 INVENTORY

A. Contractor shall provide a detailed inventory of all existing electrical equipment including switchboards, disconnects, panelboards, motor starters, etc. to be stored for later reuse. Inventory shall include type, size, capacities, and quantities of each item or piece of equipment.

3.12 TESTING

A. Equipment: Existing equipment, instruments, and accessories to remain shall be tested for defects and shall be adjusted, repaired or replaced where required. Conditions, qualifications, and procedures regarding adjustments, reparations, or replacement of existing equipment as deemed necessary by the Contractor shall be submitted to the Engineer for approval. The Contractor shall not proceed with equipment replacement without the written approval of the Engineer. The Engineer shall determine whether replacement is required and shall specify the replacement equipment to be used.

B. Additional Requirements: For busway, conductors, panelboards, switchboards, etc., refer to the appropriate Specification Section for testing requirements and additional requirements of existing equipment and systems to be a part of the new active systems.

3.13 QUALIFICATIONS

A. Only Contractors, Subcontractors, and workmen experienced and regularly engaged in the demolition of mechanical, plumbing, and electrical systems shall be permitted to perform the demolition of existing systems.

END OF SECTION 26 04 99

SECTION 26 05 00 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

A. The General Provisions, Supplemental General Provisions, Special Provisions, Division 1 Specification Sections and all relevant documents shall form a part of this Division of the Specifications and shall be incorporated in this Section and each Division 26 Section hereinafter as if repeated verbatim herein. All conditions imposed by these documents shall be applicable to all portions of the work under this Division. Certain specific paragraphs of said references may be referred to hereinafter in this Division. These references are intended to point out specific items to the Contractor, but in no way relieve him of the responsibility of reading and complying with all relevant parts of the entire Specification.

B. The Contractor shall examine and coordinate with all Contract Drawings and Specifications, and all Addenda issued. Failure to comply shall not relieve him of responsibility. The omission of details of other portions of the work from this Division shall not be used as a basis for a request for additional compensation.

C. The specific features and details for other portions of the work related to the construction in progress or to the adjacent building shall be determined by examination at the site.

1.2 DESCRIPTION

A. The requirements contained in this Section apply to all work performed under Division 26 of these Specifications.

B. The work covered by this Division of the Specifications comprises the furnishing of labor, material, equipment, transportation, tools, and services, and performing operations required for, and reasonably incidental to, the installation of the work in accordance with the applicable Contract Documents, and subject to the terms and conditions of the Contract.

C. Refer to other Divisions of the Specifications for related work.

1.3 DEFINITION OF "CONTRACTOR"

A. Where the word "Contractor" is used under any Section of this Division of the Specifications, it shall mean the Contractor engaged to execute the work included under that Section, even though this Contractor may be technically described as a Subcontractor, or an authorized representative.

B. If the Contractor, engaged to execute a portion of the work, employs a Subcontractor to perform some of that work, he shall be completely responsible for the proper execution of this Subcontractor’s work, in full conformity with the Contract Documents.

1.4 RESPONSIBILITY OF THE CONTRACTOR

A. The Contractor shall be responsible for all work of every description in connection with this Division of the Specifications. The Contractor shall specifically and distinctly assume, and does so assume, all risk for damage or injury from whatever cause to property or person used

or employed on or in connection with this work and of all damages or injury to any person or property wherever located, resulting from an action or operation under the Contract in connection with the work, and undertake the responsibility to defend DISD against all claims on account of any such damage or injury.

B. The Contractor will be held responsible for the satisfactory execution and completion of the work in accordance with the true intent of the Contract Documents. The Contractor shall provide without extra charge all incidental items required as part of the work, even though it may not be specifically indicated. If the Contractor has reason for objecting to the use of any material, equipment, device, or method of construction as indicated, the Contractor shall make report of such objections to the DISD's Representative, obtain proper approval and adjustment to the Contract, and shall proceed with the work.

1.5 TERMINOLOGY

A. Whenever the words "furnish", "provide", "furnish and install", "provide and install", and similar phrases occur, it is the intent that the materials, equipment, and devices described be furnished, installed and connected under this Division, complete for operation, unless specifically noted to the contrary.

B. It is also the intent, unless specifically noted to the contrary, that all materials, equipment and devices described and specified under this Division of the Specifications be similarly furnished, installed and connected under this Division, whether or not a phrase as described in the preceding paragraph has been actually included.

C. Whenever the words “DISD’s Representative” occurs, it is intended to refer to the Architect, Engineer and/or specific DISD’s Representative responsible for or capable of providing the necessary direction pertaining to the referenced issue.

1.6 ORDINANCES, PERMITS AND CODES

A. It shall be the Contractor's duty to perform the work and provide the materials covered by these specifications in conformance with all ordinances and regulations of all authorities having jurisdiction.

B. All work herein shall conform to all applicable laws, ordinances, and regulations of the local utility companies.

C. The Contractor shall obtain and pay for all permit and connection fees as required for the complete installation of the specified systems, equipment, devices, and materials.

D. The Contractor shall obtain permits, plan checks, inspections, and approvals applicable to the work as required by the regulatory authorities. Fees and costs of any nature whatsoever incidental to these permits, inspections and approvals shall be assumed and paid by the Contractor. The prorata costs, if any, for utilities serving this property will be paid for by DISD and shall not be included as part of this Contract.

E. The work shall be in accordance with, but shall not be limited to, the requirements of:
1. National Fire Protection Association
2. National Electrical Code
3. National Safety Code
4. State of Texas Safety Code
5. City of Dallas Building Codes
6. State of Texas Building Codes

F. Codes and standards referred to are minimum standards. Where the requirements of the Drawings or Specifications exceed those of the codes and regulations, the Drawings and Specifications govern.

1.7 MATERIALS, EQUIPMENT AND DEVICE DESCRIPTION

A. Materials, equipment, and devices shall be of the best quality customarily applied in quality commercial practice and shall be the products of reputable manufacturers. Each major component shall bear a nameplate giving the name and address of the manufacturer, and the catalog number or designation of the component.

B. Materials, equipment, and devices furnished under this Division of the Specifications shall be essentially the standard product of the specified manufacturer, or where allowed an alternate manufacturer. Where two or more units of the same kind or class of a specific item are required, these shall be the products of a single manufacturer; however, the component parts of the item need not be the products of one manufacturer.

C. In describing the various materials, equipment, and devices, in general each item will be described singularly, even though there may be a multiplicity of identical items. Also, where the description is only general in nature, exact sizes, duties, space arrangements, horsepower requirements and other data shall be determined by reference to the Contract Documents.

D. Space allocations for materials, equipment and devices have been made on the basis of present and known future requirements and the dimensions of items of equipment or devices of a particular manufacturer whether indicated or not. The Contractor shall verify that all materials, equipment, and devices proposed for use on this project are within the constraints of the allocated space.

1.8 QUALITY ASSURANCE

A. Materials, equipment and devices shall be new and of the quality specified and shall be free from defects at the time of installation. Materials, equipment, and devices damaged in shipment or otherwise damaged or found defective prior to acceptance by DISD shall not be repaired at the job site, but shall be replaced with new materials, equipment or devices identical with those damaged, unless specifically approved otherwise by the DISD's Representative.

B. Wherever a UL standard has been established for a particular type of material, equipment or device, each item of such material, equipment or device provided on this project shall meet the requirements of the UL standard in every way and shall be UL listed and labeled.

1.9 REFERENCE STANDARDS

A. Materials, equipment, devices, and workmanship shall comply with applicable local, county, state and national codes, laws and ordinances, utility company regulations and industry standards.

B. In case of differences between building codes, state laws, local ordinances, industry standards, utility company regulations and the Contract Documents, the most stringent shall govern. The Contractor shall promptly notify the DISD's Representative in writing of any such difference. Should the Contractor perform any work that does not comply with local codes, laws and ordinances, industry standards or other governing regulations, the work shall be corrected of noncompliance deficiencies with the Contractor bearing all costs.

C. In addition to the aforementioned ordinances, industry standards published by the following organizations shall apply:

AABM - American Association of Battery Manufacturers
ADA - Americans with Disabilities Act
AIA - American Institute of Architects
ANSI - American National Standards Institute
ASTM - American Society for Testing and Materials
CBM - Certified Ballast Manufacturers Association
ETL - Electrical Testing Laboratories
FM - Factory Mutual
ICEA - Insulated Cable Engineers Associated
IEEE - Institute of Electrical and Electronic Engineers
IES - Illuminating Engineering Society
IRI - Industrial Risk Insurance
NBS - National Bureau of Standards
NEC - National Electrical Code
NECA - National Electrical Contractors Association
NEMA - National Electrical Manufacturers Association
NESC - National Electrical Safety Code
NETA - National Electrical Testing Association
NFPA - National Fire Protection Association
UL - Underwriters Laboratories

D. Where the Contract Documents exceed the above requirements, the Contract Documents shall govern. In no case shall work be installed contrary to or below the minimum legal standards.

1.10 DRAWINGS AND SPECIFICATIONS

A. The interrelation of the Drawings (including the schedules) and the Specifications are as follows:
1. The Drawings establish quantities, locations, dimensions and details of materials, equipment, and devices. The schedules on the Drawings indicate the capacities, characteristics, and components.
2. The Specifications provide written requirements for the quality, standard and nature of the materials, equipment, devices, and construction systems.

B. The Drawings and Specifications shall be considered as being compatible; therefore, the work called for by one and not by the other shall be furnished and installed as though called for by both.
Resolution of conflicts between Drawings and Specifications shall be as follows:
1. If the Drawings and Specifications disagree in themselves, or with each other, the Contractor's pricing shall be based on furnishing and installing the most expensive combination of quality and quantity of work indicated. In the event of this type of disagreement, the resolution shall be determined by the DISD's Representative.
2. The Contractor shall be responsible for bringing any conflicts in the Drawings and the Specifications to the attention of the DISD's Representative immediately, prior to any work being performed.
3. In general, if there is conflict between the Drawings and Specifications, the Drawings shall govern the Specifications.
4. Where the Specifications do not fully agree with schedules on the Drawings, the schedules shall govern. Actual numerical dimensions indicated on the Drawings govern scale measurements and large-scale details govern small scale drawings.
5. Materials, equipment, and devices called for on the Drawings and not indicated herein, shall be completely provided, and installed as though it were fully described herein.
6. Materials, equipment, and devices called for herein shall be completely provided and installed, whether or not it is fully detailed, scheduled or indicated on the Drawings.

C. The Contractor shall examine the Drawings and Specifications of the other portions of the work for fixtures and finishes in connection with this work. The Contractor shall carefully examine the Drawings to determine the general construction conditions and shall familiarize himself with all limitations caused by such conditions.

D. When discrepancies exist between scale and dimension, or between the Drawings of the various portions of the work, they shall be called to the attention of the DISD's Representative for further instruction, whose instructions shall be final, and binding and work promptly resumed without any additional cost to DISD.

E. Review the construction details of the building(s) as illustrated on the Drawings of the other portions of the work, i.e., architectural, structural, civil, landscape, etc., and be guided thereby. Route conduits and set all boxes as required by the pace of the general construction.

F. The Drawings diagrammatically show the sizes and locations of the various equipment and devices, and the sizes of the major interconnecting wires, without showing exact details as to elevations, offsets, control wiring and other installation requirements. Carefully layout the work at the site to conform to the architectural and structural conditions, to avoid obstructions and to permit proper grading of pipe associated with other portions of the work. In cooperation with other Contractors, determine the exact location of equipment and devices and connections thereto by reference to the submittals and rough-in drawings, and by measurements at the site. Make minor relocations necessitated by the conditions at the site, or directed by the DISD's Representative, without additional cost to DISD.

G. The Drawings and Specifications are intended to describe and illustrate systems which will not interfere with the structure of the building(s), fit into the available spaces, and insure complete and satisfactory operating installations. Prepare installation drawings as required for all critical areas illustrating the installation of the work in this Division as related to the work of all other Divisions and correct all interferences with the other portions of the work or with the building structures before the work proceeds.

H. The Drawings do not indicate the existing electrical installations other than to identify modifications or extensions thereto. Visit the site and ascertain the conditions to be met and the work to be accomplished in removing and modifying the existing work, and in installing the new work. Failure to comply with this shall not constitute grounds for any additional payment in connection with removing or modifying any part of the existing installation or installing any new or temporary work under this Division.

1.11 SUBMITTALS

A. Submit product data and shop drawings in accordance with Division 1 of the Specifications.

B. Process product data and shop drawings to ensure that the proposed materials, equipment and devices conform to the requirements of the Contract Documents, and that there are no omissions or duplications. Provide layouts, fabrication information and data for systems, materials, equipment, and devices proposed for the project.

C. Submittals shall be provided for review and approval on all systems, equipment, devices, and materials proposed for use on this project. Submittals shall include, but not be limited to, the following:
1. Lighting and Appliance Panelboards
2. Distribution Panelboards
3. Transformers
4. Disconnect Switches

5. Circuit Breakers and Fuses
6. Materials: conduit, conductors, connectors, supports, etc.
7. Lighting Fixtures, Lamps, and Control Systems/Devices
8. Wiring Devices

D. The product data shall not consist of manufacturer's catalogs or cut sheets that contain no indication of the exact item offered. The submission on individual items shall designate the exact item offered.

E. Do not submit detailed quantitative listings of materials, equipment, and devices. It is the Contractor's responsibility to provide proper sizes and quantities to conform with Contract Documents.

F. Assemble submittals on related items procured from a single manufacturer in bound brochures or other suitable package form, rather than submitting a multiplicity of loose sheets.

G. Prepare shop drawings whenever equipment proposed varies in physical size and arrangement from that indicated thus causing rearrangement of equipment space, where tight spaces require extreme coordination between this work and other work, where called for elsewhere in these Specifications and where specifically requested by the DISD's Representative. Shop drawings shall be prepared at a scale of not less than 1/4-inch equals 1 foot.

H. The Contractor shall sign the submittal as an indication of compliance with the Contract Documents. If there are any deviations from the Contract Documents, he shall so indicate on the submittal. Any deviations not so indicated shall be cause for rejection and removal of the noncomplying equipment at the Contractor’s expense.

1.12 SUBSTITUTIONS

A. Where a single manufacturer is mentioned by trade name or manufacturer's name, unless specifically noted otherwise, it is the only manufacturer that will be accepted.

B. Where multiple manufacturers are listed, none other than those manufacturers will be accepted.

C. Manufacturers not listed will be considered for substitution prior to bid only. The substitute manufacturer shall submit a complete copy of the appropriate technical specification section minimum seven (7) business days prior to bid with each sub-paragraph noted with the comment, "compliance", "deviation", "alternate" or “not applicable”. In the case of non-primary, vendor supplied items, the name of the sub-vendor supplying said item, including model number, shall be indicated.
1. By noting the term "compliance" or "C", it shall be understood that the manufacturer is in full compliance with the item specified and will provide exactly the same with no deviations.
2. By noting the term "deviation" or "D", it shall be understood that the manufacturer prefers to provide a different component in lieu of that specified. Manufacturer shall indicate all deviations.
3. By noting the term "alternate" or "A", it shall be understood that the manufacturer proposes to provide the same operating function but prefers to do it in a different manner. An alternate shall be fully described as to what the manufacturer proposes to provide.
4. By noting the term “not applicable” or “N/A”, it shall be understood that the specified item is not applicable to the project.

D. It shall be understood that space allocations have been made on the basis of present and known future requirements and the dimensions of items of equipment or devices of a particular manufacturer whether indicated or not. If any item of equipment or device is offered in substitution which differs substantially in dimension or configuration from that indicated on the Drawings or specifications, provide as part of the submittal 1/4-inch equals 1 foot scaled drawings showing that the substitute can be installed in the space available without interfering with other portions of the work or with access for operations and maintenance in the completed project.

E. Where substitute equipment or devices requiring different arrangement or connections from that indicated is accepted by the DISD's Representative, install the equipment or devices to operate properly and in harmony with the intent of the Contract Documents, making all incidental changes in piping, ductwork or wiring resulting from the equipment or device selection without any additional cost to DISD. The Contractor shall pay all additional costs incurred by other portions of the work in connection with the substituted equipment or device.

F. DISD's Representative reserves the right to call for samples of any item of material, equipment or device offered in substitution, together with a sample of the specific item when, in their opinion, the quality of the item and/or the appearance is involved, and it is deemed that an evaluation of the item may be better made by visual inspection.

G. When any request for a substitution of material, equipment or device is submitted and rejected, the item named in the Contract Documents shall be furnished. Repetitive submittal of substitutions for the same item will not be considered.

1.13 INSTALLATION DRAWINGS

A. Prepare installation drawings for coordinating the work of this Division with the work of other Divisions, to illustrate its concealment in finished spaces, to avoid obstructions, and to demonstrate the adaptability of any item of material, equipment or device in the space upon which the Contract Documents are based.

B. Use these drawings in the field for the actual installation of this work. Provide three (3) copies, not for approval, to DISD's Representative for his information, review, and record.

1.14 WORKMANSHIP AND INSTALLATION

A. In no case shall the Contractor provide a class of material, equipment, device, or workmanship less than that required by the Contract Documents or applicable codes, regulations, ordinances or standards. All modifications which may be required by a local authority having legal jurisdiction over all or any part of the work shall be made by the Contractor without any additional charge. In all cases where such authority requires deviations from the requirements of the Drawings or Specifications, the Contractor shall report same to DISD's Representative and shall secure his approval before the work is started.

B. The work shall be performed by properly licensed technicians skilled in their respective trades. All materials, equipment and devices shall be installed in accordance with the recommendations of the manufacturer and in the best standard practice to bring about results of a first-class condition.

C. The NECA "Standards of Installation" as published by the National Electrical Contractors Association shall be considered a part of these Specifications, except as specifically modified by other provisions contained in these Specifications.

1.15 INSPECTION OF SITE

A. The accompanying drawings do not indicate existing installations other than to identify modifications of and extensions thereto. The Contractor shall visit the site, inspect the installations, and ascertain the conditions to be met and the work to be performed. Failure to comply with this shall not constitute ground for any additional payments in connection with removing or modifying any part of the existing installations and/or installing any new work under this Division.

B. Review construction details of the adjacent building presently under construction during the site inspection and include all work required to modify the existing installations and install new materials, comprising a part of the installation. Review all construction details of the new building as illustrated on the drawings and be guided thereby.

1.16 WARRANTY

A. All materials, equipment, devices, and workmanship shall be warranted for a period of one year from the date of acceptance by DISD's Representative for beneficial use by DISD, except that where specific equipment is noted to have extended warranties. The warranty shall be in accordance with AIA Document A201. The Contractor shall be responsible for the proper registration of these warranties so that DISD can make all proper claims should future need develop.

B. The Contractor shall furnish to DISD's Representative for transmittal to DISD, the name, address, and telephone number of those persons responsible for service on systems and equipment covered by the warranty.

1.17 OPERATION PRIOR TO ACCEPTANCE

A. When any equipment is operable, and it is to the advantage of the Contractor to operate the equipment, the Contractor may do so provided that he properly supervises the operation and retains full responsibility for the equipment operated. Regardless of whether or not the equipment has or has not been operated, the Contractor shall clean the equipment properly, make required adjustments and complete punch list items before final acceptance by DISD.

1.18 INSTRUCTION OF DISD'S PERSONNEL

A. Provide the services of competent engineers and/or technicians acceptable to DISD's Representative to instruct other representatives of DISD in the complete and detailed operation of each item of equipment or device of all the various electrical systems. These instructions shall be provided for whatever periods may be necessary to accomplish the desired results. Upon completion of these instructions, the Contractor shall obtain a letter of release, acknowledged by the DISD or his authorized representative, stating the dates on which the various kinds of instruction were given, and the personnel to whom the instructions were given.

B. The Contractor shall be fully responsible for proper maintenance of equipment and systems until the instructions have been given to DISD's personnel and the letter of release acknowledged.

C. In providing the instructions to DISD's personnel, the written operating and maintenance manuals shall be followed in all instances, and the DISD's personnel shall be familiarized with such manuals. Operating and maintenance manuals used for instructions shall include wiring diagrams, manufacturer's operating and maintenance instructions, parts lists (with sources identified), and other data as appropriate for each system.

1.19 SCHEDULE AND SEQUENCE OF WORK

A. The Contractor shall meet and cooperate with DISD and DISD's Representative to schedule and sequence this work so as to ensure meeting scheduled completion dates and avoid delaying other portions of the work. Work requiring special sequencing shall be at no additional cost to DISD and shall have no impact on the schedule.

1.20 INSTALLATION INSPECTIONS AND CERTIFICATIONS

A. Obtain timely inspections of the installation by the regulatory authorities. Remedy any deficiencies to the satisfaction of the inspecting official.

B. Upon final completion of the work, obtain certificates of acceptance from the regulatory authorities. Deliver the certificates to DISD's Representative for transmission to DISD.

1.21 EQUIPMENT INSTALLATION

A. Install equipment and devices in a manner to permit access to all surfaces or components, requiring such access, without the need to disassemble other unrelated parts of the work.

B. Equipment specified to be factory assembled and tested prior to shipment shall not be disassembled at the job site and reassembled at its final location. Apparatus not so specified may be disassembled and reassembled in the proper location.

C. Furnish all scaffolding, rigging, and hoisting required for the installation of all the work.

1.22 CONCRETE HOUSEKEEPING PADS

A. Concrete housekeeping pads shall be provided for all floor mounted equipment, unless noted or required otherwise.

B. All pads shall be not less than 3-1/2" high and extend a maximum 3" beyond the actual equipment size. Coordinate the proper size of the pad with the equipment furnished. Pads shall be poured in forms built of new dressed lumber with corners chamfered using sheet metal or triangular wood strips nailed to the form. Use 6 x 6 No. 3 mesh for reinforcing. Install heavy duty adjustable anchor bolts, set in the form, and positioned using templates, prior to pouring concrete. After the equipment is set on the pad, the equipment shall be aligned, leveled, and fully grouted to the pad and all void spaces shall be filled with a non-shrinking grout.

C. Perform all concrete work specified to be provided under this Division in strict accordance with the applicable provisions of Division 3, CONCRETE.

1.23 SLEEVES

A. Each conduit, regardless of material, which passes through a concrete slab, masonry wall, or roof or portion of the building structure shall be free from the structure and shall pass through a sleeve.

B. All sleeves shall be constructed from electrical-metallic tubing or equivalent weight galvanized steel tubing and shall be flush on both sides of the surface penetrated, unless noted otherwise. All sleeves penetrating the roof areas shall extend a minimum 10 inches above the roof with approved weatherproof counterflashing attached to the conduit above the roof. All sleeves penetrating floors shall extend a minimum of 6 inches above the finished floors. The sleeves shall be sized to allow free passage of the conduit to be inserted.

C. Sleeves passing through walls or floors on or below grade or in moist areas shall be constructed of galvanized rigid steel and shall be designed with a suitable flange in the center to form a waterproof passage. After the conduit has been installed in the sleeves, the void space around the conduit shall be caulked and filled with an asphalt-base compound to insure a waterproof penetration. Jute twine caulking shall not be used due to susceptibility to termite infestation.

1.24 ESCUTCHEONS

A. In each finished space, provided a chromium plated, sectional escutcheon on each conduit, or hanger rod penetrating a wall, floor, or ceiling.

B. Size escutcheons and collars to fit snugly around conduit and rods.

C. Where required, provide escutcheons with set screws so that they fit snugly against the finished surface.

1.25 ACCESS PANELS

A. Provide wall and ceiling access panels for unrestricted access to all concealed electrical equipment items and devices installed behind furrings, chases or non-removable suspended ceilings.

B. Access panels shall be UL listed and labeled as required to suit the fire rating of the surface in which installed, with mounting straps, concealed hinges, screwdriver locks, 180-degree open door design, 16-gauge steel construction and door and frame finished in prime coat finish. Panels shall be 12-inch by 12-inch minimum size but shall be larger as the access requirement of the concealed electrical equipment item or device increases.

1.26 SEALING OF PENETRATIONS

A. All penetrations in horizontal or vertical fire-rated construction shall be sealed using approved fire rated sealing materials equivalent to the following:
   1. Foam: Dow Corning 3-6548 RTV silicone foam, liquid component Part 4 (black) and liquid component Part B (off-white).
   2. Sealant: Dow Corning 96-081 RTV silicone adhesive sealant.
   3. Damming Materials: Mineral fiberboard, mineral fiber matting, mineral fiber putty, plywood, or particle board, as selected by applicator.

B. Preparation: Remove combustible materials and loose impediments from penetration opening and involved surfaces. Remove free liquid and oil from penetration surfaces.

C. Installation: In accordance with manufacturer's instructions, install damming materials and sealant to cover and seal penetration openings; inject foam mixtures into openings.

D. In addition to the Dow Corning products, equal products by Spec Seal Firestop Products, 3M Fire Barrier or CS240 Firestop are acceptable.

1.27 PROTECTION OF APPARATUS

A. At all times take every precaution to properly protect apparatus from damage due to dust, dirt, water, etc. or from damage due to physical forces. Include the erection of temporary shelters as required, to adequately protect any apparatus stored at the site, the cribbing of any apparatus directly above the construction, and the covering of apparatus in the incomplete

building with tarpaulins or other protective covering. Failure on the part of the Contractor to comply with the above to the entire satisfaction of DISD's Representative will be sufficient cause for the rejection of the pieces of apparatus in question.

B. Responsibility for the protection of apparatus extend also to existing apparatus involved in this Division of the work, whether such apparatus is designated to be used temporarily and later removed or is to be reused as a part of the permanent installation. Erect temporary sheltering structures, provide temporary bracing and supports, or cover equipment as required or directed to afford proper protection for that equipment.

C. The Contractor shall protect this work and the work of all other Contractors from damage by his work or workmen and shall make good any damage thus caused. He shall also be responsible for the proper protection of his equipment, machinery, materials, and accessories delivered and installed on the job.

1.28 INSTALLATION OF CONTROL AND OPERATING DEVICES

A. The highest operable part of controls (light switches, dimmer switches, emergency power off devices, etc.), receptacles (electrical and communications) and other operable devices shall be 48" above finish floor. The lowest operable part shall be no less than 15" above finished floor. For purposes of uniformity, unless noted otherwise, the top of a device shall be maximum 48" AFF and the bottom of a device shall be minimum 15" AFF. Refer to the electrical symbols list on the Drawings for specific requirements.

B. Visual alarm appliances shall be placed 80" above finished floor (the highest floor level within a space) or 6" below the ceiling, whichever is lower.

1.29 INSTALLATION AND CONNECTION OF OTHER DIVISION'S EQUIPMENT

A. Verify the electrical requirements of all equipment furnished under other Divisions, separate contracts, or by DISD. Install conduit, power wiring, control wiring, devices, etc. as required for complete operation of all equipment.

1.30 OPTION TO RELOCATE OUTLETS AND RELATED DEVICES

A. The location of power, data and telephone outlets, wall switches and other related devices may be relocated at DISD's option, at no additional cost to DISD, to a point within 10 feet of their present location provided the Contractor is notified prior to installation.

1.31 COOPERATION AND CLEAN-UP

A. It shall be the responsibility of the Contractor to cooperate fully to keep the job site in a clean and safe condition. Upon the completion of the job, the Contractor shall immediately remove all of his tools, equipment, surplus materials and debris.

B. After the installation is complete, and before the equipment is energized, clean the interior and exterior of all equipment thoroughly. Clean equipment, removing all debris, rubbish, and foreign materials. Each component shall be cleaned, and all dust and other foreign material removed. Components shall be cleaned of oxidation. The inside and outside of all switchgear shall also be wiped clean with a lemon-oil rag after all other cleaning is complete.

C. Any portion of the work requiring touch-up finishing shall be so finished to equal the specified finish on the product.

1.32 RECORD DRAWINGS AND DOCUMENTATION FOR DISD

A. The Contractor shall obtain at his own expense a complete set of blueline prints on which to keep an accurate record of the installation of all materials, equipment and devices covered by the Contract. The Contractor shall record up to date information at least once a week and retain the set of prints on site for periodic review by the Architect/Engineer. The record drawings shall indicate the location of all equipment and devices, and the routing of all systems. If the Contractor prepared large scale installation drawings of electrical rooms, conduit routing, busduct, routing, etc., these drawings or reproducible sepias therefrom shall be revised as required to accurately illustrate the actual installation. All conduit buried in concrete slabs, walls and below grade shall be located by dimension; both horizontally and by vertical elevation, unless a surface mounted device in each space indicates the exact location.

B. Upon anticipated completion of the job, obtain one complete reproducible set of the original drawings on which to neatly, legibly and accurately transfer all project related notations and deliver these record drawings to the Architect/Engineer at job completion before final payment and delivery to DISD. This information shall be delivered prior to final acceptance.

C. The Contractor shall accumulate in duplicate during the job progress, the following data prepared in indexed 3-ring looseleaf, hard-back binders sized for 8-1/2 inch by 11-inch sheets. No binder shall exceed 3-1/2 inches thick. This data shall be turned over to DISD's Representative for review and subsequent delivery to DISD prior to final acceptance.
   1. Warranties, guarantees and manufacturer's directions on material, equipment and devices covered by the Contract.
   2. Approved lighting fixture brochures, wiring diagrams and control diagrams.
   3. Copies of approved submittals and shop drawings.
   4. Operating instructions and recommended maintenance procedures for major apparatus.
   5. Copies of all other data and/or drawings required during construction.
   6. Repair parts list of major apparatus, including name, address, and telephone number of local supplier or representative.
   7. Tag charts and diagrams hereinbefore specified.

1.33 FINAL OBSERVATION

A. The purpose of the final observation is to determine whether the Contractor has completed the construction in accordance with the Contract Documents and that in DISD Representative's opinion the installation is satisfactory for final acceptance by DISD.

B. It shall be the responsibility of the Contractor to assure that the installation is ready for final acceptance prior to calling upon the DISD's Representative to make a final observation.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 26 05 00

SECTION 26 05 19 - LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

A. The General Provisions, Supplemental General Provisions, Special Provisions and Division 1 Specification sections, apply to work covered by this Section.

B. Comply with Division 26 Sections, as applicable. Refer to other Divisions for coordination of work.

1.2 SCOPE OF WORK

A. Provide labor, materials, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of the systems of conductors and cables for power and lighting service and for other systems included in this project, including related accessories.

1.3 SUBMITTALS

A. Submit product data and shop drawings in accordance with Division 1 for products specified under PART 2 - PRODUCTS.

B. Submittal data for conductors and cables shall include, but not be limited to, the following:
   1. Complete physical properties of the conductors and cables.
   2. Ampacity for use intended.
   3. Allowable stresses and requirements for installations, including bend radii, linear stress, and other pertinent data.
   4. Test Procedures: Submit cable manufacturer’s megger and hi-pot written test procedures for 5 & 15kV cable, including test pass/fail criteria.
   5. Test results: Submit Megger and Hi-Pot test results for 5 & 15kV cable to architect for review.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

A. Building Wire (600 volts & under): AFC, Belden, Carol, Southwire, Triangle.

B. Splice & Termination Kits: Elastimold, Raychem, Sigmaform, 3M.

2.2 SYSTEMS OF CONDUCTORS - 600 VOLTS OR LESS

C. Wire (for installation within conduit or raceway)
   1. Provide conductors of stranded soft-drawn annealed copper, 98% conductivity, new building wire, insulated in accordance with the requirements of the NEC for the several services involved. Insulation shall be rated not less than 600-volt. Conductors shall be Type "THWN" or "THHN/THWN". Solid conductors shall be utilized for wire size No. 12 and smaller.

2. Temperature ratings of conductors shall generally be 167 degrees F. For high temperature applications, the temperature ratings shall be in accordance with the NEC for the ambient condition.

D. Connectors: Make splices and connections in conductors using UL connectors.
1. Stranded Conductors: UL listed, solderless, bolted pressure or compression connectors. Connectors shall be of proper sizes to match conductor sizes.
2. Solid Conductors: UL listed, bolted pressure or spring connectors. Connectors shall be of proper sizes to match conductor sizes.
3. Motor Lead Pigtails: UL listed, crimp lugs with through-bolt fasteners between lugs. Lugs shall be of proper sizes to match conductors. Proper sized dies and tools shall be furnished to apply connectors.
4. Lighting Fixture Taps: Electrical spring connectors as specified for solid conductors.
5. Ground Connections: Burndy ground clamps or connectors of a type suitable for and having a UL listing for grounding applications.

E. Identification Tags: Nylon band with marking pad equivalent to Thomas and Betts Series TY-553M.

F. Metal Clad Cable
1. Metal Clad Cable: Type MC metal clad cable shall consist of factory assembled insulated conductors enclosed in a metallic sheath of interlocked galvanized steel strip manufactured in accordance with UL Standard 1569. The insulated conductors shall have an operating temperature of 194 degree F and shall be covered by a high dielectric strength assembly tape. Type MC cable shall be capable of passing UL's 70,000 BTU vertical tray flame test and the two hour through-penetration flame test in compliance with UL 1479. Type MC cable shall be as manufactured by AFC or equal.
2. Super Neutral MC Cable: Shall be utilized for multiple branch circuit cable feeding non-linear type loads. Cable shall include oversized neutral and isolated ground.

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

A. Pull no conductors into conduits until all work of a nature which may cause injury to conductors is completed.

B. Before any wire is pulled into any conduit, thoroughly swab the conduit to remove all foreign material and to permit the wire itself to be pulled into a clean, dry conduit. Utilize wire pulling lubricants to facilitate the pulling of conductors.

C. Exercise care in handling and installing cables to avoid damage. Carefully form cables in equipment pull boxes. Form bends in cables larger than the minimum radii shown in the cable manufacturer's published data for minimum bends such that bends will not reduce the cable life.

D. Run feeders in continuous lengths, without joints or splices, insofar as practicable. Make joints in branch circuits only where circuits divide.

E. Do not use gutters of panelboards as raceways, junction boxes, or pull boxes for conductors not terminating in said panelboards.

F. Run conduits for emergency power conductors separate from all other wiring.

G. Make splices and terminations in cables with kits and instructions provided by the kit manufacturer. Each splice shall equal the integrity of the cable electrically and environmentally.

H. Color Coding: Color coding shall be continuous for the entire length of conductors and shall be permanent and readily distinguished after installation. Color coding of conductors shall be:
   1. Neutral conductors: White for 120 volt systems and natural gray for 277 volt systems.
   2. Grounding conductors: Green for equipment ground and green with yellow striping/tracing for isolated ground. Provide an equipment grounding conductor in each conduit, bond to each device, box and light fixture.
   3. Phase conductors in 208-volt systems: Black, Red and Blue for Phases A, B, and C, respectively.
   4. Phase conductors in 480-volt systems: Yellow, brown and orange for Phases A, B, and C, respectively.
   5. Use other colors as necessary to identify controls and other special circuits, or to match existing building color schemes.
   6. Where specified colors of insulated wire and cable are unavailable, such conductors shall be color coded as specified at pull boxes, support boxes, outlet boxes, panelboards, switchboards, and other terminal and splicing points by means of double wrapped tape minimum 3" long with heat shrink clear plastic sleeve over tape.

I. Bundling Conductors: Bundle conductors in switchboards, panelboards, cabinets, and the like, using nylon traps, made for the purpose. Bundle conductors larger than No. 10 in individual circuits. Smaller conductors may be bundled in larger groups.

3.2 INSTALLATION OF CONDUCTORS 600 VOLTS OR LESS

A. Install all conductors in raceways, unless specifically noted otherwise.

B. Sizes
   1. No conductors shall be smaller than No. 12, except for signal or control circuits.
   2. For receptacle and motor branch circuits, conductors shall be No. 12 minimum.
   3. A maximum of six (6) current carrying conductors shall be permitted in a conduit. For receptacles and electronic ballasted lighting branch circuits, the neutral shall be considered a current carrying conductor.
   4. For home runs on 120-volt, 20-ampere branch circuits, where length of run from panelboard to first outlet exceeds 100 lineal feet, use No. 10 conductors; where length of run is 100 lineal feet or less, use No. 12 conductors.
   5. For home runs on 277-volt, 20-ampere branch circuits, where length of run from panelboard to first outlet exceeds 200 lineal feet, use No. 10 conductors; where length of run is 200 lineal feet or less, use No. 12 conductors.
   6. For multiple branch circuit homeruns for 120 volt, 20 ampere receptacle branch circuits and 277 volt, 20 ampere electronic ballasted lighting branch circuits, utilize a neutral conductor one size larger than the phase conductors. For individual branch circuit homeruns of either voltage the neutral conductor may be the same size as the phase conductor, but not less.
   7. Termination of multiple branch circuit conductors on circuit breakers is not acceptable.

C. Use length of flexible metal conduit (inclusive of MC cable) more than 6 feet long at final connections to all motors, transformers, generators, and similar devices subject to movement because of vibration or mechanical adjustment. Use 3/8" by 6'-0" flexible metal conduits for final connections to recessed lighting fixtures. Use liquid tight flexible metal conduit, with appropriate connections, in damp or wet locations, in mechanical equipment rooms, at motor or equipment location at or near pumps, and when installed outdoors.

3.3 WIRE PULLING

A. Pull Cord in Empty Raceways: Provide in every empty raceway, not containing conductors, a suitable pull cord to facilitate future installation of wiring. Cord shall be free from splices and shall have ample exposed length at each end. All lines shall be nylon cord with a tensile strength not less than 200 pounds. Pull wires are not acceptable.

B. Provide suitable installation equipment to prevent abrasion and cutting of conductors by raceways during the pulling of conductors. Use ropes of polyethylene, nylon or other suitable non-metallic material to pull in feeders. Metallic ropes are prohibited.

C. Attach pulling lines to conductors by means of insulated woven basket grips or by pulling eyes attached directly to conductors. Do not use rope hitches, or bare steel basket grips. All conductors to be installed in a single conduit shall be pulled in simultaneously.

D. All cable pulling lubricants shall be UL listed, of non-conducting type, and shall be certified by their manufacturer to be non-injurious to the insulation on which they are used.

E. Do not use cable pulling lubricants on conductors of ungrounded circuits which are electrically monitored by ground detector system, since such lubricant may increase the capacities to ground of these conductors.

END OF SECTION 26 05 19

SECTION 26 05 23 - CONTROL VOLTAGE ELECTRICAL POWER CABLES

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

A. The General Provisions, Supplemental General Provisions, Special Provisions and Division 1 Specification sections, apply to work covered by this Section.

B. Comply with Division 26 Sections, as applicable. Refer to other Divisions for coordination of work.

1.2 SCOPE OF WORK

A. Provide labor, materials, equipment, tools and services, and perform operations required for, and reasonably incidental to, the testing and inspecting of each item of equipment provided or installed under this Division of the Specifications.

B. Tests and inspections for each system and each item of equipment shall be in accordance with the manufacturer's instructions.

C. Tests shall prove that electrical equipment is operational within industry and manufacturer's tolerances, and that it is installed in accordance with the design Drawings and Specifications.

D. Tests and inspections shall verify that power supplies are suitable for connection to the designated equipment and systems and shall determine suitability for continued reliable operation.

E. Upon completion of tests and inspections specified, a label shall be attached to each serviced device. Labels shall indicate date and by whom (name of company) serviced as well as whether or not the service device passed or failed or passed with exceptions.

1.3 DIVISION OF RESPONSIBILITY

A. The Contractor shall perform routine insulation resistance, continuity, and rotation tests for distribution and utilization equipment prior to, and in addition to, the tests specified to be performed by the testing laboratory. The contractor's responsibility shall include the following:
   1. Engage the services of an approved testing laboratory with more than five (5) years of experience for the purpose of performing the inspections and tests specified.
   2. Supply a suitable and stable source of power to the testing laboratory at each test site. Notify the testing laboratory when equipment becomes available for acceptance tests.
   3. Coordinate work to expedite project scheduling.

B. Prior to commencement of testing, the contractor shall supply a complete set of Electrical Drawings, Specifications, and pertinent change orders to the testing laboratory.

C. The testing laboratory shall perform tests and inspections as specified. The testing laboratory's responsibility shall include the following:
   1. Notify the A/E as to when testing will commence.
   2. Provide sufficient protective barriers and warning signs to conduct tests and inspections safely.
   3. Report any material or workmanship found to be defective during tests and inspections to the A/E.
   4. Implement final settings and adjustments on electrical equipment in accordance with the values indicated.

5. Maintain written records of tests. Upon completion of the project, furnish multiple copies of the test report to the A/E in accordance with Division 1 no later than 30 days after acceptance of the project for review prior to final acceptance. The test report shall be bound, and its contents certified by the testing laboratory. The report shall include the following: a. Summary of project.
   b. Description of equipment tested.
   c. Description of test.
   d. List of the test equipment used in calibration, and calibration date.
   e. Test results.
   f. Conclusions and recommendations.
   g. Appendix, including completed test forms.

1.4 TEST INSTRUMENT CALIBRATION

A. The testing laboratory shall maintain test instruments which have been calibrated within rated accuracy. Dated calibration labels shall be visible on the test equipment.

B. Instruments shall be calibrated in accordance with the following frequency schedule:
   1. Field instruments - 6 months maximum.
   2. Laboratory instruments - 12 months.
   3. Leased specialty equipment - 12 months. (Where accuracy is guaranteed by lessor, i.e. Doble.)

1.5 SAFETY PRACTICES

A. Safety practices shall include, but are not limited to, the following requirements:
   1. Occupational Safety and Health Act of 1970-OSHA.
   2. Accident Prevention Manual for Industrial Operations as published by the National Safety Council.
   3. Applicable safety operating procedures of the governing authorities.
   4. Division 26 of these Specifications.

B. Perform tests with apparatus de-energized, except where otherwise specifically required.

C. Power circuits shall have conductors shorted to ground by a hot-line grounded device approved for that purpose.

1.6 REFERENCE STANDARDS

A. International Electrical Testing Association (NETA)

B. National Electrical Code (NEC)

C. National Electrical Safety Code

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL PROCEDURES

A. Perform each test and inspection until acceptable results are obtained in accordance with the manufacturer's recommendations, unless otherwise specified.

B. Perform tests and inspections for each system and item of equipment as applicable, unless otherwise specified. Inspect for physical damage and defective materials or installation work. Inspect for proper physical, electrical and mechanical conditions (materials and installation work).

C. Promptly report any discrepancies or unsatisfactory conditions determined by any test or inspection.

D. Perform insulation resistance tests for each applicable system and item of equipment. Do not perform this test on solid state devices or wiring connected to solid state devices. Be aware that in some cases terminated cables cannot be tested unless disconnected from end devices. Coordinate the test with the contractor in this instance.

1. Apply test voltages as follows:

INSULATION RESISTANCE TEST VOLTAGE

Voltage Rating	Test Voltage
150 - 600V	1000V

2. Investigate values of insulation resistance less than the manufacturer's recommended minimum, or less than a value equal to KV + 1 in megohms.

E. Overpotential tests shall not proceed until insulation resistance tests are satisfactorily performed. Perform overpotential tests for each system and item of equipment as specified.

3.2 TRANSFORMERS - DRY TYPE

A. Verify proper auxiliary device operation, such as fans and indicators.

B. Perform insulation resistance tests winding-to-winding and winding-to-ground.

C. Perform insulation power factor tests from winding-to-winding and from each winding-to ground. Investigate if test values exceed 3%.

D. Perform a turns ratio test between windings. Test results shall not deviate more than 0.5% from calculated ratio.

3.4 CABLES - 600 VOLTS AND LESS

A. Inspect for shield grounding, cable support and termination.

B. Check visible cable bends against ICEA and manufacturer's minimum allowable bending radius.

C. Inspect for proper fireproofing in common cable areas.

D. If cables are terminated through window type cable trays, make an inspection to verify that neutrals and grounds are properly terminated for normal operation of protective devices.

E. Perform insulation resistance tests on each cable with respect to ground and adjacent cables.

F. Perform continuity tests to confirm proper cable connections.

3.5 SOLID STATE MOLDED CASE CIRCUIT BREAKERS - 600 VOLTS AND LESS

A. Measure contact resistance in micro-ohms. Investigate values which deviate from adjacent poles or similar breakers by more than 50%.

B. Perform insulation resistance tests from each pole-to-ground, from pole-to-pole, and across open contacts of each phase. Test values shall not be less than 50 megohms.

C. Utilize primary current injection method to determine the following:
   1. Minimum pickup current of trip devices, where possible.
   2. Long time delay, using 300% pickup current.
   3. Short time pickup and short time delay.
   4. Instantaneous pickup current.

D. Verify trip unit reset characteristics.

E. Activate auxiliary protective devices, such as ground fault and under voltage relays, to insure operation of shunt trip devices.

3.6 MOLDED CASE CIRCUIT BREAKERS - 600 VOLTS AND LESS (FEEDER CIRCUIT BREAKERS ONLY)

A. Check each circuit breaker for proper mounting, conductor size and feeder designation.

B. Operate circuit breaker to insure smooth operation.

C. Open unsealed breakers and check internal components for tightness, when applicable.

D. Measure contact resistance in micro-ohms. Investigate deviations greater than 50%, as compared to adjacent poles and similar breakers.

3.7 INSTRUMENT TRANSFORMERS

A. Verify proper operation of grounding and shorting devices.

B. Electrically confirm transformer polarity.

C. Verify connection at secondary current transformer leads by applying low current to leads and check for current contribution at applicable devices.

D. Confirm transformer ratio.

E. Verify connection of secondary power transformer and control transformer leads by applying low voltage to leads and check for voltage contribution at applicable devices.

F. Check power transformer secondary load with secondary voltage and current measurements to ensure that load is less than the wattage of power transformer.

3.8 GROUND FAULT PROTECTION SYSTEMS

A. Inspect neutral main bonding connection to assure:
   1. Zero sequence system is grounded upstream from sensor.
   2. Ground strap systems are grounded through sensing device. 3. Ground connection is made ahead of neutral disconnect link.

B. Verify that control power transformer capacity is adequate for system.

C. Manually operate monitor panels to test sequences for:
   1. Trip test.

2. No trip test.
3. Non-automatic reset.

D. Inspect zero sequence systems for symmetrical alignment of core. Balance transformers about current carrying conductors.

E. Verify ground fault device circuit nameplate identification by device operation.

F. Ensure control circuit has disconnectable fuse device with current limit fuses.

G. Measure system neutral insulation resistance to ensure no shunt ground paths exist. Remove neutral-ground disconnect link, and measure neutral insulation resistance, then replace link. System neutral insulation shall be one (1) megohm or greater.

H. Determine relay pickup current by primary injection at the sensor and operate the circuit interrupting device. Relay pickup current shall not exceed 1,200 amperes.

I. Test ground fault pickup and time delay.

3.9 GROUNDING SYSTEMS

A. Perform ground continuity tests between main ground system and equipment frames, and between main ground system and system neutral and/or derived neutral points. Make test by passing a minimum 10-amp DC current between the ground reference system and the ground point to be tested. Measure voltage drop and calculate resistance by voltage drop method.

B. The main ground electrode system resistance-to-ground shall be no greater than five (5) ohms.

C. Perform an insulation power factor test.

D. Perform ground continuity test to ground grid system.

3.10 THERMOGRAPHIC SURVEY

A. A thermographic survey shall be performed as follows on all electrical system equipment once the building load is connected to the system.
1. Visual and Mechanical Inspection
   a. Inspect for physical, electrical, and mechanical condition.
   b. Visually inspect for bus alignment.
   c. Remove all necessary covers prior to scanning.
2. Equipment to be scanned shall include switches, buses, cables, cable and bus connections and circuit breakers.
3. Provide a report indicating the following:
   a. Problem area (location of "hot spot").
   b. Indicate temperature rise between "hot spot" and normal or reference area.
   c. Indicate cause of heat use.
   d. Indicate phase unbalance, if present.
   e. Index of areas scanned.
4. Test Parameters
   a. Scanning distribution systems with ability to detect 33.8°F rise between subject area and reference at 86°F.
   b. Equipment shall detect emitted radiation and convert detected radiation to visual signal.

c. Provide photographs (thermograms) of the deficient area as seen on imaging system.
d. Infrared surveys should be performed during periods of maximum possible loading but not less than eighty percent (80%) of rated load of the electrical equipment being inspected.

5. Test Results
   a. Temperature gradients of 33.8°F to 37.4°F indicate possible deficiency and warrant investigation. Corrective measures may not be required. The testing laboratory shall review deficiency with the Owner and Architect/ Engineer and make recommendation.
   b. Temperature gradients of 39.2°F to 59°F indicate minor deficiency; repair is most probably required. The testing laboratory shall review deficiency with the Owner and Architect/Engineer and make recommendation.
   c. Temperature gradients of 60.8°F and above indicate major deficiency; secure power and repair as soon as possible.
   d. Provide a report indicating the equipment and devices scanned. Provide photographs and/or thermograms any deficient area as seen on the imaging system.

END OF SECTION 26 05 23

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The General Provisions, Supplemental General Provisions, Special Provisions and Division 1 Specification sections, apply to work covered by this Section.

B. Comply with Division 26 Sections, as applicable. Refer to other Divisions for coordination of work.

1.2 SCOPE OF WORK

A. Provide labor, materials, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of the grounding systems.

B. Exposed metallic parts of the electrical system which are not intended to carry current, including system components such as busducts, switchboards, panelboards, and raceway systems, and including grounding conductors and neutral conductors of the various wiring systems, shall be grounded in accordance with NEC requirements.

1.3 GOVERNING AUTHORITIES

A. All grounding system shall comply with applicable State and Local Codes and Ordinances, with the requirements of other authorities having jurisdiction, with NEC and applicable NFPA Standards.

PART 2 - PRODUCTS

2.1 GROUNDING CONDUCTORS

A. Grounding conductors shall be annealed copper stranded conductors. Conductor shall be bare or insulated, as required or indicated, and of the sizes indicated or required by the NEC.

2.2 GROUNDING ELECTRODES

A. Provide copper clad steel ground rods 3/4 inch diameter 10 feet long designed for driven installation.

2.3 GROUNDING CONNECTORS

A. Provide exothermic type chemical welded type connectors for joining of grounding electrode conductors to ground rods, grounding plates and splicing of conductors. Provide compression and bolted type connectors for joining of grounding electrode conductors to ground bars.

B. Provide mechanical type connectors for joining of all equipment and isolated ground conductors.

PART 3 - EXECUTION

3.1 POWER SYSTEMS GROUNDING

A. Provide adequate and permanent service neutral and equipment grounding in accordance with the National Electric Code and subject to the following additional requirements.

B. Size grounding conductors in accordance with Tables 250-94 and 250-95 of the NEC.

C. Connect the service neutral and equipment ground to a common point within the metallic enclosure containing the main service disconnecting means. Equipment grounds and the identified neutral of the wiring system shall not be interconnected beyond this point in the interior wiring system. From the common point of connection of the service neutral and the equipment ground, run in nonmagnetic conduit a grounding electrode conductor without joint or splice to the grounding electrode system and connect it thereto with an approved bolted pressure clamp.

D. The grounding electrode system shall be formed by bonding together the following to the main service ground bus a #3/0 green insulated "THWN" copper ground conductor in non-magnetic conduit to provide a common grounding electrode system.
   1. Underground main metallic water pipe, connect ahead of the first valve, provide a bonding jumper across water meter (in accordance with NEC 250-81a).
   2. Structural steel building frame, connect to nearest vertical member originating at a footing (in accordance with NEC 250-81b).
   3. Concrete-encased electrode consisting of twenty feet (20') of minimum #4 AWG bare copper conductor encased in a footing or foundation in direct contact with the earth (in accordance with NEC 250-81c).
   4. Ground ring encircling the building (counterpoise) in direct contact with the earth (in accordance with NEC 250-81d).
   5. A made electrode consisting of three ground rods spaced approximately 20' apart in the form of an equilateral triangle and bonded together to form a loop (grounding triad). Each rod shall be installed a minimum of 12" below finished grade with an accessible underground rod test well for each rod with the connecting loop a minimum of 24" below finished grade.
   6. Where the above electrodes are not available or feasible, provide suitable grounding electrodes as specified in National Electrical Code Article 250-83.

E. Provide an equipotential grounding system as indicated.

F. Assure the electrical continuity of all metallic raceway systems, pulling up all conduits and/or locknuts wrench tight. Where expansion joints or telescoping joints occur, provide bonding jumpers. Wherever flexible metallic conduit is employed, provide a green insulated ground jumper installed in the flexible conduit.

G. Provide grounding bushings on all raceways terminating within all electrical enclosures constructed of separate enclosure panels which are not integrally welded together. Provide grounding conductors from such bushings to the frame of the enclosure, ground bus and equipment grounding strap where one occurs.

H. Provide a separate, green-insulated equipment grounding conductor, with insulation of the same rating as the phase conductors, for all feeders and branch circuits. Install the grounding conductors in the raceway with related phase and neutral conductors. Where parallel conductors in separate raceways occur, provide a grounding conductor in each raceway. Connect all grounding conductors to ground terminals at each end of the run, to the end that there will be no uninterrupted grounding circuit from the point of ground fault back to a point of connection of the equipment ground and system neutral.

I. Connect the secondary neutral point and the enclosure in each dry type transformer together and run a grounding electrode conductor from their common point of connection to the building grounding electrode system.

J. Systems Description
   1. Single-Point Service Ground System
      a. Provide a ground bar in the main electrical room to be used as the single- point ground point.
      b. Provide a ground bar in each branch electrical room connected back to the service ground bar with #3/0 green insulated copper in non-magnetic conduit.
   2. Counterpoise
      a. A ground loop shall be provided. The made electrode system shall be bonded to the counterpoise. The single-point service ground bar shall be bonded to the counterpoise.

3.2 GROUNDING SYSTEM TESTING

A. In addition to the tests outlined in Section 26 08 13 perform the following:
   1. Test the continuity of, and the proper connection of, each ground conductor and system, to assure that the grounding system is complete and uninterrupted. Testing shall be performed using laboratory-accuracy test instruments of suitable design for the tests to be performed. Test instruments shall be provided under Division 26.
   2. Make proper notification of testing dates and times in writing to the Owner so that he may, at his discretion, witness any of the tests. A complete record of each test shall be recorded, including the time and date of test, and the time and date submitted for acceptance.
   3. Test grounding conductors, phase conductors and neutral conductors for continuity and for possible damage to insulation. Each such conductor shall be tested for insulation from ground and from other conductors.

B. Any portions of the installations which fail to pass these tests shall be replaced, repaired or otherwise corrected to the satisfaction of the Owner’s Representative, and completely retested to show proper conformity.

END OF SECTION 26 05 26

SECTION 26 05 29 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

A. The General Provisions, Supplemental General Provisions, Special Provisions and Division 1 Specification sections, apply to work covered by this Section.

B. Comply with Division 26 Sections, as applicable. Refer to other Division for coordination of work.

1.2 SCOPE OF WORK

A. Provide labor, material, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of supporting devices, including related systems and accessories.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Unistrut Corp.

B. B-Line Systems, Inc.

C. Midland Ross-Kindorf

2.2 MATERIALS

A. Suspension Hangers
1. Suspension hangers for individual conduit runs shall be zinc plated formed steel type.

B. Vertical Supports
1. Malleable iron one hole pipe straps shall be used for vertical runs.

C. Clamps
1. Beam clamps shall be used for bar joists and beams.

D. Anti-Vibration Hangers
1. Anti-vibration hangers shall be combination type having a double deflection neoprene element in series with a steel coil spring; double deflection of 0.30"; steel coil spring shall be selected from a 1" static deflection series with a minimum additional travel to solid of ½"; spring diameters shall be large enough to permit 15 degree angular misalignment of the rod connecting the hanger to the ceiling support without rubbing the hanger box.

E. Light Fixture Hangers
1. Refer to Part 3.1 - A

F. Corrosive Areas: PVC; at factory apply a minimum of 10-mil-thick PVC coating, bonded to metal, inside and outside.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Hangers

1. Approved hangers and stiff leg supports shall be installed in quantity and size as required to carry the weight of raceway and contents and shall be arranged to prevent vibration transmission to the building and allow for raceway movement.
2. Hangers shall be supported by means of uncoated solid steel rods which are threaded to allow vertical adjustments. Lock nuts shall be provided in sufficient number and location to lock all rod adjustments permanently at the adjusted height. Two lock nuts shall be used unless the nut tightens against a threaded socket. Minimum rod diameters shall be as follows:

NOMINAL CONDUIT SIZE	ROD DIAMETER
1/2" through 2"	1/4"
2-1/2" through 3"	3/8"
4" and 5"	1/2"

3. Hanger spacing shall be as required for proper and adequate support raceway, but in no case shall be less than one hanger per 8'-0" of raceway length except that conduit less than 1" diameter shall be supported at least every 6'-0".
4. Where numerous conduits are run parallel to one another, they may be supported from a trapeze type hanger arrangement with strut bottom.
5. Anti-vibration type hangers shall be provided for equipment as required to minimize vibration and/or as directed by the Architect/Engineer.

B. Supports

1. Support of hangers shall be by means of sufficient quantities of individual after set steel expansion shields, or beam clamps attached to structural steel.
2. Stiff-legs shall be furnished and installed in cases where support from overhead structure is not possible.
3. Ceiling mounted lighting fixtures shall be supported from the building structure at two opposite corners. The Contractor shall provide fixture hangers to properly interface with the ceiling system.
4. Furnish and install complete any additional structural support steel, brackets, fasteners, etc., as required to adequately support all raceway and equipment.
5. Support of hangers from concrete slabs shall be by means of sufficient quantity of "U" brackets attached with after set expansion shields and bolts.
6. Support of hangers from concrete tees shall be by means of sufficient quantity of angle iron brackets attached with after set expansion shields and bolts.

END OF SECTION 26 05 29

SECTION 26 05 33 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

A. The General Provisions, Supplemental General Provisions, Special Provisions and Division 1 Specification sections, apply to work covered by this Section.

B. Comply with Division 26 Sections, as applicable. Refer to other Divisions for coordination of work.

1.2 SCOPE OF WORK

A. Provide labor, materials, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of all raceway systems included in this project.

1.3 SUBMITTALS

A. Submit product data and shop drawings in accordance with Division 1 for products specified under PART 2 - PRODUCTS.

PART 2 - PRODUCTS

2.1 CONDUIT

A. Galvanized Rigid Steel Conduit (GRC): Rigid steel conduit shall be galvanized, constructed of high-grade raw steel piping, galvanized inside and outside, conforming in all respects with Federal Specification WW-C-581-E, ANSI C80-1 and UL 6. Zinc coating shall be applied by the hot-dip, galvanizing process and shall be of uniform thickness not only on the inside and outside surfaces of the conduit but also on the threads of the conduit. Conduit shall be dipped in a chromic acid bath so as to form a corrosion-resistant protective coating of zinc chromate over the hot-dipped galvanized surface. Each conduit length shall be threaded and equipped with a coupling on one end and a thread protector on the other end.

B. Intermediate Metal Conduit (IMC): IMC shall be constructed of high-grade steel tubing, galvanized inside and outside and conforming in all respects with Federal Specification WW-C-581-E and UL 1242. Zinc coating shall be applied by the hot-dip, galvanized process and shall be of uniform thickness not only on the inside and outside surfaces of the conduit, but also on the threads of the conduit. Each conduit length shall be equipped with a coupling on one end and a thread protector on the other end.

C. Electrical Metallic Tubing (EMT): EMT shall be constructed of high-grade steel, manufactured specifically to standards assuring maximum welding characteristics and ductility. EMT shall conform in all respects to Federal Specification WW-C-563-A, ANSI C80-3 and UL 797. The exterior galvanized coat of zinc shall be of uniform thickness applied by the electro-galvanized process. The interior surface of each tube shall be uniformly coated with a thick, tough, elastic coating of enamel. EMT shall be dipped in chromic acid bath so as to form a corrosion resistant protective coating of zinc chromate over the galvanized surface.

D. Rigid Nonmetallic Conduit: Rigid nonmetallic conduit shall be polyvinyl chloride (PVC). PVC conduit shall be rigid, Schedule 40, heavy-wall, high-impact, conforming in all respects to the applicable requirements of Federal Specification W-C-1094-A, NEMA TC-2, and UL 651. PVC conduit shall be joined with PVC couplings of the solvent cement type to provide complete

watertight joints. Conduit systems shall be UL listed for direct burial and exposed use, and shall be in conformance with the NEC.

E. Flexible Metal Conduit: Shall be manufactured of spirally-wound, mild steel strip material having a hot-dip galvanized coating and meeting requirements of UL 1 for flexible metal conduit.

F. Liquid tight Flexible Metal Conduit: Shall be manufactured exactly as specified for flexible metal conduit and, in addition, shall have a copper grounding strand and factory-applied neoprene jacket. Liquid tight flexible conduit shall meet the requirements of UL 360. For branch circuits in raised floor areas provide blue or gray jacketed liquid tight flexible conduit.

2.2 COUPLINGS AND TERMINATORS

A. For Galvanized Rigid Steel and Intermediate Metal Conduit: Shall be factory-made threaded couplings of same material as the conduit.
1. Molded nylon insulating bushing at all boxes and cabinets, with locknuts inside and outside box or cabinet. In wet locations, watertight hubs shall be used for conduit entry into enclosures.
2. Nylon insulated grounding bushing on all conduits where grounding bushings are required, with locknuts inside and outside the enclosure. In wet locations, watertight hubs shall be used for conduit entry into enclosures.

B. For Electrical Metallic Tubing
1. Steel set screw couplings.
2. Steel set screw box connectors with nylon insulated grounding bushing, or box connector locknut, and nylon insulated grounding bushing on all tubing where grounding bushings are required.

C. For Flexible Metal Conduit
1. Couplings at connections between flexible and rigid conduit.
2. Nylon insulated throat, steel connectors at box or cabinet terminations.

D. For Liquid tight Flexible Metal Conduit
1. Adapters at connections between flexible and rigid conduit.
2. Nylon insulated throat, steel connectors at box or cabinet terminations.

E. Expansion Joints in Conduit: O.Z./Gedney, Type AX with internal ground and external bonding jumper.

F. Wire Support Bushings: Provide for vertical runs as required by the NEC. Select for the conductor size involved.
1. For conductors NO. 8 AWG and smaller provide galvanized, non-insulating type.
2. For conductors No. 6 AWG and larger provide O.Z./Gedney, Type R, insulating type.

2.3 JUNCTION AND PULL BOXES

A. Junction and pull boxes 100 cubic inches in volume and smaller shall be standard outlet boxes. Larger junction and pull boxes shall be constructed from code gauge sheet steel with overlapped riveted or welded corners and with edges turned to receive trim. Covers shall be same gauge as box and shall be screw fastened. Boxes over 864 square inches shall be sectionalized. Boxes shall be factory-fabricated from galvanized steel to prevent corrosion.

B. Size boxes in accordance with the requirements of the NEC. Boxes shall be no smaller than 4 inches square and 1-1/2 inches deep with covers accessible at all times. Set boxes on concealed conduits with covers flush with the finished wall or ceiling line. Provide junction and pull boxes of

appropriate dime**nsions for conduits and conductors noted, where shown and where** necessary for the installation and pulling of cables and wires. Install covers on junction boxes and condulets after wiring and connections are completed.

2.4 OUTLET BOXES

A. Outlet boxes shall be UL listed, and of sizes and types required for the application.

B. Boxes Recessed in Construction: Sheet steel boxes, unless noted or required otherwise. Boxes shall be no lighter than 14 gauge and shall be galvanized after fabrication. Set so face of box will finish flush with building surface.
   1. For Lighting Fixture Outlets: 4 inch square with raised fixture ring.
   2. For Wall Switches, Receptacles, and Communication Use: 4 inch square, one-piece; no sectional boxes permitted. Use boxes with plaster rings in all plastered walls where wall thickness permits. Use boxes less than 1-1/2 inch deep only in locations where deep boxes cannot be accommodated by construction.

C. Boxes Used Outdoors or in Damp/Wet Locations: Cast metal boxes (iron and alloy) with gasketed covers and threaded hubs.

2.5 PULL CORD (OR WIRES)

A. Provide a nylon cord, with a tensile strength of not less than 200 pounds, in each empty conduit to facilitate the future installation of conductors. Plastic tags shall be incorporated for identification.

2.6 WIREWAYS AND AUXILIARY GUTTERS

A. Wireways shall be constructed in accordance with UL 870. Every component including lengths, connectors, and fittings shall be UL listed and labeled. Provision shall be included in the construction to allow screwing the hinged cover closed without the use of parts other than the standard lengths, fittings, and connectors. It shall also be possible to seal the cover in the closed position with a sealing wire.

B. Wireways shall be constructed with/without knockouts, as required. Enclosure type shall be as required by conditions encountered.

C. Gutters and Wireways shall be suitable for "lay-in" conductors. Connector covers shall be permanently attached so that removal is not necessary to utilize the lay-in feature.

D. All sheet metal parts shall be provided with a rust-inhibiting phosphatizing coating and gray baked enamel finish. All hardware shall be plated to prevent corrosion. All screws installed toward the inside shall be protected by spring nuts or otherwise guarded to prevent wire insulation damage.

E. All connectors shall be slip-in type with self-retained mounting screws. All hangers shall be two-piece with hook-together feature to permit pre-assembly of wireway and hanger bottom plate before hanging on pre-installed upper bracket.

2.7 SURFACE METAL RACEWAY

A. Surface metal raceway shall be UL listed and labeled; shall be used together with couplings, clips, bushings, straps, connectors, connection covers, elbows, boxes, extension boxes, fixture boxes, extension adapters, blank covers and all other required fittings; shall be of the proper size to accommodate the conductors to be installed therein in each case.

PART 3 – EXECUTION

3.1 INSTALLATION OF UNDERGROUND CONDUIT

A. Install underground conductors in plastic conduit, unless noted or specified otherwise. Install at least 30 inches below finished grade, unless noted otherwise, on a bed of sand not less than 3 inches deep. Cover raceways with 9 inches of sand before continuing backfill. Assemble and install raceways in accordance with manufacturer's instructions. Make joints with couplings and solvent welding cement. Fabricate long radius bends with proper heating equipment. Bends showing signs of overheating or flattening are unacceptable. Bends less than 10 feet radius shall be made with rigid steel as described herein. Ream ends of all conduits before joining.

B. Install plastic conduit on non-metallic interlocking spacers securely anchored to prevent movement during backfilling.

C. Where conduit enters into or under a building and turns up out of the earth or turns up into pole bases or concrete pads, change from plastic to rigid galvanized steel conduit below grade. Do not extend any plastic conduit into, under or within a building. Make similar change from plastic to rigid galvanized steel conduit at connections to underground pull or junction boxes and at all bends.

D. All steel conduit in earth shall be rigid galvanized steel conduit. Wrap conduit with 3M 0.020-inch thick No. 52 "Scotchrap" vinyl plastic tape, half lapped to give a double thickness wrap. Remove all oil, grease and dirt from conduit with a suitable solvent, and clean and dry conduit before wrapping. If conduit is pre-wrapped in the shop and then cut and jointed on the job, wrap all joints on the job, overlapping pipe wrapping 3 inches on both sides of joint.

E. Metal conduits shown to be concrete encased shall be rigid galvanized steel. At the Contractor's option, corrosion protected conduits may be used; installation shall comply with manufacturer's recommendations.

F. At a minimum, provide a pull box of appropriate size every 500 feet of straight run and at every 90 degree bend. Perform tensile strength calculations for the conductor to be pulled to determine if pull boxes are required more frequently.

3.2 INSTALLATION OF BUILDING CONDUIT

A. All conduits installed within the building shall conform to requirements of this Section.

B. Run all conductors of every description in conduits unless noted or specified otherwise.

C. In above grade locations all conduits shall be galvanized rigid steel or intermediate metal conduit where installed exposed in damp or wet locations, installed in concrete, when exposed to physical damage or where utilized for conductors over 600 volts. When installed in concrete conduit may be PVC. Elsewhere conduit shall be EMT.

D. In areas where there are no suspended ceilings, run all conduits parallel/perpendicular to building surface planes.

E. Conduits shall be of such size and so installed that the conductors may be drawn through without injury or excessive strain, shall be secured at cabinets and boxes, with galvanized locknuts, both inside and outside, and shall have appropriate bushings inside. Bushings shall be insulating type or insulating type with bonding ground clamps where grounding bushings are required.

F. Join galvanized rigid steel and intermediate metal conduit with threaded couplings. Threaded conduits shall be reamed after threading, and shall be kept tightly closed at each end, and shall be kept in dry locations during construction. Conduits shall be swabbed out before conductors are pulled.

G. Conduits piercing roof membrane shall be flashed as specified in Division 7.

H. Ground metallic conduits as required by the NEC.

I. Provide a green grounding conductor in all conduits including PVC conduits sized as required by the NEC.

J. Install raceways continuous from outlet box to outlet box, or cabinet, with a maximum of 150 feet between pull points. The number of equivalent 1/4 bends between pull points shall not exceed that required by the NEC.

K. Do not install raceways within three (3) inches of hot water pipes, except where crossings are unavoidable, and then keep raceways at least 1 inch from insulation on the pipe. When possible, avoid installing raceways directly above, or in close proximity to objects operating at high temperatures.

L. In damp or wet locations, make every effort to avoid installing raceways in a manner which will create moisture traps. Seal both ends of raceways with an approved sealing compound to prevent moisture condensation within the raceways.

M. In systems operating at more than 300 volts between phase conductors, and where different phase conductors are to be run to a common outlet box, provide substantial barriers between adjacent devices in the box so that two different phase wires will not be in the same compartment.

N. Join EMT with the specified type of couplings. At EMT terminations, provide insulated throat, box connectors and locknuts.

O. Provide an expansion joint in each raceway run which is buried in, or rigidly secured to, the building construction on opposite sides of a building expansion joint, and in each long straight run of raceway which may be subject to excessive expansion.

P. Wherever raceways pass through floors, walls, penetrations, or other partitions, or through sleeves in floors, walls or other partitions, carefully fill any space between the outside of the raceway and the building material to prevent passage of air, water, smoke, and fumes. Filling material shall be a UL listed, intumescent sealant having fire/smoke resistive quality.

Q. Conduits utilized throughout the project shall not be smaller than 3/4 inch for feeders, multiple branch circuit homeruns and homeruns of conductors large than No. 12. Individual branch circuit wiring for No. 12 conductors shall be acceptable in ½" conduit, i.e. 2#12, 1#12G, ½" C.

3.3 INSTALLATION OF PULL AND JUNCTION BOXES

A. Size all pull and junction boxes in accordance with the NEC. Use larger sizes than required by code where job conditions so indicate.

B. Fasten all boxes securely to the building construction, independent of conduit systems.

C. On concealed conduit systems where boxes are not otherwise accessible, set boxes flush with finished surfaces for access, and provide overlapping covers.

3.4 INSTALLATION OF OUTLET BOXES

A. Terminate conduits at a metal outlet box at each outlet or device. All boxes shall conform to the NEC.

3.5 INSTALLATION OF PULL CORD (OR WIRES)

A. Provide a pull cord (or wire) in every empty raceway, not containing conductors to be installed under this Division, to facilitate future installation of wiring. Cord shall be free from splices and shall have 12 feet of exposed length at each end. Coil and identify each end of each line with plastic tag bearing complete information as to the purpose of the raceway and the location of its other end.

3.6 INSTALLATION OF CONDUIT HANGERS AND SUPPORTS

A. Furnish and install all hangers and supports required by the raceway systems. Refer to Section 16190 for additional requirements.

B. Support all above-grade electrical conduits from the building construction. Support conduits running vertically or horizontally along walls with galvanized malleable iron one-hole clamps. Carry individually supported horizontal conduits 1-1/4 inch and larger on suspension hangers.

C. Where multiple raceways are run vertically or horizontally at the same elevations, they shall be supported on trapezes formed of sections of metal framing, suspended on rods. Size trapeze members, including the suspension rods, based on the support required for the number, size, and loaded weight of the conduits. Space them as required for the smallest conduit to be supported.

D. Locate hangers and trapezes to support horizontal raceways without appreciable sagging. Hanger spacing shall not exceed NEC requirements, or recommendations of the NECA "Standard of
Installation".

E. Where local branch circuit conduits smaller than 1-1/4 inch are installed above metal lath and plaster ceilings or mechanically suspended dry ceilings of the non-removable type, they may be supported on ceiling runner channels. Where multiple conduits are passing through, they shall be supported on trapeze hangers.

F. Where local branch circuit conduits smaller than 1-1/4 inch are installed above removable type dry ceilings, support them on suitable hanger rods with metal clips at a distance above the ceiling sufficient to permit removal of ceiling panel and lighting fixtures. (Do not secure them to ceiling hanger rods.) Locate such conduits so as not to hinder access to mechanical equipment through ceiling panels. Where multiple conduits are passing through, they shall be supported on trapeze hangers.

G. Where support anchors are required, establish their type and locate in concrete construction before concrete is poured, if possible. Fit each hanger rod with a nut at its upper end and set nut in a universal concrete insert in the form. Where supported weight exceeds holding strength of a single insert, pass rods through top slot of inserts and interlock with reinforcing steel. Also, where particularly heavy loads are to be supported, suspend hanger rod or rods from a structural angle spanning two or more inserts and securely bolted thereto to distribute the weight.

3.7 INSTALLATION OF SURFACE METAL RACEWAY

A. Firmly secure raceway components to building surfaces using plastic expansion shields and flathead sheet metal screws for plaster, plastic expansion shields and flathead wood screws for drywall or masonry lead expansion shields for brick, cinder block and concrete construction.

B. Raceways shall be run perpendicular and parallel to building surfaces with boxes set plumb and square.

3.8 SEGREGATION OF WIRING SYSTEMS

A. Segregation of wiring systems shall not be compromised by the use of common pull boxes,x wireways, cabinets or any other type of enclosure.

B. The raceway system for each feeder shall be a separate system completely fault isolated from all other raceway systems.

C. The raceway system for the branch circuits of each panelboard shall be a separate system completely fault isolated from all other raceway systems.

END OF SECTION 26 05 33

SECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

A. The General Provisions, Supplemental General Provisions, Special Provisions and Division 1 Specification sections, apply to work covered by this Section.

B. Comply with Division 26 Sections, as applicable. Refer to other Divisions for coordination of work.

1.2 SCOPE OF WORK

A. Provide labor, material, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of electrical identification, including related accessories.

B. Provide electrical identification for the following:
   1. Panelboards, motor starters, contactors, disconnect switches, circuit breakers and other electrical equipment with nameplate identifying the item of equipment and the equipment serving the same.
   2. Raceways, junction boxes and pull boxes.
   3. Wiring devices.
   4. Wiring.
   5. Three phase motor rotation.

1.3 SUBMITTALS

A. Submit product data in accordance with Division 1 for products specified under PART 2 - PRODUCTS.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Brady

B. Panduit

C. Thomas & Betts

D. Seton

2.2 IDENTIFICATION

A. Nameplates
   1. Nameplates shall be black engraved surface on white core for normal power circuits and red engraved surface on white core for emergency power circuits.
   2. Provide for each distribution panelboard, branch circuit panelboard, transformer and any other similar equipment furnished under this Division identification as to its given name, voltage and origination of service. Examples are as follows:

‘HA’	‘DPA’
480Y/277V	480Y/277V
FED FROM ‘DPA’	FED FROM ‘MSA’

‘LA’	‘TLA’
208Y/120V	75 KVA, 480V to 208Y/120V
FED FROM ‘TLA’	FED FROM ‘HA’

3. Provide for each motor starter enclosure, circuit breaker enclosure, disconnect switch and any other similar equipment furnished under this Division, identification as to the specific load that it serves and the origination of service. Examples are as follows:

‘CHP-1'	‘AHU-1'
FED FROM ‘MCC-1'	FED FROM ‘DPA’

4. Provide for each feeder protective device in each distribution panelboard and any other similar equipment furnished under this Division, identification as to the specific load that it serves.
5. Nameplates shall be laminated, white core, plastic with beveled edges, minimum 1/16 inch thick. Lettering shall be machine-engraved, not less than 1/4" high, cut through the black or red surface to the white core.

B. Junction Boxes and Pull Boxes
1. Identification shall be with a black permanent marking pen on the top of 4" x 4" junction box covers or on the back of an outlet box cover plate identifying the branch circuits and systems within the conduit. Pull boxes shall be provided with a nameplate stating voltage and system served.

C. Wiring Device Wall Plates
1. On the back side of wiring device wall plates identify with a black permanent marking pen the panelboard and branch circuit number the device is served from.

D. Wire Markers
1. Wire markers for identification of wiring shall be self-adhesive type having letters and numerals indicating serving equipment and feeder or branch circuit number.

E. Rotation Tags
1. Rotation tags shall be brass or aluminum securely attached to equipment.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surfaces to receive labels or nameplates shall be carefully prepared in accordance with the manufacturer's instructions and recommendations.

3.2 NAMEPLATES

A. Nameplates shall be properly attached to identify panelboards, feeder circuit breakers, disconnect switches, pull boxes and other similar equipment furnished under this Division.

3.3 WIRE MARKERS

A. Wire markers shall be applied to each conductor or cable within panelboards, motor starter enclosures, circuit breaker enclosures, disconnect switches, cabinets, junction boxes, pull boxes, and other similar equipment identifying the serving equipment and feeder or branch circuit from which the conductors originate.

END OF SECTION 26 05 53

SECTION 26 08 00 – COMMISSIONING OF ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. The purpose of this section is to specify the Division 26 responsibilities and participation in the Commissioning Process.

B. Work under this contract shall conform to requirements of Division 01, General Requirements, Conditions of the Contract, and Supplementary Conditions. This specification covers commissioning of mechanical systems which are part of this project.

C. Commissioning work shall be a team effort to ensure that all electrical equipment and systems have been completely and properly installed, function together correctly to meet the design intent, and document system performance. Commissioning shall coordinate system documentation, equipment start-up, control system calibration, testing and balancing, and verification and performance testing.

D. The Commissioning Team shall be made up of representatives from the owner, Design Team, General Contractor (GC), manufacturers, and construction trades. The trades represented on the Commissioning Team shall include, but not be limited to: sheet metal, piping and fitting, controls, test and balance, and electrical. The lead person for each trade who will actually perform or supervise the work is to be designated as the representative to the Commissioning Team. Responsibility for various steps of the Commissioning Process shall be divided among the members of the Commissioning Team, as described in this section.

E. The CxA (Commissioning Authority) shall have responsibility for coordinating and directing each step of the Commissioning Process.

F. Electrical system installation, start-up, testing, balancing, preparation of O&M manuals, and operator training are the responsibility of the Division 26 Contractors, with coordination, observation, verification and commissioning the responsibility of Division 01. The Division 01 Commissioning Process does not relieve Division 26 from the obligations to complete all portions of work in a satisfactory and fully operational manner.

1.2 Electrical Contractor (EC) and Electrical Sub-Contractors:

A. Provide all personnel, tools, materials, and equipment to support the commissioning process. Facilitate the coordination of the commissioning work by the CxP (Commissioning Providers) and incorporate commissioning activities into the master schedule.

B. Incorporate all commissioning related activities into the project schedule, ensuring that Cx (Commissioning) activities do not delay project completion.

C. Notify Dallas ISD and the CxP in writing that equipment and systems are ready for functional testing.

D. Perform equipment startups using authorized manufacturing representatives.

E. Provide written documentation to the CxP that equipment and systems are fully operational and ready to be functionally performance tested.

F. Perform commissioning tests at the direction of the CxP, including change of season testing.

G. Attend construction phase commissioning coordination meetings.

H. Provide qualified personnel for participation in commissioning tests.

I. Provide equipment, materials, and labor necessary to correct deficiencies found during the commissioning process.

J. Participate in electrical systems, assemblies, equipment, and component maintenance orientations and inspections as directed by the CxP.

K. Provide information requested by the CxP for commissioning documentation and testing.

L. Perform all quality control functions to ensure equipment and systems are installed properly. Ensure equipment and systems are brought to a state of readiness and full functionality prior to commencing the commissioning functional performance testing processes. M. Provide qualified personnel for participation in Commissioning tests.

N. Provide a representative to attend end of warranty testing.

PART 2 - PRODUCTS – (Not Used)

PART 3 - EXECUTION – (Not Used)

END OF SECTION 26 08 00

SECTION 26 08 13 - ELECTRICAL ACCEPTANCE TESTING

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

A. The General Provisions, Supplemental General Provisions, Special Provisions and Division 1 Specification sections, apply to work covered by this Section.

B. Comply with Division 26 Sections, as applicable. Refer to other Divisions for coordination of work.

C. The furnishing and installation of control power wiring required for equipment furnished under Division 23 and not shown on the electrical drawings shall be furnished under Division 23. Control power wiring is defined as the line voltage (120V) power wiring for equipment control cabinets, temperature control, energy management, or building automation system panels and line voltage smoke/fire dampers.

D. The furnishing and installation of the temperature control wiring, energy management system or building automation wiring not shown on the electrical drawings shall be furnished under Division 23. Temperature control, energy management system and building automation system wiring is defined as the interlock or interconnecting wiring required between system control devices, appurtenances and control panels to allow the system to function automatically. This includes wiring between the fire alarm system, smoke exhaust systems, door entry systems and any other system requiring interface with the temperature control, energy management and building automation system.

1.2 SCOPE OF WORK

A. Provide labor, materials, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of power wiring to each motor-driven and/or electrically operated system or unit of equipment.

B. Provide labor, materials, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of the line voltage wiring serving power to a motor(s) or piece of electric powered equipment. The wiring shall allow the motor(s) or equipment to operate in a manual mode.

C. Provide labor, materials, equipment, tools and services and perform operations required for, and reasonably incidental to, the providing of control wiring for miscellaneous systems. The Contractor shall be responsible for reviewing the project specifications to ascertain the extent of the control wiring required for the miscellaneous systems and shall assume the responsibility for performing the work.

D. Provide labor, materials, equipment, tools and services, and perform operations required for and reasonably incidental to, the providing of a fully connected and operating smoke damper installation. Coordinate with the mechanical contractor the required work. The following is a description of the responsibilities for the specified system:
   1. The mechanical contractor will provide the smoke dampers and actuators as indicated in the specifications and on the plans. In addition, if the smoke dampers have pneumatic actuators, the mechanical contractor will provide all control air piping from a source to each smoke damper and the electro-pneumatic (EP) and/or pneumatic-electric (PE) switches as required for actuation of the smoke dampers.
   2. The electrical contractor shall provide the power wiring for the smoke damper actuators.
   3. The fire alarm contractor shall provide the signal and control wiring for the operation of the smoke dampers including all wiring of EP and/or PE switches.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials and equipment provided hereinafter shall comply with other Division 26 Sections and with Division 23 of these Specifications.

PART 3 - EXECUTION

3.1 MOTORS

A. Except for items that are furnished with factory-installed, integral motors, an electric motor of required size and electrical characteristics will be provided and installed as specified in Division 23 for each item of motor-driven equipment. As part of the work of this Section, complete the electrical installation of these motors in accordance with approved wiring diagrams and instructions.

B. Where disconnect switches or circuit breakers are not provided integral with control equipment for motors and other electrical appurtenances, provide and install all disconnect switches required by the National Electrical Code and/or as indicated on the Drawings.

3.2 SYSTEM, EQUIPMENT AND DEVICE WIRING

A. Connect complete for operation all items of heating, ventilation, air conditioning, plumbing, fire protection and all electrical systems, equipment and devices furnished by the Owner or specified in other Divisions of the Specifications. System, equipment and device outlets of various types have been indicated in the Specifications or on the drawings, but indication of exact location or scope of the work may not be indicated. Refer to the Owner and to the work specified in the other Divisions for the scope of connections to the equipment furnished by them and for the exact locations of all connections to the equipment furnished by them. Power wiring shall be provided under Division 26 as indicated. Control wiring not indicated to be provided under Division 26 shall be provided by the provider of the system, equipment, or device and installed and terminated under Division 26. Request all rough-in drawings required for proper installation of the electrical work in ample time to permit preparation of the installation drawings and thus avoid delays on the job.

END OF SECTION 26 08 13

SECTION 26 27 16 - ELECTRICAL CABINETS AND ENCLOSURES

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

A. The General Provisions, Supplemental General Provisions, Special Provisions and Division 1 Specification sections, apply to work covered by this Section.

B. Comply with Division 26 Sections, as applicable. Refer to other Divisions for coordination of work.

1.2 SCOPE OF WORK

A. Provide labor, materials, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of electrical cabinets and enclosures, including all related systems and accessories.

1.3 SUBMITTALS

A. Submit product data and shop drawings in accordance with Division 1 for products specified under PART 2 - PRODUCTS.

1.4 REFERENCE STANDARDS

A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

B. NEMA ICS 4 - Terminal Blocks for Industrial Control Equipment and Systems.

C. ANSI/NFPA 70 - National Electrical Code.

D. UL 50 - Electrical Cabinets and Boxes.

1.5 REGULATORY REQUIREMENTS

A. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Hoffman Engineering Company.

B. Square D Company.

2.2 HINGED COVER ENCLOSURES

A. Construction: NEMA 250, Type 1 and 3R steel enclosure.

B. Covers: Continuous hinge, held closed by flush latch operable by key.

C. Interior: Provide interior metal panel for mounting terminal blocks and electrical components; finish with white enamel.

D. Enclosure Finish: Manufacturer's standard enamel. When required, field painting shall be as specified by Division 9.

2.3 CABINETS

A. Boxes: Galvanized steel with gray baked enamel finish.

B. Box Size: As required or indicated.

C. Fronts: Steel, flush or surface type indicated with concealed hinge, and flush lock keyed to match branch circuit panelboard. Finish with gray baked enamel. When required, field painting shall be as specified by Division 9.

D. Provide metal barriers to separate compartments containing control wiring operating at less than 50 volts from power wiring.

E. Provide accessory feet for free-standing equipment.

2.4 TERMINAL BLOCKS

A. Terminal Blocks: ANSI/NEMA ICS 4.

B. Power Terminals: Unit construction type with closed back and tubular pressure screw connectors, rated 600 volts.

C. Signal and Control Terminals: Modular construction type, suitable for channel mounting, with tubular pressure screw connectors, rated 300 volts.

D. Provide ground bus terminal block, with each connector bonded to enclosure.

2.5 EXTRA MATERIALS

A. Provide two of each cabinet key.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verify that surfaces are ready to receive work.

B. Install products in accordance with manufacturer's instructions.

C. Install enclosures and boxes plumb. Anchor securely to wall and structural supports at each corner.

D. Install cabinet fronts plumb.

END OF SECTION 26 27 16

SECTION 26 27 26 - WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

A. The General Provisions, Supplemental General Provisions, Special Provisions and Division 1 Specification sections, apply to work covered by this Section.

B. Comply with Division 26 Sections, as applicable. Refer to other Divisions for coordination of work.

1.2 SCOPE OF WORK

A. Provide labor, material, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of wiring devices, including related systems and accessories.

1.3 SUBMITTALS

A. Submit product data and shop drawings in accordance with Division 1 for products specified under PART 2 - PRODUCTS.

1.4 REFERENCE STANDARDS

A. The wiring devices specified herein shall be designed, manufactured, tested and installed according to the latest version of the following standards:
   1. National Electrical Manufacturers Association (NEMA) WD-1
   2. Federal Specification (FS) WC-596
   3. Federal Specification (FS) WS-896
   4. Underwriters Laboratories (UL)

B. All wiring devices shall be UL listed.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Pass & Seymour

B. Hubbell

C. Leviton

D. General Electric

2.2 RECEPTACLES

A. General
   1. Receptacles shall be standard or decorative style as indicated herein. They shall be constructed of high-impact resistant thermoplastic material with a nylon face and thermoplastic back body. Unless noted otherwise, they shall be 2-pole, 3-wire with a green equipment ground screw or an automatic grounding system attached to the strap.
   2. Receptacle color shall be ivory unless noted otherwise.

B. Specification Grade
   1. Specification Grade receptacles shall be standard style. The face shall be constructed of a high-impact resistant thermoplastic. The contacts shall be a triple wipe, T-slot, one-piece copper alloy design. The device shall have a green ground screw, or an automatic grounding system attached to the strap. The device shall be 20-ampere, 125-volts, NEMA configuration 5-20R, back and side-wired.

C. Special purpose receptacles shall be constructed of a high-impact resistant thermoplastic material and shall meet the UL and Federal Specification requirements that may apply to their special category. Special purpose receptacles shall be of the specific NEMA configuration indicated on the Drawings.

D. Ground Fault Circuit Interrupter (GFCI)
   1. GFCI receptacles shall be a feed-through type wired for single receptacle protection thus not affecting receptacles downstream on the same circuit. They shall be UL rated Class 1 with 5milliampere ground fault trip level and a 20-ampere feed-through rating. GFCI receptacles shall be NEMA configuration 5-20R.

2.3 SWITCHES

A. General
   1. Switches shall be toggle or decorative rocker type as indicated herein. The body of the switch shall be made of an arc-resistant thermoset material. All toggle switch handles shall be constructed of a thermoplastic material. All rocker switch handles shall be constructed of a thermoset material. All wall switches shall be of the quiet AC type.
   2. Switches shall be SPST, DPST, 3-way or 4-way as indicated on the Drawings.
   3. Switch color shall be ivory unless noted otherwise.

B. Specification Grade
   1. Specification Grade switches shall be toggle type. The contact arms shall be made of one-piece copper alloy material. The switch shall include a green ground screw attached to the mounting strap. The switch shall be 20-ampere, 120/277-volts AC, horsepower rated, back and side-wired.

C. Incandescent Wall box Dimmers
   1. Manufacturer
      a. Lutron
   2. Performance
      a. All devices shall be capable of operating at rated capacity without adversely affecting design lifetime.
      b. All devices shall mount individually in a single gang switchbox. Devices shall be gangable without removing side sections or derating capacity.
      c. Devices shall operate in an ambient temperature range of 32ºF to 104ºF.
      d. All dimmers and switches shall incorporate an air gap switch which shall be accessible without removing the faceplate. The air gap switch shall be capable of meeting all applicable requirements of UL 20 for air gap switches in incandescent dimmers.
      e. All dimmers and switches shall provide power-failure memory. Should power be interrupted and subsequently returned, the lights will come back on to the same levels set prior to the power interruption. Restoration to some other default level is not acceptable, unless noted otherwise.
      f. Dimmers and switches shall not be susceptible to damage or loss of memory due to static discharge.
      g. Dimmers and switches shall be tested to withstand voltage surges of up to 600V and current surges of up to 200A without damage per ANSI/IEEE std. C62.411980.

h. Dimmers and switches shall meet the UL 20 limited short circuit test requirement for snap switches.

3. Dimmer Controls
   a. Dimmer control of light intensity shall be via a linear slide.
   b. Linear slide dimmer shall provide intensity and on/off control with movement of slider. This shall apply to single pole and 2-location dimmers.
   c. Dimmer shall include voltage compensation circuitry that adjusts the firing angle of the dimmer in such a manner as to compensate light output for variations in the AC line voltage. Dimmers in which the firing angle is merely held constant with varying AC line voltage shall not be acceptable.
   d. All dimmers shall provide a smooth and continuous Square Law Dimming curve.
   e. Dimmers shall utilize a filtering network to minimize interference with properly installed radio, audio and video equipment.
   f. Dimmer control slider shall be captured.
   g. All dimmers shall meet UL 20 and be appropriately marked.

4. Switches
   a. All dimmer related on/off switches shall be single pole, 3-Way and 4-Way configuration as indicated on the Drawings.
   b. Switch rating shall be 20A, 120 VAC, for tungsten or inductive loads.

5. Wall Plates
   a. Wall plates shall include mounting frame for proper device alignment and faceplate attachment.
   b. Wall plates shall be constructed of stainless steel.
   c. Wall plates shall snap on to device with no visible means of attachment.
   d. Heat fins shall not be visible on front of device.
   e. At locations with multiple devices, one seamless, multi-gang faceplate shall be provided. Coordinate proper switch box size and wall plate type.

2.4 WALL PLATES

A. Wall plates shall be provided for all switches, receptacles, blanks, telephone and special purpose outlets. The wall plates shall be of suitable configuration for the device for which it is to cover with color matched mounting screws. Color of the wall plates shall match the device, unless noted otherwise.

B. Wall plates shall be stainless steel.

C. Weatherproof: Wiring devices in wet and damp locations shall be installed with a hinged outlet cover/enclosure clearly marked “Suitable for Wet Locations While in Use” and “UL Listed”. There shall be a gasket between the cover/enclosure and the mounting surface, and between the hinged cover and mounting plate/base to assure proper seal. The cover/enclosure shall employ stainless steel mounting hardware and be constructed of impact resistant polycarbonate. The cover/enclosure shall be specification grade as manufactured by Taymac Corporation or equal.

PART 3 - EXECUTION

3.1 INSTALLATION OF WIRING DEVICES

A. Each wiring device shall be mounted in a metallic outlet box. In general, devices in finished spaces shall be flush mounted and devices in unfinished spaces, i.e. mechanical and electrical equipment rooms, shall be surface mounted. Verify the requirements of all spaces with the Architect.

B. Wall Plates
   1. Each device shall have a cover plate appropriate for the application.
   2. Cover plates shall be installed true and plumb with building lines, mortar joints and architectural features.
   3. Adjacent devices shall be mounted under a common cover plate suitable for the application.

C. Mount receptacles and special systems outlets above finish floor to the device centerline, unless noted or required otherwise.

D. Place conductor under wiring device screw terminals and draw up snugly.

E. Mount switches above finish floor to the device centerline and 6" from a door strike, unless noted or required otherwise.

F. Grounding continuity shall be maintained between devices and metallic raceway system in addition to the green equipment grounding conductor run with circuit conductors. Care shall be taken when installing receptacles having an isolated ground pole so as to not bond the equipment ground conductor to the conduit system.

G. Wire each receptacle using correct polarity (i.e., neutral to neutral terminal, etc.).

H. Mount receptacles throughout the project with ground pole at the top of the configuration when mounted vertically, on the right when horizontally mounted.

I. All exterior wiring devices shall be provided with a weatherproof cover/enclosure. Exterior receptacles shall be GFCI type.

J. Derate dimmer capacity as required by the manufacturer if side sections are removed.

K. Run a separate neutral wire for each phase of a three phase system when dimmers are installed on multiple phases and for each dimmer when multiple dimmers are installed on the same phase.

END OF SECTION 26 27 26

SECTION 26 28 23 - DISCONNECT SWITCHES – FUSED AND NON-FUSED

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

A. The General Provisions, Supplemental General Provisions, Special Provisions and Division 1 Specification sections, apply to work covered by this Section.

B. Comply with Division 26 Sections, as applicable. Refer to other Divisions for coordination of work.

1.2 SCOPE OF WORK

A. Provide labor, materials, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of disconnect switches, including all related systems and accessories.

1.3 SUBMITTALS

A. Submit product data and shop drawings in accordance with Division 1 for products specified under PART 2 - PRODUCTS.

B. Provide outline drawings with dimensions, and equipment ratings for voltage, amperage, horsepower and short circuit.

1.4 REFERENCE STANDARDS

A. Switches shall be manufactured in accordance with the following standards:
1. UL 98 - Enclosed and Dead Front Switches
2. NEMA KS1 - Enclosed Switches
3. NEMA 250 - Enclosures for Electrical Equipment

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Siemens

B. Square ‘D

C. Cutler Hammer

2.2 GENERAL

A. Switches shall be heavy duty type.

2.3 SWITCH INTERIOR

A. Switches shall have switch blades which are visible when the switch is OFF and the cover is open.

B. Lugs shall be front removable, and UL listed for 60°C or 75°C conductors 30-100 ampere, 75°C conductors 200 ampere and up.

C. Current carrying parts shall be plated to resist corrosion.

D. Switches shall have removable arc suppressor to facilitate easy access to line side lugs.

E. Switches shall have provisions for a field installable electrical interlock.

2.4 SWITCH MECHANISM

A. Switch operating mechanism shall be quick-make, quick-break such that, during normal operation of the switch, the operation of the contacts shall not be capable of being restrained by the operating handle after the closing or opening action of the contacts has started.

B. The operating handle shall be an integral part of the box, not the cover.

C. Provisions for padlocking the switch in the OFF position with at least three padlocks shall be provided.

D. The handle position shall travel at least 90° between OFF and ON positions to clearly distinguish and indicate handle position.

E. Switches shall have a dual cover interlock mechanism to prevent unintentional opening of the switch cover when the switch is ON and prevent turning the switch ON when the cover is open. The cover interlock mechanism shall have an externally operated override but the override shall not permanently disable the interlock mechanism. The tool used to override the cover interlock mechanism shall not be required to enter the enclosure in order to override the interlock.

2.5 SWITCH ENCLOSURES

A. Switch covers shall be attached with welded pin-type hinges (Type 1) or top-hinged, attached with removable screws and securable in the open position (Type 3R).

B. The enclosure shall be finished with gray baked enamel paint, which is electrodeposited on cleaned, phosphate pre-treated steel (Type 1) or gray baked enamel paint which is electrodeposited on cleaned, phosphate pre-treated galvannealed steel (Type 3R).

C. The enclosure shall have ON and OFF markings stamped into the cover.

D. The operating handle shall be provided with a dual colored, red/black position indication.

E. Switches shall have provisions to accept up to three 3/8" hasp padlocks to lock the operating handle in the OFF position.

F. Tangential knockouts shall be provided to facilitate ease of conduit entry (Type 1).

G. Type 3R enclosure shall contain no knockouts. Supply watertight hubs.

2.6 SWITCH RATINGS

A. Switches shall be horsepower rated.

B. The UL listed short circuit current rating of the switches shall be: 200,000 rms symmetrical amperes when used with or protected by Class R or Class J fuses 30-600 ampere employing appropriate fuse rejection schemes.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install disconnect switches where indicated.

B. Install fuses in fusible disconnect switches.

END OF SECTION 26 28 23

SECTION 26 29 01 – CONTACTORS

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

A. The General Provisions, Supplemental General Provisions, Special Provisions and Division 1 Specification sections, apply to work covered by this Section.

B. Comply with Division 26 Sections, as applicable. Refer to other Divisions for coordination of work.

1.2 SCOPE OF WORK

A. Provide labor, materials, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of contactors, including all related systems and accessories.

1.3 SUBMITTALS

A. Submit product data and shop drawings in accordance with Division 1 for products specified under PART 2 - PRODUCTS.

B. Product Data: Include dimensions, size, voltage ratings and current ratings.

1.4 REFERENCE STANDARDS

A. ANSI/NEMA ICS 6 - Enclosures for Industrial Controls and Systems

B. NEMA ICS 2 - Industrial Control Devices, Controllers, and Assemblies

C. ANSI/NFPA 70 - National Electrical Code

1.5 OPERATION AND MAINTENANCE DATA

A. Maintenance Data: Include instructions for replacing and maintaining coil and contacts.

1.6 REGULATORY REQUIREMENTS

A. Furnish products listed and classified by Underwriters' Laboratories.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Siemens

B. Automatic Switch Company (ASCO).

C. Square ‘D’

2.2 POWER LIGHTING CONTACTORS

A. Description: NEMA ICS 2, magnetic lighting contactor.

B. Configuration: Electrically held with continuously rated, encapsulated coils. Mechanically held and electrically operated with encapsulated coils. Standard coil clearing contacts are to be provided so that the contactor coils shall be energized only during the instance of operation.

C. Coil Voltage: 120 volts, 60 Hz, as indicated or required.

D. Poles: As indicated.

E. Contact Rating: Amperes required for all types of ballast and tungsten lighting of resistive heating, and motor loads.

F. Contacts: Totally enclosed, double-break silver-cadmium-oxide power contacts. Contact inspection and replacement shall be possible without disturbing line or load wiring.

G. Wiring: Straight-through wiring with all terminals clearly marked.

H. Enclosure: ANSI/NEMA ICS 6, Type 1 or 3R, as required to meet conditions of installation.

I. Disconnect Means: Contactor shall not provide the disconnecting means in the same enclosure.

J. Accessories
   1. Selector Switch: HAND-OFF-AUTOMATIC
   2. Auxiliary Contacts: Two, normally open and normally closed, field convertible, field convertible.

2.3 MULTI-POLE LIGHTING CONTACTORS

A. Description: Magnetic lighting contactor.

B. Configuration: Mechanically held and electrically operated with encapsulated coils. Standard coil clearing contacts are to be provided so that the contactor coils shall be energized only during the instance of operation.

C. Coil Voltage: 120 volts, 60 Hz.

D. Poles: As indicated.

E. Contact Rating: 20 amperes for all types of ballast and tungsten lighting, resistive heating, and motor loads.

F. Contacts: Totally enclosed, double-break silver-cadmium-oxide power contacts. Contact inspection and replacement shall be possible without disturbing line or load wiring. All contacts shall have clearly visible N.O. and N.C. contact status indicators.

G. Wiring: Straight-through with all terminals clearly marked.

H. Enclosure: ANSI/NEMA ICS 6, Type 1 or 3R, as required to meet conditions of installation.

I. Accessories
   1. Selector Switch: HAND-OFF-AUTOMATIC.
   2. Auxiliary Contacts: Two, normally open and normally closed, field convertible, field convertible.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

END OF SECTION 26 29 01

SECTION 26 29 13 - ENCLOSED CONTROLLERS

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

A. The General Provisions, Supplemental General Provisions, Special Provisions and Division 1 Specification sections, apply to work covered by this Section.

B. Comply with Division 26 Sections, as applicable. Refer to other Divisions for coordination of work.

1.2 SCOPE OF WORK

A. Provide labor, materials, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of enclosed motor controllers including all related systems and accessories.

1.3 SUBMITTALS

A. Submit product data and shop drawings in accordance with Division 1 for products specified under PART 2 - PRODUCTS.

B. Provide catalog sheets showing voltage, controller size, ratings and size of switching and overcurrent protective devices, short circuit ratings, dimensions, and enclosure details.

1.4 REFERENCE STANDARDS

A. NFPA 70 - National Electrical Code.

B. NECA "Standard of Installation," published by National Electrical Contractors Association.

C. NEMA AB 1 - Molded Case Circuit Breakers.

D. NEMA ICS 2 - Industrial Control Devices, Controllers, and Assemblies.

E. NEMA ICS 6 - Enclosures for Industrial Controls and Systems.

F. NEMA KS 1 - Enclosed Switches.

1.5 REGULATORY REQUIREMENTS

A. Furnish products listed and classified by Underwriters Laboratories, Inc.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Siemens

B. Square D

C. General Electric

D. Cutler-Hammer/Westinghouse

2.2 MOTOR CONTROLLER

A. Motor starters shall be across-the-line magnetic type with ratings as indicated. Starters shall be mounted in general purpose enclosures unless otherwise indicated.

B. Across-the-line magnetic starters shall be equipped with double break silver alloy contacts. All contacts shall be replaceable without removing power wiring. The starter shall have straight-through wiring.

C. Coils shall be of molded construction. All coils shall be replaceable from the front.

D. Overload relays shall be the melting alloy type with a replaceable control circuit module. Thermal units shall be of one-piece construction and interchangeable. The starter shall be inoperative of the thermal unit is removed.

E. Starters shall be suitable for the addition of four external auxiliary contact of any arrangement normally open or normally closed; external auxiliary contacts shall be field convertible.

F. All motor starters, unless noted otherwise, shall be 3-pole, 3-phase of the NEMA size indicated on the drawings with 3 melting alloy overhead relays, a 3-position "Hand-Off-Auto" (H-O-A) selector switch and a red "On" pilot light in the cover of the enclosure, and a 120 volt control power transformer with secondary fuse.

2.3 COMBINATION MOTOR CONTROLLER

A. Combination Motor Starters shall be of the ratings as indicated. The motor starters shall be across the line magnetic type complete with all accessories previously specified. Disconnect switch combination starters shall consist of a visible blade disconnect switch, a motor starter and be fusible or non-fusible as required. Circuit breaker type combination starters shall consist of a circuit breaker and a motor starter. Combination starters shall be mounted in general purpose enclosures unless otherwise indicated.

B. The disconnect handle used on combination starters shall always be in control of the disconnect device with the door opened or closed. The disconnect handle shall be clearly marked as to whether the disconnect device in "On" or "Off" and shall include a two-color handle grip, the black side visible in the "Off" position indicating a safe condition, and the red side visible in the "On" position indicating an unsafe or danger condition.

2.4 MANUAL MOTOR CONTROLLER

A. Manual starters shall consist of a manually operated toggle switch equipped with melting alloy type thermal overload relay. Thermal unit shall be of one-piece construction and interchangeable. Starter shall be inoperative if thermal unit is removed. Contacts shall be double break, silver alloy, visible from both sides of starter. Toggle operator shall be furnished with a handle guard having locking provision. Starter shall include a red pilot light.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install controllers where indicated.

B. Install controllers plumb. Provide supports in accordance with Section 260529.

C. Height: 5 ft to operating handle.

D. Select and install overload heater elements in motor controllers to match installed motor characteristics.

E. Provide engraved plastic nameplates under the provisions of Section 260553.

F. Provide neatly typed label inside each motor controller door identifying motor served, nameplate horsepower, full load amperes, code letter, service factor, and voltage/phase rating.

3.2 FIELD QUALITY CONTROL

A. Inspect and test each enclosed controller to NEMA ICS 2.

END OF SECTION 26 29 13

SECTION 26 51 00 – LIGHTING FIXTURES

PART 1 – GENERAL

1.1 RELATED REQUIREMENTS

A. The General Provisions, Supplemental General Provisions, Special Provisions and Division 1 Specification sections, apply to work covered by this Section.

B. Comply with Division 26 Sections, as applicable. Refer to other Divisions for coordination of work.

1.2 SCOPE OF WORK

A. Provide labor, material, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of the lighting as indicated.

B. Fixtures shall be complete with lamps, ballasts and related auxiliary equipment and accessories necessary to the intended operation, including mounting devices required for each type of installation.

C. Specific responsibilities of the Contractor shall include: Receipt, handling, installation, lamping, focusing, and final cleaning.

1.3 SUBMITTALS

A. Submit product data and shop drawings in accordance with Division 1 for products specified under PART 2 - PRODUCTS.

PART 2 - PRODUCTS

2.1 LIGHTING FIXTURES

A. Provide lighting fixtures in accordance with the designations and descriptions in the "Lighting Fixture Schedule" located on the Drawings. Where a single manufacturer and associated catalog number is scheduled, it has been done in order to establish a desired type and standard of quality rather than to discriminate against an equal product made by another manufacturer. Where multiple manufacturers are listed, none other than those manufacturers will be accepted.

B. Provide a lighting fixture complete with lamps, ballasts, and other required appurtenances for each lighting outlet shown. Each unit shall be furnished with all mounting and trim accessories to suit the specific services applied. Finishes shall be factory-standard except where scheduled otherwise.

C. All lighting fixtures shall bear the UL label.

D. Submit shop drawings following procedures described in Division 1.

E. Where lighting fixtures are scheduled with plastic lenses, provide virgin acrylic lenses having a thickness of 0.125 inches.

F. Exit lighting fixtures shall comply with NFPA 101 and shall have "chevron" type arrows external to the lettering.

2.2 LAMPS

A. Each lighting fixture shall be furnished with a full set of new lamps of the types indicated on the Drawings and specified herein. Lamps shall be manufactured by General Electric, Philips, or Osram-Sylvania, except where scheduled otherwise.

B. Incandescent Lamps: In general, they shall be inside frosted, energy-saving style designed for 130volt operation with a rated life of 2500 hours (extended service). Where reflector style lamps are scheduled, furnish beam pattern indicated. Special purpose incandescent and incandescent quartz lamps shall be of style, color, wattage, and configuration as scheduled as recommended by the luminaire manufacturer.

C. Fluorescent Lamps: In general, they shall be 3500K color, 48-inch length, T5HO, rapid start, energy-saving lamps with an initial nominal output of 4,450 lumens at 54 watts, and an average rated life of 20,000 hours. For special purpose fluorescent lamps, color types, lamp length, socket configuration, and illumination output shall be as scheduled, and specified herein.

D. High Intensity Discharge (HID) Lamps: Shall be of the type and wattages scheduled. Where metal halide lamps are indicated, self-extinguishing lamps shall be furnished where available in that wattage range.

E. Special lamps shall be as indicated or required for the lighting fixtures scheduled.

2.3 BALLASTS

A. Fluorescent Ballasts:
   1. Indoor Applications: Fluorescent ballast for indoor applications (minimum starting temperature of 50 degrees F) shall be equal to Motorola Lighting Inc. (MLI) rapid start high performance electronic type and meet the following requirements:
      a. Operate lamps at a frequency of 25 Khz or higher with less than 2% lamp flicker.
      b. Operate at an input voltage of 249 to 305 Vac (277V line) at an input frequency of 60 Hz. Light output shall remain constant for line voltage fluctuation of +5%.
      c. Comply with EMI and RFI limits set by the FCC (CFR 47 Part 18) for non-residential applications and not interfere with normal electrical equipment.
      d. Withstand transients as specified by ANSI C.62.41 for location category A3 in the normal mode and location category A1 in the common mode.
      e. Meet applicable ANSI standards.
      f. Nominal power factor of 0.99.
      g. No potting or PCB’s.
      h. Less than 10% Total Harmonic Distortion.
      i. Less than 6% Third Harmonic Distortion.
      j. Height compatible with fixture ballast compartment.
      k. Include a poke-in wire trap connector.
      l. Meet sound rating “A”.
      m. Underwriters Laboratories (UL) listed Class P, Type 1 Outdoor.
      n. Provide normal rated lamp life as stated by lamp manufacturers.
      o. Series wired and maintain full cathode heat during operation.
      p. Less than 1.5 lamp current crest factor (LCCF).
      q. Ballast factor standard of 0.875 +0.025 on all normal light output ballasts.
   2. Outdoor Applications: Fluorescent ballast for outdoor applications (minimum starting temperature of 0 degrees F) shall be equal to Motorola Lighting Inc. (MLI) instant start high performance electronic type and meet the following requirements:
      a. Operate lamps at a frequency of 25 Khz or higher with less than 2% lamp flicker.
      b. Operate at an input voltage of 249 to 305 Vac (277V line) at an input frequency of 60 Hz. Light output shall remain constant for line voltage fluctuation of +5%.

c. Comply with EMI and RFI limits set by the FCC (CFR 47 part 18) for non-residential applications and not interfere with normal electrical equipment.
d. Withstand transients as specified by ANSI C.62.41 for location category A3 in the normal mode and location category A1 in the common mode.
e. Meet applicable ANSI standards.
f. Nominal power factor of 0.99.
g. No plotting or PCB's.
h. Less than 10% Total Harmonic Distortion.
i. Less than 6% Third Harmonic Distortion.
j. Height compatible with fixture ballast compartment.
k. Include a poke-in wire trap connector.
l. Meet sound rating "A".
m. Underwriters Laboratories (UL) listed Class P, Type 1 Outdoor.
n. Provide normal rated lamp life as stated by lamp manufacturers.
o. Series wired and maintain full cathode heat during operation.
p. Less than 1.7 lamp current crest factor (LCCF).
q. Ballast factor standard of 0.875 +0.025 on all normal light output ballasts.

B. High Intensity Discharge (HID) Ballasts: In general, shall be regulator type designed to start and operate the specified lamp combination with a maximum wattage variation of +/-5% with a variation input voltage of +/-10%. Unit shall be designed for reliable start and operation to an ambient temperature of 20 degrees F. At rated line voltage, the power factor shall be not less than 95%. Ballast primary current during starting shall not exceed current during lamp operation. Voltage and lamp characteristics shall be as indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Lighting fixtures shall be installed in symmetrical patterns with ceiling grids, partitions, air conditioning outlets, smoke detectors, sound system speakers and similar devices. The locations are of a general nature and shall not be scaled for locations. Refer to architectural reflected ceiling plans, where these are provided, for specific locations of lighting fixtures. The reflected ceiling plans shall be the governing documents for fixture locations.

B. Stem-mounted fixtures shall have stems installed straight and perpendicular to the mounting surfaces.

C. Each luminaire shall be supported at no fewer than two (2) points on each side for fixtures up to 48 inches in length.

D. The weight of each fixture shall rest only on the fixture support system and attached to ceiling channels. Provide hangers, cables, supports, channels, frames and brackets of each kind required to erect this equipment safely in place.

E. The mounting brackets shall be installed to overlap the ceiling support channels in order to prevent the channels from shifting from underneath the fixtures.

F. The mounting brackets shall lock in position so that the bottom of each fixture is flush with the underside of the ceiling, without additional leveling adjustments.

G. The lighting fixture installations shall not interfere with the installation or removal of adjacent ceiling panels.

H. Wire lay-in type fixtures in ceilings using concealed outlet boxes accessible through ceiling panels; install conductors, including a grounding conductor, in flexible metallic conduit from box to fixture.

3.2 CLEANING

A. At the completion of the work leave all fixtures free of all dirt, duct, grease, spots and debris, with all glass and plastic clean and unbroken.

END OF SECTION 26 51 00

SECTION 27 05 00 – COMMON WORK RESULTS FOR COMMUNICATIONS

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

A. The General Provisions, Supplemental General Provisions, Special Provisions and Division 1 Specification sections, apply to work covered by this Section.

B. Comply with Division 26 Sections, as applicable. Refer to other Divisions for coordination of work.

1.2 SCOPE OF WORK

A. Provide labor, materials, equipment, tools, and services, and perform operations required for, and reasonably incidental to, the providing of a telephone and data communications empty conduit system, including all related systems and accessories.

1.3 SUBMITTALS

A. Submit product data and shop drawings in accordance with Division 1 for products specified under PART 2 - PRODUCTS.

PART 2 – PRODUCTS

2.1 GENERAL

A. Conduit, conduit sleeves, outlet boxes, cover plates and pull wire as indicated.

B. Fireproofing material for telephone and data communication conduit and conduit sleeves through fire rated walls and floors.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install telephone and data communication raceways as indicated.

B. Install individual raceways from telephone and data communications outlets to above accessible ceiling. In areas without a ceiling, raceways shall be routed to the nearest ceiling space. In building without a ceiling, raceways shall be extended back to the existing main telephone/ data communication board or to a location indicated on the Drawings. Field verify existing main telephone/data board location prior to bid.
   1. Minimum size conduit: 3/4 inch.
   2. Raceway installation shall be in accordance with Section 26 05 33.
   3. Coordinate raceway installations in millwork and other fabricated architectural items with the other portions of the Work.
   4. Provide pull wire in each raceway tagged on each end.
   5. Raceways shall be terminated with an insulating bushing or a suitable connector with an insulated throat.

C. Provide telephone and data communications outlet boxes.
   1. Provide a one-gang outlet unless noted otherwise.
   2. Install outlet box and device ring at each location.

3. Install telephone and data communications outlets at same height specified for convenience outlets unless noted otherwise. Group telephone and data communications outlets with related receptacle outlets unless noted otherwise.
4. Install a blank cover plate on all unused communications outlet boxes.

END OF SECTION 27 05 00

SECTION 28 13 00 - VIDEO INTERCOM AND ACCESS CONTROL SYSTEM

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Hands-free color video system with pan, tilt, and zoom.

1.2 RELATED SECTIONS

A. Division 1

B. Division 26

C. Division 27

1.3 REFERENCES

1.4 SYSTEM DESCRIPTION – HANDS-FREE COLOR VIDEO INTERCOM MASTER MONITOR STATION

A. Answering Door Call in Hands-Free Mode:
   1. Press CALL button.
   2. Chime tone sounds, caller is seen on video monitor, and outside sound is heard.
   3. Audio and video turn off after approximately 45 seconds if not answered.
   4. Press TALK button momentarily, and after beep, communicate hands free. Red transmit LED lights when you talk and goes off as you listen to caller or hear outside sounds.
   5. After finishing communication, press OFF button and communication will end after beep.

B. Answering Door Call in Press-to-Talk (PTT) Mode:
   1. Press CALL button.
   2. Chime tone sounds, caller is seen on video monitor, and outside sound is heard.
   3. Audio and video turn off after approximately 45 seconds if not answered.
   4. Press and hold TALK button for minimum of 1 second. Beep sounds, and after approximately 1 second another beep sounds, which indicates PTT mode is engaged. If TALK button is pressed less than 0.5 seconds, PTT mode is not engaged.
   5. When communicating, keep TALK button pressed. To hear caller's voice, release TALK button.
   6. After finishing communication, press OFF button and communication will end after beep.

C. Instant-Voice-Call Function:
   1. Press CALL button.
   2. Even without answering, door area can be seen and heard with video and audio for approximately 45 seconds. Inside sound is not heard outside.

D. Activating Door Release:
   1. Press DOOR RELEASE button.
   2. Open door while release mechanism is activated. During release, red DOOR RELEASE LED flashes.

E. Entrance Monitoring:
   1. Press MONITOR button in standby mode.
   2. Video monitor displays image from door station and incoming audio is heard. If you do not press TALK button, caller will not hear sounds from inside station.

3. Press OFF button to end communication.

F. Room-to-Room Communication:
1. Press CALL button to talk with other person.
2. Call-in is sent to sub master station.
3. Reply of other person is not heard.
4. If other person presses TALK button, hands-free communication is possible.
5. Press and release OFF button to end communication.

G. Wide/Zoom Switching:
1. Press ZOOM/WIDE button when picture is displayed.
2. Switching between wide and zoom occurs each time button is pressed.

H. Pan/Tilt Operation:
1. When zoom picture is displayed, press UP, DOWN, LEFT, and RIGHT buttons.
2. Moving diagonally is also possible.

I. Zoom Picture Preset:
1. Picture can be set to display using set zoom picture position for when call is received from door station.
2. When switching from wide picture to zoom picture, zoom picture displays at preset position.
3. When zoom picture is displayed, press UP, DOWN, LEFT, and RIGHT buttons.
4. While viewing picture, set desired picture position.
5. Press ZOOM/WIDE button for minimum of 2 seconds.
6. Beep will sound and position setting will be completed.

J. Night Illumination:
1. At night, door station illuminator LED lights up during calling or communication.
2. When Call is Made from Door Station:
   a. If CALL button of door station is pressed, illuminator LED lights up.
   b. When communication ends, illuminator LED will go out.
3. Light Up Illuminator LED During Entrance Monitoring:
   a. When TALK button is pressed during entrance monitoring, communications starts and illuminator LED will light up.
   b. Inside sound can be heard at entrance.
   c. When communication ends, illuminator LED will go out.

K. Backlight Adjustment, Night Sensitivity Adjustment:
1. To perform adjustment, press ADJUST button when image is difficult to see. Automatic adjustment to more visible screen is performed.
2. To cancel adjustment, press ADJUST button during adjustment.

L. If Optional Units Installed:
1. When separately installed sensor detects malfunction or CALL button is pressed, alarm sound occurs and red transmit LED flashes.
2. Press OFF button to stop alarm sound.

M. Automatic Recording:
1. If a call is received from video door station, unit starts recording automatically.
2. Red record LED flashes during recording.
3. Recording starts approximately 2 seconds after CALL button of video door station is pressed.
4. Maximum length of approximately 6 seconds (6 shots) can be recorded, with 1 picture and 1 shot for each second.
5. Maximum of 40 images can be recorded (combined total of automatic recording and manual recording images).

6. If 40 images are exceeded, images are overwritten starting from image with oldest recording date.
7. Initial setting is for recording to be done with first 3 pictures as zoom pictures at a preset position, and next 3 pictures as wide pictures.

N. Manual Recording:
1. Display video image with operation such as entrance monitoring.
2. Press REC button. Red record LED flashes 6 times and recording starts.
3. Maximum length of approximately 6 seconds (6 shots) can be recorded, with 1 image and 1 shot for each second.
4. Maximum of 40 images can be recorded (combined total of automatic recording and manual recording images).
5. When 40 images are exceeded, new images overwrite old images starting from oldest recorded date.

O. Play Recorded Picture:
1. Press PLAY button in standby mode to display picture with most recent date.
2. Press PLAY button on play-waiting screen. Recorded image is played. When play of 1 image ends, next image is displayed.
3. To advance play screen frame-by-frame, press PLAY button during playback to pause. Play moves forward frame-by-frame each time DOOR RELEASE button is pressed. When frames of 1 image end, next picture is displayed.
4. Press OFF button to end.

P. Save Recorded Picture:
1. Display picture that you want to save in play-waiting screen. Press MENU button to display save/erase selection screen.
2. Press PLAY button. If image is saved, key symbol is displayed. If image has already been saved, save is cancelled. Each time PLAY button is pressed, operation switches between save and cancel.

Q. Erase Recorded Picture:
1. Display picture that you want to erase in play screen. Press MENU/MEMO button to display save/erase selection screen.
2. Press MENU button to erase.
3. Press REC button to stop erasing.
4. Once picture is erased, it cannot be restored.

1.5 SUBMITTALS

A. Comply with Section 01330 (01 33 00) – Submittal Procedures.

B. Product Data: Submit manufacturer's product data, including installation instructions.

C. Shop Drawings: Submit the following:
1. Wiring Diagrams: Indicate wiring for each item of equipment and interconnections between items of equipment.
2. Include manufacturer's names, model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.

D. Installation and Operation Manuals:
1. Submit manufacturer's installation and operation manual, including operation instructions and component wiring diagrams.
2. Provide detailed information required for Owner to properly operate equipment.

E. Warranty: Submit manufacturer's standard warranty.

1.6QUALITY ASSURANCE

A. Manufacturer's Qualifications: ISO 9001:2008 certified company.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions.

C. Handling: Protect materials during handling and installation to prevent damage.

1.8WARRANTY

A. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Aiphone Corporation, 1700 130th Avenue NE, Bellevue, Washington 98005. Toll Free (800) 692-0200. Phone (425) 455-0510. Fax (425) 455-0071. Website www.aiphone.com. E-mail info@aiphone.com.

2.2VIDEO INTERCOM AND ACCESS CONTROL SYSTEM

A. Hands-Free Color Video System with Pan, Tilt, and Zoom: Aiphone JK Series.

B. Hands-Free Color Video Intercom Master Monitor Station:
   1. Power: 18 V DC.
   2. Current Consumption: 400 mA maximum.
   3. Calling: Chime and image, approximately 45 seconds.
   4. Communication:
      a. Hands-Free Mode: Hands free 60 seconds.
      b. PTT Mode: Press-to-talk, release-to-listen 60 seconds.
   5. Acceptable product:
      a. Aiphone JK-1MED

C. Vandal-Resistant Video Door Station
   1. Faceplate: Stainless steel.
   2. Flush mount.
   3. Microphone.
   4. Speaker.
   5. Camera:
      a. Complementary metal oxide semiconductor (CMOS).
      b. Scanning Lines: 525.
      c. Minimum Subject Illumination: 18 inches.
   6. CALL button.
   7. Vandal resistant.
   8. Weather resistant.
   9. Acceptable product:
      a. Aiphone Model IS-IPDVF.

D. Electric Door Strike:
   1. Acceptable product:

a. Aiphone EL-12S \

E. Card Reader
1. Acceptable product:
a. Allegion aptiQ™ MT15

F. Wireless Electronic Lock
1. Acceptable product:
a. Allegion Schlage AD-400

G. Door Contact
1. Acceptable product:
a. Interlogix 1078-G

H. Request-to-exit Detector
1. Acceptable product:
a. Bosch DS160

I. Door Controller
1. Acceptable product:
a. Open Options SSP-D2

J. Reader Sub- controller
1. Acceptable product:
a. Open Options RSC-1 Single Reader
b. Open Options RSC-2 Dual Reader

K. Power Supply
1. Acceptable product:
a. Altronix AL1012ULXB
b. Altronix AL1024ULXB

L. Access Power Controller
1. Acceptable product:
a. Altronix ACM8

M. Power Distribution Module
1. Acceptable product:
a. Altronix PD8

N. Enclosure
1. Acceptable product:
a. Unity CON-8RDR

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive hands-free color video system with pan, tilt, and zoom.

B. Notify Architect of conditions that would adversely affect installation or subsequent use.

C. Do not begin installation until unacceptable conditions are corrected.

3.2 INSTALLATION

A. Install hands-free color video system with pan, tilt, and zoom in accordance with manufacturer's instructions at locations indicated on the Drawings.

B. Mount equipment plumb, level, square, and secure.

3.3 ADJUSTING

C. Adjust hands-free color video system with pan, tilt, and zoom for proper operation in accordance with manufacturer's instructions.

3.4 DEMONSTRATION AND TRAINING

A. Demonstration:
   1. Demonstrate that hands-free color video system with pan, tilt, and zoom functions properly.
   2. Perform demonstration at final system inspection by qualified representative of manufacturer.

B. Instruction and Training:
   1. Provide instruction and training of Owner's personnel as required for operation of hands-free color video system with pan, tilt, and zoom.
   2. Provide hands-on demonstration of operation of system components and complete system, including user-level program changes and functions.
   3. Provide instruction and training by qualified representative of manufacturer.
   4. Provide a minimum of eight hours.

3.5 PROTECTION

A. Protect installed hands-free color video system with pan, tilt, and zoom from damage during construction.

END OF SECTION 28 13 00

SECTION 28 16 00 - INTRUSION DETECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Coordination, provision, installation, inspection, testing, instruction, and warranties of a Intrusion Detection System.

B. All plant, materials, equipment, transport and labor necessary to accomplish this and have a complete and working system.

C. Each of the following:
1. Required licenses and permits including payment of charges and fees.
2. Verification of dimensions and conditions at the job site.
3. Provision of submittal information.
4. Installation in accordance with the contract documents, manufacturer's recommendations, applicable codes and authority having jurisdiction.
5. Documented sound system tests and adjustments.
6. Instruction of operating personnel.
7. Provision of manuals.

D. Related Sections:
1. Section 26 05 00 - Common Work Results for Electrical
2. Section 26 05 53 - Identification for Electrical Systems
3. Section 27 05 00 - Common Work Results for Communications

1.2 DEFINITIONS

A. Hard-Wired System: Alarm, supervisory, and detection devices that are directly connected, through individual dedicated conductors to central control unit.

B. Zone: A space or area for which an intrusion must be detected and uniquely identified, the sensor or group of sensors assigned to perform the detection, and any interface equipment between the sensors and the communication link to central control unit.

C. LCD: Liquid-crystal display.

D. LED: Light-emitting diode.

1.3 SYSTEM DESCRIPTION

A. Confirm condition of the existing system with existing CAD floor plans, before commencing work to expand the alarm systems. Verify functionality of all existing system components.

B. The system will be configured of a microprocessor-based central controls, remote intrusion sensors and detection devices, and a communication link to perform monitoring, alarm, and control functions. The system is physically and electronically modular with provision that will allow for future expansion. The system will be self-monitoring and self-diagnostic.

C. The system is configured as a communication link that is hard wired using separate individual circuits for each zone that includes alarm initiation, alarm device operation, and control.

1.4 SYSTEM FUNCTIONAL PERFORMANCE

A. A Central Control Unit will provide continuous electronically supervision of system components for normal, alarm and trouble conditions. The central control unit indicates deviations from normal conditions at any location in the system. Indication includes identification of a device or circuit in which a deviation has occurred and whether the deviation is an alarm or malfunction.

B. The central control unit directly monitors intrusion detection devices and circuits.

C. An audible signal sounds and a plain-language identification of the zone producing the alarm appears on an LED or LCD at the central control unit. An annunciator panel displays a common alarm light and an audible tone.

D. The system will produce a print record of an alarm, supervisory and trouble events on a system printer. This report can be sorted by zone, device and function. The central control system receives a signal then prints a report of the alarm, supervisory, or trouble condition. The system will report the type of signal (alarm, supervisory, or trouble), the zone description, date, and time of the occurrence. When the system is reset a report reset event with the same information concerning the device, location, date, and time of the event is recorded. Commands initiate the reporting of a list of current alarm, supervisory, and trouble conditions in a system or a log of past events.

E. The maximum permissible signal time elapse is two seconds between actuation of any alarm or detection and its indication at central control unit.

F. The central control unit indicates circuit faults with both zone and trouble signals and makes a distinctive audible tone and illuminates an LED indicating light. The maximum permissible elapsed time between occurrence of a trouble condition and indication at central control unit is 20 seconds.

G. The system can be programmed to change status of various combinations of zones automatically between "secure" and "access" at scheduled times. Changeable schedules for status changes preset, repetitive, daily and weekly operation and special scheduled operations up to a year in advance. Manual secure-access control stations override programmed settings.

H. Manual Secure-Access Control: Coded entries at manual stations change status of associated zone between "secure" and "access."

1.5 SUBMITTALS

A. Provide simultaneously the following for approval thirty (30) days after issuance of Notice to Proceed and prior to commencement of Work:
   1. A complete list and quantity of product incorporated within the Work. Sequence of sheets shall be in specification order.
   2. Shop Drawings as defined in this section.

B. Submit bound sets of the following Project Record Manual information after substantial completion and prior to final inspection. Quantity of submissions is determined by the project General Contractor. Documents shall be segregated into two separate binders containing data relevant to operational, service & maintenance and warranty issues. Duplicate data within the separate bindings when it will reasonably clarify procedures, e.g., operational data in maintenance binding.
   1. Operations Manual
      a. Product Data:
         1) Product actually incorporated within the Work.
         2) All product documentation shall be originals, copies are not acceptable.

3) Manufacturer's documentation for each type of product conforming to the scheme above.
4) Each product's Owner's/Instruction Manual.
5) For custom circuits or modifications, a description of the purpose, capabilities, and operation of each item.
6) Manufacturer's wiring diagram for each type of product actually incorporated.
7) Separately bound list of all product incorporated within the Work arranged in alphanumeric order. The list shall include manufacturer's serial numbers.
8) Record drawings: Final rendition Shop Drawings depicting system as installed.
9) Test Reports: Recorded findings of Contractor Commissioning Test located in Part 3.
10) System Operation and Instructions: Prepare a complete and typical procedure for the operation of the equipment as a system, organized by subsystem or activity. This procedure should describe the operation of all system capabilities.
11) Assume the intended reader of the manual to be technically experienced but unfamiliar with the components and the facility.

2. Service, Maintenance & Warranty Manual:
   a. Provide an original copy of the service manual on every piece of equipment for which the manufacturer offers a service manual. Arrange manuals in the same order as the operations manual.
   b. Provide manufacturer's maintenance and care instructions.
   c. Provide maintenance instructions, including maintenance phone numbers and hours; maintenance schedule; description of products recommended or provided for maintenance purposes, and instructions for the proper use of these products.
   d. Provide manufacturer's warranty statements on each product.
   e. Provide date of substantial completion and ending dates for warranties for each group of products.

C. Shop Drawings. Provide the following documentation:
1. Schematic: Detailed wiring diagrams showing interconnection of contractor provided components and fabricated products, wiring and cabling diagrams depicting cable types and designators, and device designators. Give each component a unique designator and use this designator consistently throughout the project.
2. Equipment: Location of equipment in racks, consoles, or on tables, with dimensions; wire routing and cabling within housings; AC power outlet and terminal strip locations.
3. Full fabrication details of custom enclosure and millwork indicating size, material, finish and openings for equipment.
4. Fabricated Plates and Panels: Provide complete drawings on custom fabricated plates or panels. Drawings shall include dimensioned locations of components, component types, engraving information, plate material and color, and bill of material.
5. Labeling: Equipment and cable labeling scheme. Include font sizes and styles, explanation of scheme, and designator schedule.
6. Schedules: Wiring schedule showing source and destination of wiring and indicating which wiring is in conduit. Junction box schedule showing type of box, size, mounting and location.

D. Submittal format:
1. Each submittal shall include a unique number and be numbered in consecutive order.
2. Each submittal shall include a complete table of contents with the following information:
   a. Project title and number.
   b. Submittal number. In the case of a re-submittal, use the original submittal number immediately followed by the suffix "R" immediately followed by a unique number and be numbered in consecutive order.

3. Date of submission.
4. Referenced addendum or change order number as applicable.
5. Referenced specification Section, Part, Article, Paragraph and page number or drawing reference as applicable.
6. Index Product Data sheets by manufacturer and model or part number.
7. Each submission shall be stamped with Contractor's certification stamp, initialed or signed certifying:
    a. Review, approval and acceptance of submission.
    b. Certification of product compliance to specification.
    c. Verification product may be incorporated within the work.
8. Arrange product data list in alphanumeric order. Follow list with manufacturer's data sheets, arranged in the same order. If a data sheet shows more than one product, indicate the model being proposed with an arrow or other appropriate symbol.
9. Drawings executed at an appropriate scale, not smaller than 1/8" = 1'-0"'.
10. Separate major grouping with labeled binder tabs.
11. Bind Project Record Manual in titled locking three ring style binders sized for 150 per cent of the material. Maximum size: three-inch spine. Use multiple volumes if necessary.

E. Resubmission Requirements:
1. Make any requested corrections or change in submittals required. Resubmit for review until no exceptions are taken.
2. Indicate any changes that have been made other than those requested.

F. Submit "Letter of Conformance" in accordance with Section 01 33 00 indicating specified items selected for use in project.

G. Shop Drawings: Include data on custom -fabricated components. Show plans, elevations, and sections detailing installed features and devices.
1. System Wiring Diagrams: One reproducible and four prints include system diagram unique to Project. Show connections for all devices, components, and auxiliary equipment. Differentiate between manufacturer-installed and field-installed wiring. Include diagrams for equipment and for system with all terminals and interconnections identified.

H. System Operation Description: Include method of operation and supervision of each component and each type of circuit, and sequence of operations for manually and automatically initiated system inputs. Description must cover this specific Project; manufacturer's standard descriptions for generic systems are not acceptable.

I. Product Certificates: Signed by manufacturers of components certifying that products furnished comply with requirements.

J. Qualification Data: For firms and persons specified in "Quality Assurance" Article.

K. Record of field tests of system.

L. Maintenance Data: For products and system to include in maintenance manuals specified in Division 01. Include data for each type of product, including all features and operating sequences, both automatic and manual. Include user's software data and recommendations for spare parts and components to be stocked at Project site.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A certified technician accredited by the National Burglar and Fire Alarm Association, and who is an authorized service representative of central -control unit manufacturer.

B. Manufacturer Qualifications: Central -control unit manufacturer or factory-authorized agency maintains a service center capable of providing training, parts, and emergency maintenance and repairs for overall system at Project site with 24 hours' maximum response time.

C. Testing Agency Qualifications: Comply with requirements specified in Section 01 45 00 "Quality Control." A current member firm of the National Burglar and Fire Alarm Association. Experienced in performing tests of intrusion detection systems.
   1. Testing Agency's Field Supervisor: Person currently certified as an advanced alarm technician by the National Burglar and Fire Alarm Association.

D. Source Limitations: Obtain system components from central -control unit manufacturer who shall assume responsibility for system components and for their compatibility.

E. FM Compliance: FM-approved and -labeled intrusion detection devices and equipment.

F. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

G. Comply with NFPA 70.

H. Comply with UL 1076.

1.7 SYSTEM SERVICE CONDITIONS

A. The system will be capable of withstanding the following environmental conditions without mechanical or electrical damage or degradation of operating capability:
   1. Altitude: Sea level to 4000 feet.
   2. Ambient Temperature for Indoor Components: 0 to 40 deg C.
   3. Relative Humidity for Indoor Components: 5 to 95 percent, non-condensing.
   4. Ambient Temperature for Outdoor Components: Minus 25 to plus 50 deg C.
   5. Relative Humidity for Outdoor Components: 0 to 100 percent.

1.8 WARRANTY

A. Installer shall warrant equipment to be free of defects in materials and workmanship for one year after date of Substantial Completion. Defects occurring in labor or materials within one-year warranty shall be rectified by replacement or repair. Within the warranty period, provide answers to service calls and requests for information within a 24-hour period and repair or replace any faulty item within a 24-hour period without charge, including parts and labor.

B. This warranty shall not void specific warranties issued by manufacturers for greater periods of time, nor shall it void any rights guaranteed to the Owner by law.

C. Contractor to provide Owner with the name and telephone number of the person to call for service. This information shall be part of Project Record Drawings.

D. Thirty days prior to the end of the warranty period provide a complete checkout of all system components. Repair or replace any defective equipment or transducers discovered during the testing. Correct any defects in wiring or other functional problems reported by Owner.

Warranty replacement and service of equipment shall not apply to Owner furnished equipment. Coordinate inspection visit with the Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Approved Manufacturer:
   1. Napco Security Technologies, Inc. (800-645-9445).

2.2 EQUIPMENT

A. Connect new devices to existing system. In the event that there is not adequate capacity, the existing panel is to be increased in capacity or replaced.

B. If replacement of the existing system is required, existing intrusion detection devices and cabling are also to be replaced.

C. Protection from Power Line Surges: Use integral surge suppressors listed in UL 1449 and complying with IEEE C62.41, Category B. Include the following features:
   1. Suppression Level: 300 V.
   2. Maximum Response Time: 5 nanoseconds.
   3. Circuit: Multistage, using inductors and silicon-avalanche zener diodes or equivalent.
   4. Indicator Lamp: Labeled neon or LED located on control unit and arranged to extinguish on failure of protection.
   5. Fuses: Externally accessible.

D. System and Equipment-Interference Resistance: Not affected by radiated-radio-frequency interference and electrical induction of 15 V/m over a frequency range of 10 to 10,000 MHZ and conducted interference signals up to 0.25-V RMS injected into power supply lines at 10 to 10,000 MHZ.

E. Tamper Protection: Tamper switches on detection devices, control units, annunciators, pull boxes, junction boxes, cabinets, and other system components indicated to provide an alarm signal when unit is opened or partially disassembled. Central -control unit identifies tamper alarms and indicates location in alarm display.

F. Products: Provide the following products subject to conformance with the requirements specified. Note: Connections shall be made to the relays (NO/NC) to provided fire alarm control panel for fire alarm and fire alarm trouble.
   1. Controller
      a. Gemini P9600
   2. Expansion Module
      a. Gemini GEMEZM8
   3. Keypad
      a. Gemini GEMK1CA
   4. Motion Detectors Type 1:
      a. Bosch DS938ZA
   5. Motion Detector Type 2:
      a. Bosch ISC-PDL1-W30G
   6. Motion Detector Type 3:
      a. Napco PIR-1510
   7. Beam Detector
      a. Optex Photoelectic Detector SL-200QN
   8. Alert Siren:
      a. Revere Industries RVL-36C/SRN\

9. Power Supply/Charger
    a. Altronix AL400ULXPD16
10. Rechargeable Battery
    a. Altronix BT126
11. Enclosure
    a. Mier Products, Inc BW-99B
12. Cables
    a. 22 AWG: Anixter AL-2204C-2-2N-01-BX or approved equal
    b. 16 AWG: Anixter AL-1804C-2-2N-01-BX or approved equal
13. J-Hooks
    a. Cooper B-line BCH12-W2
14. Alarm Monitor
    a. Coordinate with Dallas ISD on monitoring component of AES system.
    b. General Contractor will take control to Dallas ISD maintenance to program if necessary.
        1) AES – 7007 Intellinet 2.0

2.3 ELECTRICAL POWER

A. Normal System Power Supply: 120 V, 60 Hz, through a locked disconnect device. System control unit supplies power to components.

B. Power Continuity: Batteries in power supplies of control units and individual system components maintain continuous system operation during outages of both normal and backup ac system supply.
1. Batteries: Rechargeable, valve-regulated, recombinant, sealed lead-acid type with nominal 10-year life expectancy. Capacity adequate to operate portion of system served, including audible trouble signal devices for up to four hours and audible and visual alarm devices under alarm conditions for an additional 10 minutes.
2. Battery Charger: Solid-state, fully automatic, variable-charging-rate type. Charger recharges fully discharged battery within 24 hours.

C. Annunciation: Central -control unit indicates, as a change in system condition, switching of system or component to backup power.

2.4 INTRUSION DETECTION DEVICES

A. Comply with UL 639.

B. Configuration: Single or multiple components to perform indicated functions. Single component devices may not be used where multiple-component devices are indicated.

C. Power Source: One or more dedicated power supply circuits from control unit.

D. Detection Indicator: LED in unit housing, latch type where indicated.
1. Sensitivity: Detect presence of an intruder within their zone patterns, but not outside their zone patterns.

E. Acoustical Devices: Detect intrusion by monitoring pattern of a steady-state sonic field produced by an ultrasonic transmitter. Changes in pattern are analyzed and those matching the profile of an intrusion initiate an alarm.

F. Glass-Break Devices, Acoustic Type: Detect unique airborne acoustic energy spectrum caused by breaking glass.

G. Dual -Technology, Glass-Break and Vibration Devices: Require both methods to result in an alarm signal.

2.5 CONTROL UNITS

A. Comply with UL 1076.

B. Cabinet: Lockable steel enclosure, arranged so operations required for testing, normal operation, and maintenance are performed from front of enclosure. If more than a single cabinet is required to form a complete control unit, provide exactly matching modular enclosures. Accommodate all components and allow ample gutter space for interconnecting cabinets and field wiring. Identify each enclosure by an engraved, laminated, phenolic-resin nameplate. Lettering on enclosure nameplate shall not be less than 1 inch high. Identify individual components and modules within cabinets with permanent labels.

C. Systems: Separate and independent alarm and supervisory systems in control units. Alarm initiating zone boards consist of plug-in cards. Arrangements requiring removal of field wiring for module replacement are not acceptable.

D. Timing Unit: Solid state, programmable, 365 day. Features include the following:
   1. Astronomic Control: For automatic adjustment of light switching at dawn and dusk.
   2. Confirmation: Relays, contactors, and other control devices have auxiliary contacts connected to provide confirmation signals to the system of on or off status of the equipment controlled. Software interprets such signals, displays equipment status, and initiates failure signals.
   3. Override Capability: Programmed shutdown of lighting and other items can be overridden by using override push buttons or by entering a command over a telephone data link.

E. Control Modules: Types and capacities as required to perform unit functions. Visible and audible signals in central -control unit indicate alarm, supervisory, and trouble conditions for each zone. Each type of audible alarm has a distinct sound.

F. Zones: Quantity of alarm and supervisory zones as indicated with capacity for expanding number of zones by a minimum of 25 percent.

G. Power Supply Circuits: Units provide power for remote power-consuming detection devices. Circuit capacity is adequate for at least a 25 percent increase in load.

H. Indicating Lights: Individual LED devices designate each zone. An LED test switch for each control unit section illuminates all LED devices on that section of the unit. Manual toggle test switches or push test-buttons do not require a key to operate. Alarm and supervisory signals light a red LED for the associated zone. Trouble signals light an amber LED for the associated zone.

I. Resetting: Controls permit silencing audible signals for individual zones but prevent resetting of alarm, supervisory, or trouble signals while the condition still exists.

J. Alphanumeric Display and System Controls: Arrange for basic interface between human operator at central -control unit and system components, including annunciation, supervision, and control. A display with a minimum of 80 characters displays alarm, supervisory, and component status messages and indicates control commands to be entered into system. Arrange keypad to enter and execute control commands.

2.6 SECURE-ACCESS CONTROL STATIONS

A. Keypad: Arranged for entering and executing commands for system status changes.

B. Key-Operated Switch: Changes zone between "secure" and "access" modes.

2.7 SYSTEM PRINTER

A. Description: Listed in UL 1610 and labeled as an integral part of intrusion detection system.

2.8 CONDUCTORS AND CABLES

A. Cable for fire panel connection shall be power limited fire alarm plenum cable 2 conductor 16AWG Red (FPLP).

B. Cable for hold-up button connections shall be power limited fire alarm plenum cable 4 conductor 22 AWG (FPLP).

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install system according to NFPA 70, NFPA 72, applicable codes, and manufacturer's written instructions.

B. Comply with UL 681 and/or 1641.

C. Wiring Method: Install wiring in raceways. Conceal raceways, except in unfinished indoor spaces.

D. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess. Provide and use lacing bars and distribution spools.

E. Number of Conductors: As recommended by system manufacturer for functions indicated.

F. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

G. Connections: Comply with torque-tightening values specified in UL 486A.

H. Identify components, conductors, and cables according to Section 26 05 53 - "Identification for Electrical Systems". Color-code conductors and apply wire and cable marking tape to designate wires and cables so media are identified and in coordination with system wiring diagrams.

I. Install power supplies and other auxiliary components for detection devices at control units, unless otherwise indicated. Do not install such items near the devices they serve. Provide tamper switches where mounted separately from control units.

J. Interface with other products: complete connection to telephone system for central station monitoring.

K. Equipment shall be firmly secured in place with supports and fastenings providing a minimum safety factor of three. Provide adequate ventilation for all equipment.

L. Security system requires two (2) loop start telephone lines in place, with RJ31X jacks and 24hour emergency power supply.

3.2 GROUNDING

A. Ground system components and conductor and cable shields to eliminate shock hazard and to minimize ground loops, common-mode returns, noise pickup, cross talk, and other impairments.

3.3 FIELD QUALITY CONTROL

A. Inspection: Verify that units and controls are properly labeled, and interconnecting wires and terminals are identified.

B. Pre-testing: Align and adjust system and perform pre-testing of all components, wiring, and functions to verify compliance with specified requirements. Correct deficiencies by replacing malfunctioning or dam aged items with new items.

C. Testing: Perform the following field quality-control testing:

D. Manufacturer's Field Services: Engage a factory-authorized service representative to inspect field-assembled components and perform system pre-testing, testing, adjustment, and programming.
   1. Operational Tests: Schedule tests after pre-testing has been successfully completed. Perform operational system tests to verify compliance with Specifications. Test all modes of system operation and intrusion detection. Methodically test for detection of intrusion and for false alarms in each zone of intrusion detection. Test for false alarms by simulating activities outside indicated detection patterns.
   2. Report: Prepare a written report of observations, inspection, and tests.

E. Retesting: Correct deficiencies and retest until total system meets requirements of the Specifications and com plies with applicable standards.

F. Schedule testing with at least seven days' advance notice.

3.4ADJUSTING

A. Occupancy Adjustment: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting and reprogramming to sui t actual occupied conditions. Provide up to two visits to Project for this purpose without additional cost.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to explain programming and operation of system and to train Owner's maintenance personnel on procedures and schedules for maintaining, programming, operating, adjusting, troubleshooting, and servicing system.

B. Refer to Section 01 79 00 “Demonstration and Training” for additional requirements.
.

END OF SECTION 28 16 00

SECTION 28 31 10 – FIRE ALARM SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Section 23 09 24 “Building Management Control. System”

1.02 SUMMARY

A. This section of the specification includes the furnishing, installation, and connection of an intelligent reporting, microprocessor controlled, addressable, fire detection and emergency alarm communication system. It shall include, but not be limited to, alarm initiating devices, alarm notification appliances, control panels, auxiliary control devices, annunciators, power supplies, and wiring as shown on the drawings and specified herein.

B. The fire alarm shall comply with requirements of NFPA Standard 72 for Protected Premises Signaling Systems except as modified and supplemented by this specification. The system shall be electrically supervised and monitor the integrity of all conductors.

C. The system shall be an active/interrogative type system where each addressable device is repetitively scanned, causing a signal to be transmitted to the main fire alarm control panel (FACP) indicating that the device and its associated circuit wiring is functional. Loss of this signal at the main FACP shall result in a trouble indication as specified hereinafter for the particular input.

D. The facility shall have an emergency voice alarm communication system. Digitally stored message sequences shall notify the building occupants that a fire or life safety condition has been reported. Message generator(s) shall be capable of automatically distributing up to eight (8) simultaneous, unique messages to appropriate audio zones within the facility based on the type and location of the initiating event. The Fire Command Center (FCC) shall also support Emergency manual voice announcement capability for both system wide or selected audio zones and shall include provisions for the system operator to override automatic messages system wide or in selected zones.

E. The system shall be support additional, alternate Fire Command Centers, which shall be capable of simultaneous monitoring of all system events. Alternate Fire Command Centers shall also support an approved method of transferring the control functions to an alternate Fire Command Center when necessary. All Fire Command Centers shall be individually capable of assuming Audio Command functions such as Emergency Paging, audio zone control functions.

F. Each designated zone shall transmit separate and different alarm, supervisory and trouble signals to the Fire Command Center (FCC) and designated personnel in other buildings at the site via a multiplex communication network.

G. The fire alarm system shall be manufactured by an ISO 9001 certified company and meet the requirements of BS EN9001: ANSI/ASQC Q9001-1994

H. The system and its components shall be Underwriters Laboratories, Inc. listed under the appropriate UL testing standard as listed herein for fire alarm applications and the installation shall be in compliance with the UL listing.

I. The installing company shall employ NICET (minimum Level II Fire Alarm Technology) technicians on site to guide the final checkout and to ensure the systems integrity.

J. System Programming:
1. Ability to program the system via the local user interface.
2. The system shall be capable of off-line/on-line programming by the manufacturers programming utility.

K. Provide a cloud base connected life safety platform with the ability to remotely monitor the buildings fire system and capable of providing system diagnostics with full detail reports on annual test and inspections from a web-based server or mobile device application. The software shall also expand to allow for future offerings and provide dedicated account access to facility users and service personal.

L. The system shall automatically track NFPA 72 installation and testing requirements for all fire system devices to ensure that every device is functionally tested upon installation and then periodically as required by Code. A gateway/hub shall be utilized to retrieve the system information using its native protocol and/or bar codes without the need of additional tools and accessories.

M. This section includes the minimum requirements for the following equipment:
1. Main Fire Alarm Control Panel
2. Signal Line Circuit Control Module
3. Enclosures
4. Digital Voice Command Center
5. Power Supply
6. Addressable Auxiliary Field Power Supply
7. Field Charging Power Supply
8. System Circuit Supervision
9. Audio Amplifiers
10. CLSS Checkpoint Hub Gateway
11. Digital Alarm Communicator Transmitter
12. Speaker Notification Devices
13. Audible/Visual Combination Devices
14. Programmable Electronic Sounders
15. Manual Fire Alarm Stations
16. Duct Smoke Detectors
17. Projected Beam Detectors
18. Waterflow Indicator
19. Sprinkler and Standpipe Valve Supervisory Switches
20. Annunciator Control Display
21. Network Node Communication
22. ONYXWorks Workstation
23. Network Control Display
24. Gateway and Webserver Communication
25. VESDA VEA Detector
26. Addressable Wireless Devices
27. Intelligent Photoelectric Smoke Detector
28. Intelligent Thermal Detectors
29. Self-testing Photoelectric Smoke Detector
30. Self-testing Thermal Detector

31. Self-testing Photo Thermal Detector
32. High Sensitivity Photo Smoke Detector
33. Multi-Criteria Smoke Detector
34. Low Frequency Sounder Base
35. intelligent Duct Smoke Detector
36. CO Detector
37. Photoelectric Smoke and CO Detector
38. Batteries and External Charger

1.03 APPLICABLE STANDARDS AND SPECIFICATIONS

A. The specifications and standards listed below form a part of this specification. The system shall fully comply with the latest issue of these standards, if applicable.

B. National Fire Protection Association (NFPA) – USA
No. 12 Extinguishing Systems (low and high)
No. 12A Halon 1301 Extinguishing Systems
No. 13 Sprinkler Systems
No. 15 Water Spray Systems
No. 16 Foam / Water Deluge and Spray Systems
No. 17 Dry Chemical Extinguishing Systems
No. 17A Wet Chemical Extinguishing Systems
No. 2001 Clean Agent Extinguishing Systems
No. 70 National Electric Code
No. 90A Air Conditioning Systems
No. 92A Smoke Control Systems
No. 92B Smoke Management Systems in Malls, Atria, Large Areas
No. 72 National Fire Alarm Code
No. 101 Life Safety Code

C. Underwriters Laboratories Inc. (UL) – USA
No. 268 Smoke Detectors for Fire Protective Signaling Systems
No. 864 Control Units for Fire Protective Signaling Systems
No. 217 Smoke Detectors, Single and Multiple Station
No. 228 Door Closers - Holders for Fire Protective Signaling Systems
No. 268A Smoke Detectors for Duct Applications
No. 521 Heat Detectors for Fire Protective Signaling Systems
No. 464 Audible Signaling Appliances
No. 38 Manually Actuated Signaling Boxes
No. 1481 Power Supplies for Fire Protective Signaling Systems
No. 346 Waterflow Indicators for Fire Protective Signaling Systems
No. 1076 Control Units for Burglar Alarm Proprietary Protective Signaling Systems
No. 1971 Visual Notification Appliances
No. 2017 Standard for General-Purpose Signaling Devices and Systems

D. Local and State Building Codes.

E. Latest Adopted Edition of the International Building Code

F. Latest Adopted Edition of the International Fire Code

G. All requirements of the Authority Having Jurisdiction (AHJ)

1.04 APPROVALS

A. The system shall have proper listing and/or approval from the following nationally recognized agencies:

UL	Underwriters Laboratories, Inc.
FM	Factory Mutual
NYFD	New York Fire Department
CSFM	California State Fire Marshal

B. The system shall be listed by national agencies as suitable for extinguishing release applications.

C. The Fire Alarm Control Panel and all transponders shall meet the modular listing requirements of the ninth edition of UL Standard 864 (Control Units). Each subassembly, including all printed circuits, shall include the appropriate UL modular label. This includes all printed circuit board assemblies, power supplies, and enclosure parts. Systems that do not include modular labels may require return to the factory for system upgrades and are not acceptable.

1.05 SCOPE

A. A new intelligent reporting, microprocessor-controlled fire detection system shall be installed in accordance to the project specifications and drawings.

B. The system shall be designed such that each signaling line circuit (SLC) is limited to only 80% of its total capacity at initial installation.

C. Basic Performance:
1. Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded on NFPA Style 4 (Class B) Signaling Line Circuits (SLC).
2. Initiation Device Circuits (IDC) shall be wired Class B (NFPA Style A) as part of an addressable device connected by the SLC Circuit.
3. Notification Appliance Circuits (NAC) shall be wired Class B (NFPA Style Y)
4. On Style 6 or 7 (Class A) configurations a single ground fault or open circuit on the system Signaling Line Circuit shall not cause system malfunction, loss of operating power or the ability to report an alarm.
5. Alarm signals arriving at the FACP shall not be lost following a primary power failure (or outage) until the alarm signal is processed and recorded.
6. Speaker circuits may be controlled by NAC outputs built into the amplifiers, which shall function as addressable points on the Digital Audio Loop.
7. Notification Appliance Circuits (NAC) speaker circuits shall be arranged such that there is a minimum of one speaker circuit per floor of the building or smoke zone whichever is greater.
8. Audio amplifiers and tone generating equipment shall be electrically supervised for normal and abnormal conditions.
9. Notification Appliance Circuits (NAC) speaker circuits and control equipment shall be arranged such that loss of any one (1) speaker circuit will not cause the loss of any other speaker circuit in the system.
10. Speaker circuits shall be arranged such that there is a minimum of one speaker circuit per smoke zone.
11. Speaker circuits shall be electrically supervised for open and short circuit conditions. If a short circuit exists on a speaker circuit, it shall not be possible to activate that circuit.

12. Audio amplifiers and tone generating equipment shall be electrically supervised for abnormal conditions. Digital amplifiers shall provide built-in speaker circuits, field configurable as four Class B (Style Y), or two Class A (Style Z) circuits.
    a. Speaker circuits shall be 25 VRMS Speaker circuits shall have 20% space capacity for future expansion or increased power output requirements.

D. Basic System Functional Operation
1. When a fire alarm condition is detected and reported by one of the systems initiating devices, the following functions shall immediately occur:
    a. The System Alarm LED shall flash.
    b. A local piezo electric signal in the control panel shall sound.
    c. The touchscreen LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.
    d. Printing and history storage equipment shall log the information associated each new fire alarm control panel condition, along with time and date of occurrence.
    e. All system output programs assigned via control-by-event interlock programming to be activated by the particular point in alarm shall be executed, and the associated system outputs (notification appliances and/or relays) shall be activated.
    f. The audio portion of the system shall sound the proper audio signal to the appropriate zones.

1.06 SYSTEM MAINTENANCE ANALYSIS AND REPORTING

A. The software shall automatically report fire system events during usage and via Push Notifications when the App is not in the foreground on a mobile device. The software shall also record active events during test and inspection mode and capable of silencing alarm/trouble during the test period remotely.

B. The software shall be capable of downloading and uploading such data to approved handheld devices via web portal or bar codes. Systems that rely solely on the use of bar codes shall not be considered as equal. No proprietary software of any kind shall be required for viewing reports online.

C. The software shall have the capability to provide several services with open protocol to allow for future expansion. At minimum the software shall have the following functionalities;
    1. Check point access for commissioning.
    2. Detail commissioning reports.
    3. Facility Management.
    4. Service Site Management
    5. Check point remote access for service monitoring
    6. User Management

D. The software shall be secure and encrypted with user authentication to meet cyber security requirements. Each user shall have a dedicated account with limitations based on designated clearances. Online access to the web-based reporting system shall run 24/7 with no downtime.

E. Allow active control of fire system during test and inspection when connected to the buildings network for authentication. Off premise services shall only allow for monitoring and history of the system.

F. Forwarding of event notifications and reports by utilizing a mobile device or PC.

G. Full capability to monitor an unlimited number of buildings and shall display events customizable to the user.

1.07 SUBMITTALS

A General

1. Two copies of all submittals shall be submitted to the Architect/Engineer for review.
2. All references to manufacturer's model numbers and other pertinent information herein is intended to establish minimum standards of performance, function and quality. Equivalent compatible UL-listed equipment from other manufacturers may be substituted for the specified equipment as long as the minimum standards are met.
3. All substitute equipment proposed as equal to the equipment specified herein, shall meet or exceed the following standards. For equipment other than that specified, the contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment.

B Shop Drawings

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
2. Include manufacturer's name(s), model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.
3. Show annunciator layout, configurations, and terminations.

C Manuals

1. Submit simultaneously with the shop drawings, complete operating and maintenance manuals listing the manufacturer's name(s), including technical data sheets.
2. Wiring diagrams shall indicate internal wiring for each device and the interconnections between the items of equipment.
3. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system.
4. Approvals will be based on complete submissions of manuals together with shop drawings.

D. Software Modifications

1. Provide the services of a factory trained and authorized technician to perform all system software modifications, upgrades or changes. Response time of the technician to the site shall not exceed 4 hours.
2. Provide all hardware, software, programming tools and documentation necessary to modify the fire alarm system on site. Modification includes addition and deletion of devices, circuits, zones and changes to system operation and custom label changes for devices or zones. The system structure and software shall place no limit on the type or extent of software modifications on-site. Modification of software shall not require power down of the system or loss of system fire protection while modifications are being made.

E. Certifications

1. Together with the shop drawing submittal, submit a certification from the major equipment manufacturer indicating that the proposed supervisor of the installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include names and addresses in the certification.

1.08 GUARANTY

A. All work performed, and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance. The full cost of maintenance, labor and materials required to correct any defect during this one year period shall be included in the submittal bid.

1.09 POST CONTRACT MAINTENANCE

A. Complete maintenance and repair service for the fire detection system shall be available from a factory trained authorized representative of the manufacturer of the major equipment for a period of one (1) year after expiration of the guaranty.

B. As part of the bid/proposal, include a quote for a maintenance contract to provide all maintenance, tests, and repairs described below. Include also a quote for unscheduled maintenance/repairs, including hourly rates for technicians trained on this equipment, and response travel costs for each year of the maintenance period. Submittals that do not identify all post contract maintenance costs will not be accepted. Rates and costs shall be valid for the period of One (1) year after expiration of the guaranty.

C. Maintenance and testing shall be on a semiannual basis or as required by the AHJ. A preventive maintenance schedule shall be provided by the contractor describing the protocol for preventive maintenance. The schedule shall include:
   1. Systematic examination, adjustment and cleaning of all detectors, manual fire alarm stations, control panels, power supplies, relays, waterflow switches and all accessories of the fire alarm system.
   2. Each circuit in the fire alarm system shall be tested semiannually.
   3. Each smoke detector shall be tested in accordance with the requirements of NFPA 72 Chapter 7.

1.10 POST CONTRACT EXPANSIONS

A. The contractor shall have the ability to provide parts and labor to expand the system specified, if so requested, for a period of three (3) years from the date of acceptance.

B. As part of the submittal, include a quotation for all parts and material, and all installation and test labor as needed to increase the number of intelligent or addressable devices by ten percent (10%). This quotation shall include intelligent smoke detectors, intelligent heat detectors, addressable manual stations, addressable monitor modules and addressable modules equal in number to one tenth of the number required to meet this specification (list actual quantity of each type).

C. The quotation shall include installation, test labor, and labor to reprogram the system for this 10% expansion. If additional FACP hardware is required, include the material and labor necessary to install this hardware.

D. Do not include cost of conduit or wire or the cost to install conduit or wire.

E. Submittals that do not include this estimate of post contract expansion cost will not be accepted.

PART 2 - PRODUCTS

2.01 MANUFACTURES

A. Basis of Design Product: Subject to compliance with requirements, provide product indicated on drawings as manufactured by NOTIFIER; a Honeywell company.

2.02 EQUIPMENT AND MATERIAL, GENERAL

A. All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment, and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protected premises protective signaling (fire alarm) system. The authorized representative of the manufacturer of the major equipment, such as control panels, shall be responsible for the satisfactory installation of the complete system. The materials, equipment, and devices shall be tested to function with manufactures approved FACP via a cloud base life safety services system.

B. The system shall fully comply with commissioning and test and inspect reports as outline in NFPA-72. System test shall automatically retrieve the fire systems connected devices utilizing a gateway. In applications where a gateway is not applicable the systems peripheral devices shall be entered manually and/or by using barcodes.

C. All equipment and components shall be installed in strict compliance with each manufacturer's recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc. before beginning system installation. Refer to the riser/connection diagram for all specific system installation/termination/wiring data.

D. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.

2.03 CONDUIT AND WIRE

A. Conduit
   1. Conduit shall be in accordance with The National Electrical Code (NEC), local and state requirements.
   2. Where possible, all wiring shall be installed in conduit or raceway. Conduit fill shall not exceed 40 percent of interior cross-sectional area where three or more cables are contained within a single conduit.
   3. Cable must be separated from any open conductors of Power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, as per NEC Article 760.
   4. Wiring for 24-volt control, alarm notification, emergency communication and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.
   5. Conduit shall not enter the fire alarm control panel, or any other remotely mounted control panel equipment or backboxes, except where conduit entry is specified by the FACP manufacturer.

6. Conduit shall be 3/4-inch minimum.

B. System Wiring

1 All fire alarm system wiring must be new.
2. Wiring shall be in accordance with local, state and national codes (e.g., NEC Article 760) and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 18 AWG for initiating device circuits, signaling line circuits, and notification appliance circuits.
3. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.
4. Wire and cable not installed in conduit shall have a fire resistance rating suitable for the installation as indicated in NFPA 70 (e.g., FPLR).
5. The system shall permit the use of IDC and NAC wiring in the same conduit with the multiplex communication loop.
6. All field wiring shall be completely supervised. In the event of a primary power failure, disconnected standby battery, removal of any internal modules, or any open circuits in the field wiring; a trouble signal will be activated until the system and its associated field wiring are restored to normal condition.
7. All analog voice speaker and analog telephone circuits shall use twisted/shielded pair to eliminate cross talk.

C. Terminal Boxes, Junction Boxes i All boxes and cabinets shall be UL listed for their intended purpose.

D. Initiating circuits shall be arranged to serve like categories (manual, smoke, waterflow). Mixed category circuitry shall not be permitted except on signaling line circuits connected to intelligent reporting devices.

E. The fire alarm control panel shall be connected to a separate dedicated branch circuit, maximum 20 amperes. This circuit shall be labeled at the main power distribution panel as FIRE ALARM. Fire alarm control panel primary power wiring shall be 12 AWG. The control panel cabinet shall be grounded securely to either a cold-water pipe or grounding rod.

2.04 MAIN FIRE ALARM CONTROL PANEL

A. The main FACP Central Console shall be a NOTIFIER INSPIRE N16 Series Model and shall contain a microprocessor based Central Processing Unit (CPU). The FACP shall be a single scalable hardware platform without the need to replace the CPU for future expansion. The CPU shall communicate with and control the following types of equipment used to make up the system: intelligent addressable smoke and thermal (heat) detectors, addressable modules, control circuits, and notification appliance circuits, local and remote operator terminals, printers, annunciators, and other system-controlled devices.

B. The FACP will be based on a licensing model to allow for future expansion. Licensable features shall include but not limited to additional general zones, logic zones, CLIP mode support and network display support. The FACP shall be backwards compatible to support previous Onyx series devices.

C. The FACP shall be fully networkable to support traditional NOTI-Fire-Net standard and high speed networks.

D. The main FACP shall include the capability to function as a network control display along with its main functions.

E. Functionality of the FACP shall allow for the ability to annunciate and specify commands directly from the LED touchscreen without the need of a external programmer.

F. In conjunction with intelligent Loop Control Modules and Loop Expander Modules, the main FACP shall perform the following functions:
   1. Supervise and monitor all intelligent addressable detectors and monitor modules connected to the system for normal, trouble and alarm conditions.
   2. Supervise all initiating signaling and notification circuits throughout the facility by way of connection to addressable monitor and control modules.
   3. Detect the activation of any initiating device and the location of the alarm condition. Operate all notification appliances and auxiliary devices as programmed. In the event of CPU failure, all SLC loop modules shall fallback to degrade mode. Such degrade mode shall treat the corresponding SLC loop control modules and associated detection devices as conventional two-wire operation. Any activation of a detector in this mode shall automatically activate associated Notification Appliance Circuits.
   4. Visually and audibly annunciate any trouble, supervisory, security or alarm condition on operator's terminals, panel display, and annunciators.
   5. When a fire alarm condition is detected and reported by one of the systems initiating devices or appliances, the following functions shall immediately occur:
      a. The system alarm LED shall flash.
      b. A local piezo-electric audible device in the control panel shall sound a distinctive signal.
      c. The touchscreen LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.
      d. Printing and history storage equipment shall log and print the event information along with a time and date stamp.
      e. All system outputs assigned via preprogrammed equations for a particular point in alarm shall be executed, and the associated system outputs (alarm notification appliances and/or relays) shall be activated.
      f. When a trouble condition is detected and reported by one of the systems initiating devices or appliances, the following functions shall immediately occur:
      g. The system trouble LED shall flash.
      h. A local piezo-electric audible device in the control panel shall sound a distinctive signal.
      i. The touchscreen LCD display shall indicate all information associated with the trouble condition, including the type of trouble point and its location within the protected premises.
      j. Printing and history storage equipment shall log and print the event information along with a time and date stamp.
      k. All system outputs assigned via preprogrammed equations for a particular point in trouble shall be executed, and the associated system outputs (trouble notification appliances and/or relays) shall be activated.
   6. When a supervisory, security alarm or pre-alarm condition is detected by an initiating devices or appliance, the following functions shall immediately occur:

a. The system trouble LED shall flash.
b. A local piezo-electric audible device in the control panel shall sound a distinctive signal.
c. The touchscreen LCD display shall indicate all information associated with the supervisory condition, including the type of trouble point and its location within the protected premises.
d. Printing and history storage equipment shall log and print the event information along with a time and date stamp.
e. All system outputs assigned via preprogrammed equations for a particular point in trouble shall be executed, and the associated system outputs (notification appliances and/or relays) shall be activated.

G. Operator Control
1. Acknowledge
a. Activation of the control panel acknowledge selection in response to new alarms and/or troubles shall silence the local panel piezo electric signal and change the alarm and trouble LEDs from flashing mode to steady-ON mode. If multiple alarm or trouble conditions exist, selection of acknowledge shall advance the LCD display to the next alarm or trouble condition. In addition, the FACP shall support Block Acknowledge to allow multiple trouble conditions to be acknowledged with a single depression of this switch.
b. Depression of the Acknowledge switch shall also silence all remote annunciator piezo sounders.
2. Signal Silence
a. Selection of the Signal Silence shall cause all programmed alarm notification appliances and relays to return to the normal condition. The selection of notification circuits and relays that are silence able by this switch shall be fully field programmable within the confines of all applicable standards. The FACP software shall include silence inhibit and auto-silence timers.
3. Drill Switch
a. Selection of the Drill mode shall activate all programmed notification appliance circuits. The drill function shall latch until the panel is silenced or reset.
4. System Reset
a. Selection of the System Reset shall cause all electronically latched initiating devices to return to their normal condition. Initiating devices shall re-report if active. Active notification appliance circuits shall not silence upon Reset. Systems that deactivate and subsequently re-activate notification appliance circuits shall not be considered equal. All programmed Control-By-Event equations shall be reevaluated after the reset sequence is complete if the initiating condition has cleared. Non-latching trouble conditions shall not clear and re-report upon reset.
5. Lamp Test
a. The Lamp Test switch shall activate all local system LEDs, light each segment of the liquid crystal display and display the panel software revision for service personal.
6. Scroll Display Keys
a. There shall be Scroll Display keys for FIRE ALARM, SECURITY, SUPERVISORY, TROUBLE, and OTHER EVENTS. Depression of the Scroll Display key shall display the next event in the selected queue allowing the operator to view events by type.
7. Print Screen
a. Depression of the PRINT SCREEN switch shall send the information currently displayed on the touchscreen LCD.

H. System Capacity and General Operations

The control panel shall be scalable up to 10 SLC modules without the need of replacing the CPU. Each SLC module shall support a maximum of 318 analog/addressable devices for a system capacity of 3180 points. The system shall be capable of up to 4500 annunciation points per system regardless of the number of addressable devices.

1. The Fire Alarm Control Panel shall include a full featured 10-inch 1024x600 resolution LCD with touch capability, including audible and visible feedback, backlit by a long life, solid-state LCD. It shall also include a full QWERTY-style keypad on the color, touchscreen display. The display shall have the ability to scroll events by type (i.e. Fire Alarm, Supervisory Alarm, Trouble, etc) using the touchscreen.
2. The touchscreen LCD shall be intuitive and allow for custom configuration of actional events to be program as a selectable icon on the screen.
3. All programming or editing of the existing program in the system shall be achieved without special equipment and without interrupting the alarm monitoring functions of the fire alarm control panel.
4. The FACP shall be able to provide the following software and hardware features:
    a. Pre-signal and Positive Alarm Sequence: The system shall provide means to cause alarm signals to only sound in specific areas with a delay of the alarm from 60 to up to 180 seconds after start of alarm processing. In addition, a Positive Alarm Sequence selection shall be available that allows a 15-second time period for acknowledging an alarm signal from a fire detection/initiating device. If the alarm is not acknowledged within 15 seconds, all local and remote outputs shall automatically activate immediately.
    b. Smoke Detector Pre-alarm Indication at Control Panel: To obtain early warning of incipient or potential fire conditions, the system shall support a programmable option to determine system response to real-time detector sensing values above the programmed setting. Two levels of Pre-alarm indication shall be available at the control panel: alert and action.
    c. Alert: It shall be possible to set individual smoke detectors for pre-programmed pre-alarm thresholds. If the individual threshold is reached, the pre-alarm condition shall be activated.
    d. Action: If programmed for Action and the detector reaches a level exceeding the pre-programmed level, the control panel shall indicate an action condition. Sounder bases installed with either heat or smoke detectors shall automatically activate on action Pre-Alarm level, with general evacuation on Alarm level.
    e. The system shall support a detector response time to meet world annunciation requirements of less than 3 seconds.
    f. Device Blink Control: Means shall be provided to turn off detector/module LED strobes for special areas.
    g. NFPA 72 Smoke Detector Sensitivity Test: The system shall provide an automatic smoke detector test function that meet the requirements of NFPA 72.
    h. Programmable Trouble Reminder: The system shall provide means to automatically initiate a reminder that troubles exist in the system. The reminder will appear on the system display and (if enabled) will sound a piezo alarm.
    i. On-line or Off-line programming: The system shall provide means to allow panel programming either through an off-line software utility program away from the panel or while connected and on-line. The system shall also support upload and download of programmed database and panel executive system program to a Personal Computer/laptop.
    j. History Events: The panel shall be capable maintaining a history file up to the last 4000 events, each with a time and date stamp. History events shall include all alarms, troubles, operator actions, and programming entries. The control panels shall also maintain up to a 1000 event Alarm History buffer, which consists of the 1000 most recent alarm events from the 4000-event history file.

k. The system shall provide means for all SLC devices on any SLC loop to be auto programmed into the system by specific address. The system shall recognize specific device type ID's and associate that ID with the corresponding address of the device.

l. Drill: The system shall support means to activate all silenceable fire output circuits in the event of a practice evacuation or "drill". If enabled for local control, the front panel switch shall be held for a minimum of 2 seconds prior to activating the drill function.

m. Passwords and Users: The system shall support two password levels, master and user. Up to 9 user passwords shall be available, each of which may be assigned access to the programming change menus, the alter status menus, or both. Only the master password shall allow access to password change screens.

n. Two Wire Detection: The system shall support standard two wire detection devices specifically from the following manufacture: System Sensor.

o. Block Acknowledge: The system shall support a block Acknowledge for Trouble Conditions

p. Sensitivity Adjust: The system shall provide Automatic Detector Sensitivity Adjust based on Occupancy schedules including a Holiday list of up to 15 days.

q. Environmental Drift Control: The system shall provide means for setting Environmental Drift Compensation by device. When a detector accumulates dust in the chamber and reaches an unacceptable level but yet still below the allowed limit, the control panel shall indicate a maintenance alert warning. When the detector accumulates dust in the chamber above the allowed limit, the control panel shall indicate a maintenance urgent warning.

r. Custom Action Messages: The system shall provide means to enter up to 100 custom action messages of up to 160 characters each. It shall be possible to assign any of the 100 messages to any point.

s. Print Functions: The system shall provide means to obtain a variety of reports listing all event, alarm, trouble, supervisory, or security history. Additional reports shall be available for point activation for the last Walk Test performed, detector maintenance report containing the detector maintenance status of each installed addressable detector, all network parameters, all panel settings including broad cast time, event ordering, and block acknowledge, panel timer values for Auto Silence, Silence Inhibit, AC Fail Delay time and if enabled, Proprietary Reminder, and Remote Reminder timers, supervision settings for power supply and printers, all programmed logic equations, all custom action messages, all non-fire and output activations (if pre-programmed for logging) all active points filtered by alarms only, troubles only, supervisory alarms, pre-alarms, disabled points and activated points, all installed points filtered by SLC points, logic zones, annunciators, releasing zones, special zones, and trouble zones.

t. Local Mode: If communication is lost to the central processor the system shall provide added survivability through the intelligent loop control modules. Inputs from devices connected to the SLC and loop control modules shall activate outputs on the same loop when the inputs and outputs have been set with point programming to participate in local mode or when the type codes are of the same type: that is, an input with a fire alarm type code shall activate an output with a fire alarm type code.

u. Resound based on type for security or supervisory: The system shall indicate a Security alarm when a monitor module point programmed with a security Type Code activates. If silenced alarms exist, a Security alarm will Resound the panel sounder. The system shall indicate a Supervisory alarm when a monitor module point programmed with a supervisory Type Code activates. If there are silenced alarms, a Supervisory alarm will Resound the panel sounder.

v. Read status preview - enabled and disabled points: Prior to re-enabling points, the system shall inform the user that a disabled device is in the alarm state. This shall provide notice that the device must be reset before the device is enabled thereby avoiding activation of the notification circuits.
w. Custom Graphics: When fitted with an LCD display, the panel shall permit uploading of a custom bit-mapped graphic to the display screen.
x. Multi-Detector and Cooperating Detectors: The system shall provide means to link one detector to up to two detectors at other addresses on the same loop in cooperative multi-detector sensing. There shall be no requirement for sequential addresses on the detectors and the alarm event shall be a result or product of all cooperating detectors chamber readings.
y. Tracking/Latching Duct (ion and photo): The system shall support both tracking and latching duct detectors either ion or photo types.
z. One-Man Walk Test: The system shall provide both a basic and advanced walk test for testing the entire fire alarm system. The basic walk test shall allow a single operator to run audible tests on the panel. All logic equation automation shall be suspended during the test and while annunciators can be enabled for the test, all shall default to the disabled state. During an advanced walk test, field-supplied output point programming will react to input stimuli such as CBE and logic equations. When points are activated in advanced test mode, each initiating event shall latch the input. The advanced test shall be audible and shall be used for pull station verification, magnet activated tests on input devices, input and output device and wiring operation/verification.
aa. Multiple agent releasing zones: The system shall support up to 10 releasing zones to protect against 10 independent hazards. Releasing zones shall provide up to three cross-zone and four abort options to satisfy any local jurisdiction requirements.
bb. Alarm Verification, by device, with timer and tally: The system shall provide a user-defined global software timer function that can be set for a specific detector or indicating panel module input. The timer function shall delay an alarm signal for a user-specified time period and the control panel shall ignore the alarm verification timer if another alarm is detected during the verification period. It shall also be possible to set a maximum verification count between 0 and 20 with the "0" setting producing no alarm verification. When the counter exceeds the threshold value entered, a trouble shall be generated to the panel.

l Central Processing Unit

1. The Central Processing Unit shall be the same component with the ability to expand to a larger system as required by the project without the need to be replaced.
2. The Central Processing Unit shall communicate with, monitor, and control all other modules within the control panel. Removal, disconnection, or failure of any control panel module shall be detected and reported to the system display by the Central Processing Unit.
3. The Central Processing Unit shall contain and execute all control-by-event (including Boolean functions including but not limited to AND, OR, NOT, ANYx, and CROSSZONE) programs for specific action to be taken if an alarm condition is detected by the system. Such control-by-event programs shall be held in non-volatile programmable memory and shall not be lost with system primary and secondary power failure.
4. The Central Processing Unit shall also provide a real-time clock for time annotation, to the second, of all system events. The time-of-day and date shall not be lost if system primary and secondary power supplies fail.
5. The CPU shall be capable of being programmed on site without requiring the use of any external programming equipment. Systems that require the use of external programmers or change of EPROMs are not acceptable.

6. Consistent with UL864 standards, the CPU and associated equipment are to be protected so that voltage surges or line transients will not affect them.
7. Each peripheral device connected to the CPU shall be continuously scanned for proper operation. Data transmissions between the CPU and peripheral devices shall be reliable and error free. The transmission scheme used shall employ dual transmission or other equivalent error checking techniques.
8. The CPU shall provide an EIA-232 interface between the fire alarm control panel and the UL Listed Electronic Data Processing (EDP) peripherals.
9. The CPU shall provide two EIA-485 ports for the serial connection to annunciation and control subsystem components.
10. The EIA-232 serial output circuit shall be optically isolated to assure protection from earth ground.
11. The CPU shall provide one high-speed serial connection for support of network communication modules.
12. The CPU shall provide double pole relays for FIRE ALARM, SYSTEM TROUBLE, SUPERVISORY, and SECURITY. The SUPERVISORY and SECURITY relays shall provide selection for additional FIRE ALARM contacts.
13. The EIA-485 interface may be used for network connection to a proprietary-receiving unit.
14. An expandable power supply shall be standard to allow for future system modifications without the need to add additional hardware.

J System Display

1. The system display shall provide all the controls and indicators used by the system operator and may also be used to program all system operational parameters.
2. The display assembly shall contain, and display as required, custom alphanumeric labels for all intelligent detectors, addressable modules, and software zones.
3. The system display shall provide a 10-inch touchscreen LCD. The interactive touchscreen LCD shall indicate the status of the following system parameters: AC POWER, FIRE ALARM, PREALARM, SECURITY, SUPERVISORY, SYSTEM TROUBLE, OTHER EVENT, SIGNALS SILENCED, POINT DISABLED, and CPU FAILURE.
4. The system display shall provide a QWERTY style keypad with control capability to command all system functions, entry of any alphabetic or numeric information, and field programming. Two different password levels with up to ten (one Master and nine User) passwords shall be accessible through the display interface assembly to prevent unauthorized system control or programming.
5. The system display shall include the following operator control selections: ACKNOWLEDGE, SIGNAL SILENCE, RESET, DRILL, and LAMP TEST. Additionally, the display interface shall allow scrolling of events by event type including, FIRE ALARM, SECURITY, SUPERVISORY, TROUBLE, and OTHER EVENTS. A PRINT SCREEN button shall be provided for printing the event currently displayed on the LCD.
6. The touchscreen LCD shall be intuitive and allow for custom configuration of actional events to be program as a selectable icon on the screen.

K Loop (Signaling Line Circuit) Control Module

1. The Loop Control Module shall monitor and control a minimum of 318 intelligent addressable devices. This includes 159 intelligent detectors (Photoelectric, or Thermal) and 159 monitor or control modules.

2. The Loop Control Module shall contain its own microprocessor and shall be capable of operating in a local/degrade mode (any addressable device input shall be capable of activating any or all addressable device outputs) in the unlikely event of a failure in the main CPU.
3. The Loop Control Module shall provide power and communicate with all intelligent addressable detectors and modules on a single pair of wires. This SLC Loop shall be capable of operating as a NFPA Style 6 (Class B) circuit.
4. The SLC interface board shall be able to drive an NFPA Style 6 twisted unshielded circuit up to 12,500 feet in length. The SLC Interface shall also be capable of driving an NFPA Style 6, no twist, no shield circuit for limited distances determined by the manufacturer. In addition, SLC wiring shall meet the listing requirements for it to exit the building or structure. "T"-tapping shall be allowed in either case.
5. The SLC interface board shall receive analog or digital information from all intelligent detectors and shall process this information to determine whether normal, alarm, or trouble conditions exist for that particular device. Each SLC Loop shall be isolated and equipped to annunciate an Earth Fault condition. The SLC interface board software shall include software to automatically maintain the detector's desired sensitivity level by adjusting for the effects of environmental factors, including the accumulation of dust in each detector. The analog information may also be used for automatic detector testing and the automatic determination of detector maintenance requirements.

L Enclosures

1. The control panel shall be housed in a UL-listed cabinet suitable for surface or semi-flush mounting. The cabinet and front shall be corrosion protected, given a rust-resistant prime coat, and manufacturer's standard finish.
2. The back box and door shall be constructed of 0.060 steel with provisions for electrical conduit connections into the sides and top.
3. The door shall provide a key lock and include a transparent opening for viewing all indicators. For convenience, the door shall have the ability to be hinged on either the right or left-hand side.
4. The control unit shall be modular in structure for ease of installation, maintenance, and future expansion.
5. The FACP shall have a modular dress panel and door design with interchangeable door hinge locations.

M Digital Voice Command Center

1. The Digital Voice Command Center located with the FACP, shall contain all equipment required for all audio control, signaling and supervisory functions. This shall include speaker zone indication and control, digital voice units, and master microphone
2. Function: The Voice Command Center equipment shall perform the following functions:
    a. Operate as a supervised multi-channel emergency voice communication system. The system shall have the capability to support up to eight (8) simultaneous messages.
    b. Operate as a two-way emergency telephone system control center.
    c. Audibly and visually annunciate the active or trouble condition of every speaker circuit and emergency telephone circuit.
    d. Audibly and visually annunciate any trouble condition for digital tone and voice units required for normal operation of the system.
    e. Provide all-call Emergency Paging activities through activation of a single control switch.
    f. As required, provide vectored paging control to specific audio zones via dedicated control switches.

g. Provide a factory recorded "library" of voice messages and tones in standard WAV. File format, which may be edited and saved on a PC running a current Windows® operating system.

h. Provide a software utility capable of off-line programming for the DVC operation and the audio message files. This utility shall support the creation of new programs as well as editing and saving existing program files. Uploading or downloading the shall DVC not inhibit the emergency operation of other nodes on the fire alarm network.

i. Support an optional mode of operation with four analog audio outputs capable of being used with UL 864 fire-listed analog audio amplifiers and SCL controlled switching.

j. The Digital Voice Command shall be modular in construction, and shall be capable of being field programmable without requiring the return of any components to the manufacturer and without requiring use of any external computers or other programming equipment.

k. The Digital Voice Command and associated equipment shall be protected against unusually high voltage surges or line transients

N Emergency Voice Alarm Communication System

1. The emergency voice alarm communication system shall incorporate a Two-way emergency telephone communication system.

a. Two-way emergency telephone communication circuits shall be supervised for open and short circuit conditions.

b. Two-way emergency telephone (Fire Fighter Telephone) communication shall be supported between the Digital Voice Command Center and up to seven (7) remote Fire Fighter's Telephone locations simultaneously on a telephone riser.

c. Means shall be provided to connect FFT voice communications to the speaker circuits in order to allow voice paging over the speaker circuit from a telephone handset.

O Portable Emergency Telephone Handset Jack

1. Portable Emergency telephone handset jacks shall be flush mounted on stainless steel plates as indicated on the plans. Jacks shall be approved for emergency telephone system application.
2. Insertion of a portable handset plug into a jack shall send a signal to the fire command center, which shall audibly and visually indicate the on-line condition, and shall sound a "ring" indication in the handset.
3. The two-way emergency telephone system shall support a minimum of seven (7) handsets online without degradation of the signal.

P Fixed Emergency Telephone Handset

1. The telephone cabinet shall be painted red and clearly labeled as "Emergency Telephone." The cabinets shall be located where shown on drawings.
2. The handset cradle shall have a switch connection so that lifting the handset off of the cradle shall send a signal to the fire command center, which shall audibly and visually in- dicate its on-line (off-hook) condition.
3. On activating the remote phone, the phone earpiece shall sound a telephone ring signal until the master handset is lifted.
4. The two-way emergency telephone system shall support a minimum of seven (7) handset on line without degradation of the signal

Q Power Supply

1. The Addressable Main Power Supply shall operate on 120/240 VAC, 50/60 Hz, and shall provide all necessary power for the FACP.
2. The Addressable Main Power Supply shall provide the required power to the CPU using a switching 24 VDC regulator and shall incorporate a battery charger for 24 hours of standby power using dual rate charging techniques for fast battery recharge.
3. The Addressable Main Power Supply shall provide a battery charger for 24 hours of standby using dual rate charging techniques for fast battery recharge. The supply shall be capable of charging batteries ranging in capacity from 7-200 amp-hours within a 48-hour period.
4. The Addressable Main Power Supply shall provide a very low frequency sweep earth detect circuit, capable of detecting earth faults.
5. The Addressable Main Power Supply shall be power limited per UL864 requirements.

R Auxiliary Field Power Supply – Addressable

1. The auxiliary addressable power supply is a remote 24 VDC power supply used to power Notification Devices and field devices that require regulated 24VDC power. The power supply shall also include and charge backup batteries.
2. The addressable power supply for the fire alarm system shall provide up a minimum of 6.0 amps of 24-volt DC regulated power for Notification Appliance Circuit (NAC) power or 5 amps of 24-volt DC general power. The power supply shall have an additional .5 amp of 24 VDC auxiliary power for use within the same cabinet as the power supply. It shall include an integral charger designed to charge 7.0 - 25.0-amp hour batteries.
3. The addressable power supply shall provide four individually addressable Notification Appliance Circuits that may be configured as two Class "A" and two Class "B" or four Class "B" only circuits. All circuits shall be power limited per UL 864 requirements.
4. The addressable power supply shall provide built-in synchronization for certain Notification Appliances on each circuit without the need for additional synchronization modules. The power supply's output circuits shall be individually selected for synchronization. A single addressable power supply shall be capable of supporting both synchronized and non-synchronized Notification Devices at the same time.
5. The addressable power supply shall operate on 120 or 240 VAC, 50/60 Hz.
6. The interface to the power supply from the Fire Alarm Control Panel (FACP) shall be via the Signaling Line Circuit (SLC) or other multiplexed means Power supplies that do not use an intelligent interface are not suitable substitutes. The required wiring from the FACP to the addressable power supply shall be a single unshielded twisted pair wire. Data on the SLC shall be transmitted between 24 VDC, 5 VDC and 0 VDC at approximately 3.33k baud.
7. The addressable power supply shall supervise for battery charging failure, AC power loss, power brownout, battery failure, NAC loss, and optional ground fault detection. In the event of a trouble condition, the addressable power supply shall report the incident and the applicable address to the FACP via the SLC.
8. The addressable power supply shall have an AC Power Loss Delay option. If this option is utilized and the addressable power supply experiences an AC power loss, reporting of the incident to the FACP will be delayed. A delay time of eight or sixteen hours shall be Dipswitch selected.
9. The addressable power supply shall have an option for Canadian Trouble Reporting and this option shall be Dip-switch selectable.
10. The addressable power supply mounts in either the FACP backbox or its own dedicated surface mounted backbox with cover.
11. Each of the power supply's four output circuits shall be DIP-switch selected for Notification Appliance Circuit or General Purpose 24 VDC power. Any output circuit shall be able to provide up to 2.5 amps of 24 VDC power.

12. The addressable power supply's output circuits shall be individually supervised when they are selected to be either a Notification Appliance Circuit when wired Class "A" or by the use of and end-of-line resistor. When the power supply's output circuit is selected as General 24VDC power, the circuit shall be individually supervised when an end-of-line relay is used.
13. When selected for Notification Appliance Circuits, the output circuits shall be individually DIP-switch selectable for Steady, March Time, Dual Stage or Temporal.
14. When selected as a Notification Appliance Circuit, the output circuits of the addressable power supply shall have the option to be coded by the use of a universal zone coder.
15. The addressable power supply shall interface and synchronize with other power supplies of the same type. The required wiring to interface multiple addressable power supplies shall be a single unshielded, twisted pair wire.
16. An individual or multiple interfaced addressable power supplies shall have the option to use an external charger for battery charging. Interfaced power supplies shall have the option to share backup battery power.

S Field Charging Power Supply

The FCPS is a device designed for use as either a remote 24-volt power supply or used to power Notification Appliances.

1. The FCPS shall offer up to 6.0 amps (4.0 amps continuous) or 10 amps of regulated 24volt power. It shall include an integral charger designed to charge up to 33-amp hour batteries and to support 60-hour standby.
2. The Field Charging Power Supply shall have two input triggers. The input trigger shall be a Notification Appliance Circuit (from the fire alarm control panel) or a relay. Four outputs (two Style Y or Z and two style Y) shall be available for connection to the Notification devices.
3. The FCPS shall include trouble history modes for diagnostic support. FCPS shall include individual NAC power and trouble LEDs for diagnostic efficiency.
4. The Field Charging Power Supply shall include the ability to delay the AC fail delay per NFPA requirements.
5. Self-Contained in compact, locking cabinet constructed of heavy gauge steel with a corrosion-resistant powder coat chip and scratch-resistant finish. Cabinet shall consist of 10 double knockouts and a removable door for ease of installation and wiring.
6. The FCPS shall be capable of utilizing a wide range of end of line supervision values (normal 2K- 27K ohms).
7. The FCPS shall be completely configurable via onboard dip switches, with no extra software required.
8. The FCPS include power limited circuitry, per 1995 UL standards.

T System Circuit Supervision

1. The FACP shall supervise all circuits to intelligent devices, transponders, annunciators and peripheral equipment and annunciate loss of communication with these devices. The CPU shall continuously scan above devices for proper system operation and upon loss of response from a device shall sound an audible trouble, indicate which device or devices are not responding and print the information in the history buffer and on the printer.
2. Transponders that lose communication with the CPU shall sound an audible trouble and light an LED indicating loss of communications.
3. Sprinkler system valves, standpipe control valves, PIV, and main gate valves shall be supervised for off-normal position.
4. All speaker and emergency phone circuits shall be supervised for opens and shorts. Each transponder speaker and emergency phone circuit shall have an individual ON/OFF indication (green LED).

U Field Wiring Terminal Blocks

1. All wiring terminal blocks shall be the plug-in/removable type and shall be capable of terminating up to 12 AWG wire. Terminal blocks that are permanently fixed to the PC board are not acceptable.

V Audio Amplifiers

1. The Audio Amplifiers will provide Audio Power (@25 Volts RMS) for distribution to speaker circuits.
2. Multiple audio amplifiers may be mounted in a single enclosure, either to supply incremental audio power, or to function as an automatically switched backup amplifier(s).
3. The audio amplifier shall provide the following built-in controls:
   a. Amplifier Address Selection Switches
   b. Signal Silence of communication loss annunciation Reset
   c. Level adjustment for background music
   d. Enable/Disable for Earth Fault detection on DAP A 5 Switch for 2-wire/4-wire FFT riser
4. Adjustment of the correct audio level for the amplifier shall not require any special tools or test equipment.
5. Includes audio input and amplified output supervision, back up input, and automatic switch over function, (if primary amplifier should fail).
6. System shall be capable of backing up digital amplifiers.
7. One-to-one backup shall be provided by either a plug-in amplifier card or a designated backup amplifier of identical model as the primary amplifier.
8. One designated backup amplifier shall be capable of backing up multiple primary amplifiers mounted in the same or adjacent cabinets.
9. Multi-channel operation from a single amplifier shall be supported by the addition of an optional plug-in amplifier card.

W Controls with associated LED Indicators Speaker Switches/Indicators

1 The speaker circuit control switches/indicators shall include visual indication of active and trouble status for each speaker circuit in the system.

2 The speaker circuit control panel shall include switches to manually activate or deactivate each speaker circuit in the system.

X Remote Transmissions

1. Provide local energy or polarity reversal or trip circuits as required.
2. The system shall be capable of operating a polarity reversal or local energy or fire alarm transmitter for automatically transmitting fire information to the fire department.
3. Provide capability and equipment for transmission of zone alarm and trouble signals to remote operator's terminals, system printers and annunciators.
4. Transmitters shall be compatible with the systems and equipment they are connected to such as timing, operation and other required features.

Y System Expansion

1. Design the main FACP and required components so that the system can be expanded in the future (to include the addition of twenty percent more circuits or

zones) without disruption or replacement of the existing control panel. This shall include hardware capacity, software capacity and cabinet space.

Z Field Programming

1. The system shall be programmable, configurable and expandable in the field without the need for special tools, laptop computers, or other electronic interface equipment. There shall be no firmware changes required to field modify the system time, point information, equations, or annunciator programming/information.
2. It shall be possible to program through the standard FACP keyboard all system functions.
3. All field defined programs shall be stored in non-volatile memory.
4. Two levels of password protection shall be provided in addition to a key-lock cabinet. One level shall be used for status level changes such as point/zone disable or manual on/off commands (Building Manager). A second (higher-level) shall be used for actual change of the life safety program (installer). These passwords shall be five (5) digits at a minimum. Upon entry of an invalid password for the third time within a one-minute time period an encrypted number shall be displayed. This number can be used as a reference for determining a forgotten password.
5. The system programming shall be "backed" up via an upload/download program and stored on compatible removable media. A system back-up disk shall be completed and given in duplicate to the building owner and/or operator upon completion of the final inspection. The program that performs this function shall be "non-proprietary", in that, it shall be possible to forward it to the building owner/operator upon his or her request. vi The installer's field programming and hardware shall be functionally tested on a computer against known parameters/norms which are established by the FACP manufacturer. A software program shall test Input-to-Output correlations, device Type ID associations, point associations, time equations, etc. This test shall be performed on an IBM compatible PC with a verification software package. A report shall be generated of the test results and two copies turned in to the engineer(s) on record.

AA Specific System Operations

1. Smoke Detector Sensitivity Adjust: Means shall be provided for adjusting the sensitivity of any or all analog intelligent smoke detectors in the system from the system keypad or from the keyboard of the video terminal. Sensitivity range shall be within the allowed UL window.
2. Alarm Verification: Each of the Intelligent Addressable Smoke Detectors in the system may be independently selected and enabled to be an alarm verified detector. The alarm verification function shall be programmable from 5 to 50 seconds and each detector shall be able to be selected for verification during the field programming of the system or any time after system turn-on. Alarm verification shall not require any additional hardware to be added to the control panel. The FACP shall keep a count of the number of times that each detector has entered the verification cycle. These counters may be displayed and reset by the proper operator commands.

BB System Point Operations

1. Any addressable device in the system shall have the capability to be enabled or disabled through the system keypad or video terminal.
2. System output points shall be capable of being turned on or off from the system keypad or the video terminal.

3. Point Read: The system shall be able to display the following point status diagnostic functions without the need for peripheral equipment. Each point shall be annunciated for the parameters listed:

    a. Device Status.
    b. Device Type.
    c. Custom Device Label.
    d. Software Zone Label.
    e. Device Zone Assignments.
    f. Analog Detector Sensitivity.
    g. All Program Parameters.

4. System Status Reports: Upon command from an operator of the system, a status report will be generated and printed, listing all system statuses:
5. System History Recording and Reporting: The fire alarm control panel shall contain a history buffer that will be capable of storing up to 4000 system events. Each of these events will be stored, with time and date stamp, until an operator requests that the contents be either displayed or printed. The contents of the history buffer may be manually reviewed; one event at a time, and the actual number of activations may also be displayed and or printed. History events shall include all alarms, troubles, operator actions, and programming entries.
6. The history buffer shall use non-volatile memory. Systems which use volatile memory for history storage are not acceptable.
7. Automatic Detector Maintenance Alert: The fire alarm control panel shall automatically interrogate each intelligent system detector and shall analyze the detector responses over a period of time.
8. If any intelligent detector in the system responds with a reading that is below or above normal limits, then the system will enter the trouble mode, and the particular Intelligent Detector will be annunciated on the system display and printed on the optional system printer. This feature shall in no way inhibit the receipt of alarm conditions in the system, nor shall it require any special hardware, special tools or computer expertise to perform.
9. The system shall include the ability (programmable) to indicate a "pre-alarm" condition. This will be used to alert maintenance personal when a detector is at 80% of its alarm threshold in a 60 second period.

2.05 CLOUD BASED REPORTING AND MONITORING REQUIREMENTS

A All equipment, components and software shall be new and meet manufacturers current model. The materials, equipment, and devices shall be tested to function with manufactures approved FACP via a cloud base life safety services system.

B The system shall fully comply with commissioning and test and inspect reports as outline in NFPA-72. System test shall automatically retrieve the fire systems connected devices utilizing a gateway. In applications where a gateway is not applicable the systems peripheral devices shall be entered manually and/or by using barcodes.

C CONNECTED LIFE SAFETY SERVICES SOFTWARE PLATFORM

1. The software shall meet all the requirements outline in the System Maintenance and Analysis Reporting section of this specification.

a. System shall be compatible with IOS and Android mobile functionality and have web-based access with Windows and MAC based platforms without the need to install software on a dedicated network server.
b. Functions through the mobile App and Web access should have all the following features:

1. Device count per building
2. Event log on App and Web access
3. Control and reporting via Mobile App
4. Automatic data input
5. Automatic report generation

2. The system shall support an IP based gateway to enable the panel or local Noti-Fire-Net to be connected to an ONYXWorks workstation via the Inter-net or Intranet. This gateway shall also support the ability to integrate the system to an interactive firefighter's display.
3. Webserver: The system shall support a webserver allowing remote connection via the Internet or Intranet. Authorized users will have the ability to view panel/network history, event status and device properties. The webserver shall also support sending event information via email or text to up to 50 registered users, the webserver shall be available from the fire alarm control panel manufacturer.
4. Web Portal Interface: The system shall be capable of being interfaced with a web portal to integrate with Inspection and Service Manager utilities. The web portal and inspection and service manager utilities shall be available from the fire alarm control panel manufacturer.

D CLSS CHECKPOINT HUB GATEWAY

1. Provide a CheckPoint gateway for connection to a NOTIFIER fire system panel, serving as an interface between the FACP, Cloud and peripheral devices. The CheckPoint Hub shall be capable of reading the connected device system data base from a single or network of panels and shall transmit the data to the Connected Life Safety Services (CLSS) cloud.
2. Equipment standard features shall allow Blue Tooth mobile paring for gateway configuration and control capability.
3. Connection to NOTIFIER INSPIRE N16 series fire system panels utilizing Universal Protocol Ports via RJ45.
4. Provide Nominal Voltage consumption of 12V to 32V DC from the FACP or an external power supply.
5. The CLSS gateway shall allow for alarm transmission to a central station via IP and or GSM.
6. The system shall support the ability for installation and or test and inspection personnel to generate automated commissioning reports or test and inspection reports via the Connected Life Safety Service (CLSS) platform enabling reports to be provided to the appropriate stakeholders immediately after completion of the system commission or test and inspection.
7. The CLSS platform shall support the ability to automatically capture every addressable device connected to the system ensuring that each addressable device is accounted for and properly tested. CLSS shall also support importing any non addressable devices associated with the system to ensure all system devices are accounted for and properly tested.
8. For self-testing devices CLSS shall identity any issues associated the integrity of the ability for the smoke detector to properly detect smoke such as a dust cap not being removed or someone tampering with the detector by obstructing the smoke detector chamber.

E DIGITAL ALARM COMMUNICATION TRANSMITTER

1. The CLSS gateway shall include an interface to allow for cell communication, per UL/NFPA/FCC requirements. It shall include the ability for split reporting of panel events.
2. Communication via cellular shall be concluded by utilizing AT&T or Verizon communication services.
3. The CLSS Gateway shall be completely field programmable utilizing the CLSS mobile app.
4. Communication shall include vital system status such as:

a. Independent Zone (Alarm, trouble, non-alarm, supervisory)
b. Independent Addressable Device Status
c. AC (Mains) Power Loss
d. Low Battery and Earth Fault
e. System Off Normal
f. 12 and 24 Hour Test Signal
g. Abnormal Test Signal (per UL requirements)
h. EIA-485 Communications Failure
i. Phone Line Failure
j. It shall support independent zone/point reporting when used in the Contact ID format. In this format the communicator shall support transmission of up to 2,040 points. This enables the central station to have exact details concerning the origin of the fire or response emergency.

2.06 SYSTEM COMPONENTS

A Speakers: Notifier-System Sensor L Series

1. All speakers/audibles shall operate on 25 VRMS or with field selectable output taps from 0.5 to 2.0 Watts.
2. Speakers/audibles in corridors and public spaces shall produce a nominal sound output of 84 dBA at 10 feet.
3. Frequency response shall be a minimum of 400 HZ to 4000 HZ. Capable of producing 520 HZ low Frequency for hearing impaired, etc.
4. The back of each speaker shall be sealed to protect the speaker cone from damage and dust.

B Audible/Visual Combination Devices

1. Shall meet the applicable requirements of Section A listed above for audibility.
2. Shall meet the requirements of Section D listed below for visibility.
3. Visuals shall be installed at a height no less than 90 inches from the floor and no less than 6 inches below the finished ceiling when the greater of the two cannot be achieved as required per NFPA-72

C Programmable Electronic Sounders

1. Electronic sounders shall operate on 24 VDC nominal.
2. Electronic sounders shall be field programmable without the use of special tools, at a sound level of at least 90 dBA measured at 10 feet from the device.
3. Shall be flush or surface mounted as shown on plans.

D Strobe lights, such as the Notifier-System Sensor Lseries, shall meet the requirements of the ADA, UL Standard 1971, be fully synchronized, and shall meet the following criteria:

1. The maximum pulse duration shall be 2/10 of one second

2. Strobe intensity shall meet the requirements of UL 1971.

3. The flash rate shall meet the requirements of UL 1971.

E Manual Fire Alarm Stations

1. Manual fire alarm stations shall be non-code, non-breakglass type, equipped with key lock so that they may be tested without operating the handle.
2. Stations must be designed such that after an actual activation, they cannot be restored to normal except by key reset.
3. An operated station shall automatically condition itself so as to be visually detected, as operated, at a minimum distance of 100 feet (30.5 m) front or side.
4. Manual stations shall be constructed of high impact Lexan, with operating instructions provided on the cover. The word FIRE shall appear on the manual station in letters one half inch (12.7 mm) in size or larger.
5. Manual Fire Alarm station shall be located within 5ft of each exit door and mounted between 42-48 inches from the finish floor as required per NFPA-72 and ADA requirements.
6. Add additional manual fire alarm stations when the distance between stations exceed 200ft.

F Duct Smoke Detectors

1. Duct smoke detectors shall be a 24 VDC type with visual alarm and power indicators, and a reset switch. Each detector shall be installed upon the composite supply/return air ducts(s), with properly sized air sampling tubes.

G Projected Beam Detectors

1. The projected beam type shall 24 VDC device.
2. The detector shall be listed to UL 268
3. The detector shall operate in either a short range (16' - 100') or long range (100' - 330') mode.
4. The temperature range of the device shall be -22 degrees F to 131 degrees F.
5. The detector shall feature a bank of four alignment LEDs on both the receiver and the transmitter that are used to ensure proper alignment of unit without special tools.
6. Beam detectors shall feature automatic gain control which will compensate for gradual signal deterioration from dirt accumulation on lenses.
7. The unit shall be both ceiling and wall mountable.
8. The detector shall have the ability to be tested using calibrated test filters or magnet activated remote test station.

H Waterflow Indicator

1. Waterflow Switches shall be an integral, mechanical, non-coded, non-accumulative retard type.
2. Waterflow Switches shall have an alarm transmission delay time which is conveniently adjustable from 0 to 60 seconds. Initial settings shall be 30-45 seconds.
3. All waterflow switches shall come from a single manufacturer and series.
4. Waterflow switches shall be provided and connected under this section but installed by the mechanical contractor.

5. Where possible, locate waterflow switches a minimum of one (1) foot from a fitting which changes the direction of the flow and a minimum of three (3) feet from a valve.

I Sprinkler and Standpipe Valve Supervisory Switches

1. Each sprinkler system water supply control valve riser, zone control valve, and standpipe system riser control valve shall be equipped with a supervisory switch. Standpipe hose valves, and test and drain valves shall not be equipped with supervisory switches.
2. PIV (post indicator valve) or main gate valves shall be equipped with a supervisory switch.
3. The switch shall be mounted so as not to interfere with the normal operation of the valve and adjusted to operate within two revolutions toward the closed position of the valve control, or when the stem has moved no more than one-fifth of the distance from its normal position.
4. The supervisory switch shall be contained in a weatherproof aluminum housing, which shall provide a 3/4-inch (19 mm) conduit entrance and incorporate the necessary facilities for attachment to the valves.
5. The switch housing shall be finished in red baked enamel.
6. The entire installed assembly shall be tamper proof and arranged to cause a switch operation if the housing cover is removed, or if the unit is removed from its mounting.
7. Valve supervisory switches shall be provided and connected under this section and installed by mechanical contractor.

    a. This unit shall provide for each zone: alarm indications, using a red alarm and yellow trouble long-life LEDs and control switches for the control of fire alarm control panel functions. The annunciator will also have an ON-LINE LED, local piezo electric signal, local acknowledge/lamp test switch, and custom slide-in zone/function identification labels.
    b. Switches shall be available for remote annunciation and control of output points in the system, system acknowledge, telephone zone select, speaker select, global signal silence, and global system reset within the confines of all applicable standards.

J Annunciator Control Display

1. The annunciator shall provide the FACP or NCD with remote, serially connected annunciators. Arrays of LED’s indicate, at a remote location the status of the system. Common system functions such as silence, system reset and local annunciator controls are controlled through switches on the annunciators keypad.
2. The annunciator communicates to the FACP via a two-wire serial interface. Power is provided by the FACP via 24 VDC power and is inherently supervised
3. The LCD annunciator shall display all alarm and trouble conditions in the system.
4. An audible indication of alarm shall be integral to the touchscreen LCD display.
5. The display shall be UL listed for fire alarm application.
6. It shall be possible to connect up to 32 LCD displays and be capable of wiring distances up to 6,000 feet from the control panel.
7. The annunciator shall connect to a separate, dedicated "terminal mode" EIA-485 interface. This is a two-wire loop connection and shall be capable of distances to 6,000 feet. Each terminal mode LCD display shall mimic the main control panel.
8. Up to 160 annunciators can be supported by the FACP., additionally it shall allow up to 10 annunciators to be configure as routers with each router supporting an additional 15 annunciators.

9. The LED annunciator shall offer an interface to a graphic style annunciator and provide each of the features listed above.

2.07 NETWORK NODE

A Standard Network Communication

1. The network architecture shall be based on a Local Area Network (LAN), a firmware package that utilizes a peer-to-peer, inherently regenerative communication format and protocol. The protocol shall be based on ARCNET or equivalent. The network shall use a deterministic token-passing method. Collision detection and recovery type protocols are not acceptable substitutes due to life safety requirements. In addition, there shall be no master, polling computer, central file computer, display controller or other central element (weak link) in the network which, on failure, may cause complete loss of network communications or cause major degradation of network capability. There shall be no cascading of CPUs or master/slave relationships at the network level to facilitate network communications. Failure of any node shall not cause failure or communication degradation of any other node or change the network communication protocol among surviving nodes located within distance limitations. Each node/panel shall communicate on the network at a baud rate of not less than 312 KBPS (kilo bits per second). A node may be an intelligent Fire Alarm Control Panel (FACP), ONYXWorks Workstation (ONYXWorks), Embedded Gateway, Network Control Annunciator (NCA), BACnet Gateway, Modbus Gateway, or Network Web Server (NWS). The network shall be capable of expansion to at least 103 nodes.
2. Each network node address shall be capable of storing Event equations. The event equations shall be used to activate outputs on one network node from inputs on other network nodes.
3. The network shall be capable of communicating via wire or fiber optic medium. A wire network shall include a fail-safe means of isolating the nodes in the unlikely event of complete power loss to a node.
4. A network repeater shall be available to increase the twisted-pair distance capability in 3,000 ft. increments. As an option, a repeater shall be available for fiber optics that increases the wire distance in 8 dB increments. A mix (hybrid) fiber/wire network repeater shall also be supported. Systems that have distance limitations, and have no available means to regenerate signals are not suitable substitutes.

B High Speed Network Communication

1. The high-speed network (HS-NCM) architecture shall be based on a Local Area Network (LAN), a firmware package that utilizes a peer-to-peer, inherently regenerative communication format and protocol. The network shall use a deterministic token-passing method. Collision detection and recovery type protocols are not acceptable substitutes due to life safety requirements. In addition, there shall be no master, polling computer, central file computer, display controller or other central element (weak link) in the network which, on failure, may cause complete loss of network communications or cause major degradation of network capability. There shall be no cascading of CPUs or master/slave relationships at the network level to facilitate network communications. Failure of any node shall not cause failure or communication degradation of any other node or change the network communication protocol among surviving nodes located within distance limitations. Each node/panel shall communicate on the network at a baud rate of not less than 3Mbps on

wire or 100Mbps on fiber. A node may be an intelligent NOTIFIER INSPIRE N16 Series Fire Alarm Control Panel (FACP), ONYXWorks Workstation (ONYXWorks), Embedded Gateway, Network Control Annunciator (NCA), BACnet Gateway, Modbus Gateway, Digital Voice Command Center (DVC) or Network Web Server (NWS).

2. The network shall be capable of expansion to at least 200 nodes. iii Network upload/download shall support broadcast and point to point operation.
3. Each network node address shall be capable of storing Event equations. The event equations shall be used to activate outputs on one network node from inputs on other network nodes.
4. The Network shall utilize an IP based Ethernet technology adapted for long range use on wire media using VDSL technology. vi The Network shall be compatible with multimode and single mode fiber optic media without the use of external converters.
5. The Network shall be fully capable of Style 7 operation.
6. The network shall be capable of communicating via wire (14-18AWG) or fiber optic medium. A wire network shall include a fail-safe means of isolating the nodes in the unlikely event of complete power loss to a node.
7. The high speed (HS-NCM) shall function as a network repeater to increase the twistedpair distance capability in 3,000 ft. increments. As an option, a HS-NCM shall be available for fiber optics that increases the fiber optic distance in dB increments stated in section 2.3.A.13. A mix (hybrid) fiber/wire network HS-NCM's shall also be supported. Systems that have distance limitations and have no available means to regenerate signals are not suitable substitutes.

C ONYXWorks Workstation

1. The ONYXWorks workstation shall utilize a Microsoft® operating system. Each workstation shall be capable of graphically annunciating and controlling all network activity. Network display devices that are only capable of displaying a subset of network points shall not be suitable substitutes.
2. The ONYXWorks workstation shall be an industrial grade computer with the following minimum requirements: Intel® Dual Core processor, operating at a minimum of 2.16 GHz, 3.2 GB of RAM, 64 MB Video RAM, two 160 GB hard disks, mouse, DVDROM/CD-RW, 3PCI / 1 ISA expansion slots, sound card, 300-watt power supply, and SVGA graphics with a screen resolution of 1024 x 768. The ONYXWorks workstation shall include a 19-inch wide-screen LCD monitor.
3. The ONYXWorks workstation shall be capable of storing over 100,000 network events in a history file. Events shall be stored on hard disk and shall be capable of back-up storage to a tape drive. The history buffer allows the operator to view events in a chronological order. A filter shall be available for displaying chronological events by operator, date, time, fire alarms, troubles (including security, supervisory and system/device), disabled points/zones, system programming, operator response and operator log in/log out. The ability to print history files shall also be available.
4. The ONYXWorks workstation shall use a Windows® dialog box technology to address, interrogate, control, and/or modify intelligent points on each fire alarm node. This shall include, and not be limited to: Activating outputs, enabling or disabling points, adding or removing intelligent points, viewing intelligent detector sensitivity levels and modifying point information (custom messages, detector type, verification, day/night selection etc.).
5. The ONYXWorks workstation shall include a PC network card for the ability to display system information in a graphical (floor plan) format. Each floor plan shall include icons created for intelligent devices. These icons shall blink and change to the

appropriate programmed icon when an event occurs. When the device has been acknowledged, the icon shall become steady. Once the point has returned to normal, the normal icon is displayed. In addition to the graphical representation of the device, the user shall be able to link pictures, documents, and sound files to the device. The ONYXWorks workstation shall also provide the ability to auto-vector to the floor plan (screen) of the device that is active. By selecting a device in the graphic presentation, the operator of the ONYXWORKS shall have the ability to log onto the corresponding node and interrogate the associated intelligent point.

6. The ONYXWorks workstation shall have the ability to provide the following information through a Windows® pull down menu: An Event Counter that contains the number of new and total events on the network. The information that is displayed shall consist of Fire Alarms, Pre-Alarms, Security Alarms, Supervisory Alarms, and Troubles. Detailed Event window that contains all Off-Normal events, both unacknowledged and acknowledged that are present in the system.
7. The ONYXWorks workstation shall have the option, from a Windows® pull down menu, to connect to a third-party paging service that allows the ONYXWorks workstation to automatically send text-based messages regarding system status to a typical text pager.
8. The ONYXWorks workstation shall be UL-Listed for fire protection (UL864) and burglary (UL1076).
9. The ONYXWorks workstation shall meet FCC regulations (Part 15, subpart J) regardless of its connection means to the network.
10. The ONYXWorks workstation shall have a flexible way of assigning operator passwords. There shall be an unlimited number of possible operators, each with specific levels of control. Each operator shall have his/her own password. Operator password and control selection shall be available to a high level "administrator" who shall have complete control over levels of control. xi The ONYXWorks workstation shall include an industry-standard EIA-232 port for a UL864 listed printer. xii The ONYXWorks workstation shall require a PC network card to display events from the Inspire panel.

D Network Control Display

1. A Network Control Display (NCD) shall be provided to display all intelligent system points. The NCD shall be capable of displaying information for all events on a fully utilized network of at least 300,000 points. Network display devices that are capable of displaying only a subset of network points shall not be suitable substitutes.
2. The NCD screen shall have a resolution of 1024x600 with touch capability, including audible and visible feedback, backlit by a long life, solid-state LCD. It shall also include a full QWERTY-style keypad on the color, touchscreen display. Additionally, the network display shall have the ability to scroll events by type (i.e. Fire Alarm, Supervisory Alarm, Trouble, etc) using the touchscreen.
3. The NCD shall have the ability to display up to 3,000 events in order of priority and time of occurrence. Counters shall be provided to indicate the total number of events by type. iv The NCD shall mount in any of the network node fire alarm control panels. Optionally, the network display may mount in a backbox designed for this use. The NCD shall connect to the network over either a wire or fiber interface.

    a. The NCD shall include touchscreen buttons for system-wide control of Acknowledge, Signal Silence, System Reset, Drill, and local Lamp Test.
    b. The NCD shall include indication on the touchscreen of Fire Alarm, Trouble, Supervisory, Signals Silenced, Disabled Points, and other (non-fire) events. The NCD will also include LEDs to indicate primary power status and any off-normal event.

c. The NCD shall include a Master username and password and up to 49 additional usernames and passwords. Each password shall be up to 16 alpha-numeric characters in length.

2.08 SYSTEM COMPONENTS – ADDRESSABLE DEVICES

A. Addressable Devices – General

1. Addressable devices shall provide an address-setting means using rotary decimal switches. Addressable devices that require the address be programmed using a programming utility are not an allowable substitute.
2. Addressable devices shall use simple to install and maintain decade (numbered 0 to 15) type address switches. Devices which use a binary address or special tools for setting the device address, such as a dip switch are not an allowable substitute.
3. Detectors shall be Analog and Addressable and shall connect to the fire alarm control panel's Signaling Line Circuits.
4. Addressable smoke and thermal detectors shall provide dual (2) status LEDs. Both LEDs shall flash under normal conditions, indicating that the detector is operational and in regular communication with the control panel, and both LEDs shall be placed into steady illumination by the control panel, indicating that an alarm condition has been detected. If required, the flashing mode operation of the detector LEDs can be programmed off via the fire control panel program.
5. The fire alarm control panel shall permit detector sensitivity adjustment through field programming of the system. Sensitivity can be automatically adjusted by the panel on a time-of-day basis.
6. Using software in the FACP, detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72, Chapter 7.
7. The detectors shall be ceiling-mount and shall include a separate twist-lock base which includes a tamper proof feature.
8. The following bases and auxiliary functions shall be available:
   a. Sounder base rated at 85 DBA minimum,
   b. Form-C Relay base rated 30VDC, 2.0A
   c. Isolator base
   d. Where required a Low Frequency 520 HZ
9. The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel.
10. Detectors shall also store an internal identifying type code that the control panel shall use to identify the type of device (example: Duct, PHOTO, THERMAL).
11. Self-testing initiating devices shall be capable of providing both a functional test and smoke entry test using a self-test function. The detector shall transmit a wireless beacon activated only during self-test mode designed to communicate with the CLSS app to prove successful completion of a visual inspection.

B Addressable Vesda VEA Detector

1. An early warning addressable ASD smoke detection system, the VESDA-E VEA shall be installed throughout the areas nominated on the drawings.

2. The ASD shall be capable of connection to the NOTIFIER INSPIRE N16 series Fire Alarm Control Panels via a Signaling Line Circuit (SLC) using the communications protocol native to the system, without the use of any additional hardware. Addressable monitoring modules shall be utilized where direct SLC connectivity is possible.
3. The ASD system shall incorporate addressable microbore sampling tubes and pinpoint locations from where the smoke events are reported.
4. The system will consist of a central housing with 40 microbore sampling tubes that are routed to the protected area with capacity to expand up to 120 microbore sampling tubes.
5. Each sampling point shall be identified in accordance with Codes or Standards. The spacing and location of the sample ports shall be in compliance with NFPA-72 standard detection requirements.
6. The system shall support maximum microbore tube length of 100m (328ft) per tube, however shorter tube lengths may be used as per the manufacturer's guidelines.
7. The system shall incorporate end to end tube integrity and sample point integrity monitoring
8. The system shall incorporate centralized smoke test and maintenance facilities to ensure the proper operation of the smoke sensor module and other system components.
9. The system shall be powered from a regulated supply of nominally 24V DC.
10. The FACP shall be capable of monitoring and annunciating up to four smoke event thresholds on the ASD and several trouble conditions.
11. The detector shall have four output levels for the global detector alarm corresponding to Alert, Action, Fire 1 and Fire 2. The detector program sensitivity for Fire-1 shall base on the desire obscuration level below:

    High = 1.6% obs/m (0.5% obs/ft),

    Enhanced = 4% obs/m (1.3% obs/ft)

    Standard = 8% obs/m (2.5% obs/ft)

12. The detector shall have a test port per detection chamber to facilitate centralized smoke test under user control.

C Addressable Manual Fire Alarm Box (manual station)

1. Addressable manual fire alarm boxes shall, on command from the control panel, send data to the panel representing the state of the manual switch and the addressable communication module status. They shall use a key operated test-reset lock and shall be designed so that after actual emergency operation, they cannot be restored to normal use except by the use of a key.
2. All operated stations shall have a positive, visual indication of operation and utilize a key type reset.
3. Manual fire alarm boxes shall be constructed of Lexan with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters, 1.75 inches (44 mm) or larger.

D Addressable Wireless Devices

1. The system shall be capable of supporting intelligent addressable wireless detectors, modules, pull stations and AV devices with similar capabilities as wired addressable intelligent devices.
2. Intelligent wireless devices shall utilize a gateway device to communicate with the intelligent fire alarm control panel, so that the wireless devices report to the panel using the established SLC protocol.
3. Wireless devices shall be capable of co-existing on the same panel with wired devices, and shall be capable of participating in common control-by-event programming sequences.
4. Wireless devices (excepting the gateway) shall operate on batteries recommended by the manufacturer and shall be UL tested and listed for 2 years of system operation on one set of batteries.
5. Intelligent wireless devices shall use a UL approved Class A mesh communication protocol to provide redundant supervised wireless communication links.
6. Wireless AV systems shall offer synchronization within a single mesh network.
7. Available Wireless devices shall include:

    a. Intelligent wireless smoke detector (photoelectric technology)
    b. Intelligent wireless smoke/heat combo detector
    c. Intelligent wireless fixed temperature heat detector, 135 degrees F.
    d. Intelligent wireless rate of rise heat detector, 135 degrees F.
    e. Wireless monitor module
    f. Wireless relay module
    g. Wireless synchronization module
    h. Wireless AV base for use with wired AV devices
    i. Wireless pull station 10 Wireless gateway

8. A program that supports qualification of potential wireless applications, configuration and installation, and diagnostics shall be available. This program shall be installed on a Windows® PC, and shall be capable of communicating with wireless devices by use of a USB adapter that plugs into the computer.

E Intelligent Photoelectric Smoke Detector

1. The detectors shall use the photoelectric (light-scattering) principal to measure smoke density and shall, on command from the control panel, send data to the panel representing the analog level of smoke density.

F Intelligent Thermal Detectors

1. Thermal detectors shall be intelligent addressable devices rated at 135 degrees Fahrenheit Fixed Temperature. 195 degrees where required. It shall connect via two wires to the fire alarm control panel signaling line circuit.

G Self-Testing Photo Smoke Detector

1. Smoke detectors shall be intelligent addressable devices using photoelectric (lightscattering) principal to measure smoke density. It shall connect via two wires to the fire alarm control panel signaling line circuit.
2. The detector shall comply with UL268 7th edition; operating at 24-28V dc, nominal.

3. The self-test sensor shall generate a controlled amount of smoke into the chamber which will test the optics in response to a real smoke simulation.
4. The detector shall also measure the dilution of smoke within a set time frame to determine if there is masking that will prevent smoke from entering the chamber and create a failure mode code to determine the self test fault.
5. An alarm condition shall be generated upon smoke entering the chamber.
6. A trouble condition shall be generated with a failure mode code, if the testing chamber reveals its being blocked.

H Self-Testing Thermal Detector

1. Thermal detectors shall be intelligent addressable devices rated at 135°F (57.2°C) Fixed Temperature. It shall connect via two wires to the fire alarm control panel signaling line circuit.
1. The detector shall comply with UL521 7th edition; operating at 24-28V dc, nominal.
2. The self-test sensor shall generate energy into an internal thermistor to allow register heat to be identified.
3. The detector shall also measure the cooling of the heating element after it's cycle has been completed.
4. An alarm condition shall be generated upon the introduction of heat from the thermistor.
5. A trouble condition shall be generated with a failure mode code, if the thermistor does not detect heat.

I Self-Testing Photo Thermal Detector

1. Photo Thermal detectors shall be intelligent addressable devices using photoelectric (light scattering) principal to measure smoke density and rated at 135°F (57.2°C) Fixed Temperature. It shall connect via two wires to the fire alarm control panel signaling line circuit.
2. The detector shall comply with UL268 and UL521 7th edition; operating at 24-28V dc, nominal.
3. The self-test sensor shall generate a controlled amount of smoke into the chamber which will test the optics in response to a real smoke simulation and shall generate energy into an internal thermistor to allow register heat to be identified.
4. The detector shall also measure the dilution of smoke within a set time frame to determine if there is masking that will prevent smoke from entering the chamber.
5. The detector shall also measure the cooling of the heating element after its cycle has been completed.
6. An alarm condition shall be generated upon smoke entering the chamber. and heat from the thermistor.
7. A trouble condition shall be generated with a failure mode code if the testing chamber reveals its being blocked, or if the thermistor does not detect heat.

J High Sensitivity Photo Smoke Detector

1. The intelligent high sensitivity photoelectric smoke detector shall include a smoke-sensing chamber and patented optic block designed to amplify signals from smoke.
2. The intelligent LED photo detector shall have nine sensitivity levels and be sensitive to a minimum obscuration of 0.02 percent per foot.
3. The detector shall be listed to meet UL 268 7TH edition requirements and UL268A for duct applications.

4. The intelligent laser photo detector shall support standard, relay, isolator and sounder detector bases.
5. The laser photo detector shall not require other cleaning requirements than those listed in NFPA 72. Replacement, refurbishment or specialized cleaning of the detector head shall not be required.

K Multi-Criteria Smoke Detectors

1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire alarm control unit.
3. Automatically adjusts its sensitivity by means of drift compensation and smoothing algorithms. The detector shall send trouble alarm if it is incapable of compensating for existing conditions.
4. Test button tests all sensors in the detector.
5. An operator at fire alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
   a. Primary status.
   b. Device type.
   c. Present sensitivity selected.
   d. Sensor range (normal, dirty, etc.).
6. Sensors: The detector shall be comprised of four sensing elements including a smoke sensor, a carbon monoxide sensor, an infrared sensor, and a heat sensor.
7. Smoke sensor shall be photoelectric type as described in "System Smoke Detectors" Article.
8. Carbon monoxide sensor shall be as described in "Carbon Monoxide Detectors" Article.
9. Heat sensor shall be as described in "Heat Detectors" Article. x Each sensor shall be separately listed according to requirements for its detector type.

L Low Frequency Sounder Base

1. Low frequency sounder base shall be listed to UL 268 and UL 464. The low frequency sounder shall have an option to switch between a temporal three-pattern, temporal fourpattern, non-temporal (continuous) or march time pattern.
2. The low frequency sounder base shall offer two volume levels. The alarm current shall not exceed 140 mA at 16 VDC and operate between 10% and 93% relative humidity. iii The low frequency sounder base shall have the ability to synchronize with notification devices without the use of added accessories. A manual locking feature shall be available to prevent removal of the attached sensor head.

M Intelligent Duct Smoke Detector

1. The smoke detector housing shall accommodate intelligent photoelectric detector, of that provides continuous analog monitoring and alarm verification from the panel.
2. When sufficient smoke is sensed, an alarm signal is initiated at the FACP, and appropriate action taken to change over air handling systems to help prevent the rapid distribution of toxic smoke and fire gases throughout the areas served by the duct system.

N Addressable Control Module

1. Addressable control modules shall be provided to supervise and control the operation of one conventional NACs of compatible, 24 VDC powered, polarized audio/visual notification appliances.

2. The control module NAC may be wired for Style Z or Style Y (Class A/B) with a current rating of 2 Amps for Style Z and 3 Amps for Style Y. For speaker applications the module is rated for 50 watts at 25 or 70.7.
3. Audio/visual power shall be provided by a separate supervised power circuit from the main fire alarm control panel or from a supervised UL listed remote power supply.
4. The control module shall be suitable for pilot duty applications and rated for a minimum of 0.6 amps at 30 VDC.

5. For multiple circuit control a module shall be available that provides 6 Style B or 3 Style D control circuits.

O Addressable Relay Module

1. Addressable Relay Modules shall be available for HVAC control and other building functions. The module shall provide two form C relays rated at up to 3 Amps resistive and up to 2.0 Amps inductive. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to ensure that 100% of all auxiliary devices energize at the same time on the same pair of wires.
2. For multiple relay control a module shall be available that provides 6 programmable Form-C relays.

P Addressable Releasing Control Module

1. An addressable FlashScan releasing module shall be available to supervise and control compatible releasing agent solenoids.
2. The module shall operate on a redundant protocol for added protection.
3. The module shall be configurable for Style Z or Style Y (Class A/B) and support one 24 volt or two 12-volt solenoids.

Q Isolator Module

1. Isolator modules shall be provided to automatically isolate wire-to-wire short circuits on an SLC Class A or Class B branch. The isolator module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit fault on the SLC loop segment or branch. At least one isolator module shall be provided for each floor or protected zone of the building.
2. If a wire-to-wire short occurs, the isolator module shall automatically open-circuit (disconnect) the SLC. When the short circuit condition is corrected, the isolator module shall automatically reconnect the isolated section.
3. The isolator module shall not require address-setting, and its operations shall be totally automatic. It shall not be necessary to replace or reset an isolator module after its normal operation.
4. The isolator module shall provide a single LED that shall flash to indicate that the isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated.

R Serially Connected Annunciator Requirements

1. The annunciator shall communicate to the fire alarm control panel via an EIA 485 (multidrop) two-wire communications loop. The system shall support two 6,000 ft. EIA-485 wire runs. Up to 32 annunciators, each configured up to 96 points, may be connected to the connection, for a system capacity of 3,072 points of annunciation.

2. An EIA-485 repeater shall be available to extend the EIA-485 wire distance in 3,000 ft. increments. An optional version shall allow the EIA-485 circuit to be transmitted over Fiber optics. The repeater shall be UL864 approved.
3. Each annunciator shall provide up to 96 alarm and 97 trouble indications using a long-life programmable color LED's. Up to 96 control switches shall also be available for the control of Fire Alarm Control Panel functions. The annunciator will also have an "ONLINE" LED, local piezo sounder, local acknowledge and lamp test switch, and custom zone/function identification labels.
4. The annunciator may be field configured to operate as a "Fan Control Annunciator". When configured as "Fan Control," the annunciator may be used to manually control fan or damper operation and can be set to override automatic commands to all fans/dampers programmed to the annunciator.
5. Annunciator switches may be programmed for System control such as, Global Acknowledge, Global Signal Silence, Global System Reset, and on/off control of any control point in the system.
6. An optional module shall be available to utilize annunciator points to drive EIA-485 driven relays. This shall extend the system point capacity by 3,072 remote contacts.
7. The LED annunciator shall offer an interface to a graphic style annunciator and provide each of the features listed above.

S CO Detectors

1. The detector shall have the ability to detect Carbon Monoxide gases in compliance with UL 2075.
2. The detector shall automatically include drift compensation of CO cell.
3. Provide a 24 Volt with Integral Sounder base connected to the SLC Addressable Circuit.

   Sounder shall be capable of providing a Temp 4 pattern for CO Alarm indication.
4. The sounder bases shall synchronize with it’s native system.

T Photoelectric CO detectors

1. The detector shall have dual functionality to detect Carbon Monoxide gases in compliance with UL 2075 use photoelectric principle to measure smoke density in accordance with UL268 7TH edition.
2. The detector shall automatically include drift compensation of CO cell.
3. Provide a 24 Volt with Integral Sounder base connected to the SLC Addressable Circuit. Sounder shall be capable of providing a Temp 4 pattern for CO Alarm indication and a Temp 3 for Fire conditions.
4. The sounder bases shall synchronize with its native system.

2.09 BATTERIES AND EXTERNAL CHARGER

A. Battery

1. Shall be 12 volt, Gell-Cell type.
2. Battery shall have sufficient capacity to power the fire alarm system for not less than twenty-four hours plus 5 minutes of alarm upon a normal AC power failure.
3. The batteries are to be completely maintenance free. No liquids are required. Fluid level checks refilling, spills and leakage shall not be required.

B. External Battery Charger

1. Shall be completely automatic, with constant potential charger maintaining the battery fully charged under all service conditions. Charger shall operate from a 120/240-volt 50/60 hertz source.
2. Shall be rated for fully charging a completely discharged battery within 48 hours while simultaneously supplying any loads connected to the battery.
3. Shall have protection to prevent discharge through the charger. iv Shall have protection for overloads and short circuits on both AC and DC sides.

PART 3 EXECUTION

3.01 INSTALLATION

A Installation shall be in accordance with the NEC, NFPA 72, local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer.

B All conduit, junction boxes, conduit supports, and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage.

C All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.

D Manual Pull Stations shall be suitable for surface mounting or semi-flush mounting as shown on the plans, and shall be installed not less than 42 inches, nor more than 48 inches above the finished floor.

3.02 TYPICAL OPERATION

A. Actuation of any manual station, smoke detector heat detector or water flow switch shall cause the following operations to occur unless otherwise specified:

1. Activate all programmed speaker circuits.
2. Actuate all strobe units until the panel is reset.
3. Light the associated indicators corresponding to active speaker circuits.
4. Release all magnetic door holders to doors to adjacent zones on the floor from that the alarm was initiated.
5. Return all elevators to the primary or alternate floor of egress.
6. A smoke detector in any elevator lobby shall, in addition to the above functions, return all elevators to the primary or alternate floor of egress.
7. Smoke detectors in the elevator machine room or top of hoistway shall return all elevators in to the primary or alternate floor. Smoke detectors or heat detectors installed to shut down elevator power shall do so in accordance with ANSI A17.1 requirements and be coordinated with the electrical contractor.
8. Duct type smoke detectors shall, in addition to the above functions shut down the ventilation system or close associated control dampers as appropriate.
9. Activation of any sprinkler system low pressure switch or valve tamper switch shall cause a system supervisory alarm indication.

3.03 TEST AND INSPECTION REPORT

A. Only a factory-authorized service representative trained shall be allowed to test and inspect components, assemblies, and equipment installations, including connections.

B. All test and inspection shall be completed by using the CLSS platform.

C Perform the following tests and inspections via the mobile app:

1. Visual Inspection: Conduct visual inspection prior to testing.
   a. Inspection shall be based on completed record Drawings and system documentation that is required by the "Documentation" chapter in NFPA 72.

   b. Comply with the "Visual Inspection" table in the "Inspection" section of the "Inspection, Testing, and Maintenance" chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
2. Verification shall take place carrying out an automated self-testing process (without need of manual intervention or a smoke/ heat pole). The detectors shall be able to carry out the following;
   a. Functional test on heat or smoke
   b. Smoke entry test for smoke alarms
   c. Determine that the dust cover is in place during construction.
   d. Determine that the dust cover has been removed when the building becomes ready for occupation.
   e. Provide an automated summary report of above points.
3. The system will register real events from all initiating devices not in test mode after each test. Upon an alarm condition during the self-test process the system will be overwritten and initiate an alarm at the FACP.
4. System Testing: Comply with the "Testing" table in the "Testing" section of the "Inspection, Testing, and Maintenance" chapter in NFPA 72.
5. During inspection the software shall automatically comply and generate "Fire Alarm System Record of Completion" in the "Documentation" chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" section of the "Inspection, Testing, and Maintenance" chapter in NFPA 72.

D. Annual Test and Inspection: One year after date of Substantial Completion, test fire alarm system complying with visual and testing inspection requirements in NFPA 72. A report shall be automatically be generated from the mobile app upon completion and provide to applicable parties.

3.04 SYSTEM TEST

A. Provide the service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment to technically supervise and participate during all of the adjustments and tests for the system.

B Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.

C Close each sprinkler system flow valve and verify proper supervisory alarm at the FACP.

D. Verify activation of all flow switches.

E. Open initiating device circuits and verify that the trouble signal actuates.

F. Open signaling line circuits and verify that the trouble signal actuates.

G. Open and short notification appliance circuits and verify that trouble signal actuates.

H. Ground initiating device circuits and verify response of trouble signals.

I. Ground signaling line circuits and verify response of trouble signals.

J. Ground notification appliance circuits and verify response of trouble signals.

K. Check presence and audibility of tone at all alarm notification devices.

L. Check installation, supervision, and operation of all intelligent smoke detectors during a walk test.

M. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.

N. When the system is equipped with optional features, the manufacturer's manual should be consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.

3.05 FINAL INSPECTION

A. At the final inspection a factory trained representative of the manufacturer of the major equipment shall demonstrate that the systems function properly in every respect.

3.06 INSTRUCTION

A. Provide instruction as required for operating the system. Hands-on demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided.

B. The contractor and/or the systems manufacturer's representatives shall provide a typewritten "Sequence of Operation."

END OF SECTION 28 31 10

SECTION 31 63 29 - DRILLED CONCRETE PIERS AND SHAFTS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Dry-installed drilled piers.

1.2 UNIT PRICES

A. Drilled Piers: Actual net volume of drilled piers in place and approved. Actual length, shaft diameter, and bell diameter if applicable, may vary, to coincide with elevations where satisfactory bearing strata are encountered. These dimensions may also vary with actual bearing value of bearing strata determined by an independent testing and inspecting agency. Adjustments are made on net variation of total quantities, based on design dimensions for shafts and bells.
   1. Base bids on indicated number of drilled piers and, for each pier, the design length from top elevation to bottom of shaft, extended through the bell, if applicable, and the diameter of shaft and bell.
   2. Unit prices include labor, materials, tools, equipment, and incidentals required for excavation, trimming, shoring, casings, dewatering, reinforcement, concrete fill, testing and inspecting, and other items for complete drilled-pier installation.

B. Rock Measurement: Volume of rock actually removed, measured in original position, but not to exceed outside dimensions of drilled piers cast against rock. Unit prices for rock excavation include replacement with approved materials.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Design Mixtures: For each concrete mixture.

C. Shop Drawings: For concrete reinforcement.

1.5 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Material certificates.

C. Material test reports.

D. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Record drawings.

1.7 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:
   1. AWS D1.1, "Structural Welding Code - Steel."
   2. AWS D1.4, "Structural Welding Code - Reinforcing Steel."

1.8 FIELD CONDITIONS

A. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Owner is not responsible for interpretations or conclusions drawn from this data.
   1. Make additional test borings and conduct other exploratory operations necessary for drilled piers.
   2. The geotechnical report is included elsewhere in the Project Manual.

B. Survey Work: Engage a qualified land surveyor or professional engineer to perform surveys, layouts, and measurements for drilled piers. Before excavating, lay out each drilled pier to lines and levels required. Record actual measurements of each drilled pier's location, shaft diameter, bottom and top elevations, deviations from specified tolerances, and other specified data.
   1. Record and maintain information pertinent to each drilled pier and indicate on record Drawings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Drilled-Pier Standard: ACI 336.1 except as modified in this Section.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A, deformed.

2.3 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source, throughout Project:
   1. Portland Cement: ASTM C 150, Type I Type II Type I/II.
   2. Blended Hydraulic Cement: ASTM C 595, Type IS, Portland blast-furnace slag cement.

B. Normal-Weight Aggregate: ASTM C 33, graded, 3/4-inch- nominal maximum coarse-aggregate size.
   1. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94 and potable.

D. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
   1. Water-Reducing Admixture: ASTM C 494, Type A.
   2. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
   3. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.

4. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.

2.4 STEEL CASINGS

A. Steel Pipe Casings: ASTM A 283/A 283M, Grade C, or ASTM A 36, carbon-steel plate, with joints full-penetration welded according to AWS D1.1.

2.5 CONCRETE MIXTURES AND MIXING

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than Portland cement according to ACI 301 limits as if concrete were exposed to deicing chemicals.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 TO 0.30 percent by weight of cement.

D. Proportion normal-weight concrete mixture as follows:
1. Compressive Strength (28 Days): 3,600 psi.

E. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94, and furnish batch ticket information.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Unclassified Excavation: Excavate to bearing elevations regardless of character of surface and subsurface conditions encountered.

B. Classified Excavation: Excavation is classified as standard excavation, special excavation, and obstruction removal and includes excavation to bearing elevations as follows.

C. Excavate shafts for drilled piers to indicated elevations. Remove loose material from bottom of excavation.

D. Notify and allow testing and inspecting agency to test and inspect bottom of excavation. If unsuitable bearing stratum is encountered, make adjustments to drilled piers as determined by Architect.
1. Do not excavate shafts deeper than elevations indicated unless approved by Architect.
2. Payment for additional authorized excavation is according to Contract provisions for changes in the Work.

E. End-Bearing Drilled Piers: Probe with auger to a depth below bearing elevation, equal to diameter of the bearing area of drilled pier. Determine whether voids, clay seams, or solution channels exist.

F. Temporary Casings: Install watertight steel casings of sufficient length and thickness to prevent water seepage into shaft; to withstand compressive, displacement, and withdrawal stresses; and to maintain stability of shaft walls.
1. Remove temporary casings, maintained in plumb position, during concrete placement and before initial set of concrete, or leave temporary casings in place.

G. Bells: Excavate bells for drilled piers to shape, base thickness, and slope angle indicated. Excavate bottom of bells to level plane and remove loose material before placing concrete.

H. Tolerances: Construct drilled piers to remain within ACI 336.1 tolerances.

3.2 INSTALLATION

A. Install steel casings of minimum wall thickness indicated and of diameter not less than diameter of drilled pier.

B. Comply with recommendations in CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

C. Place concrete in continuous operation and without segregation immediately after inspection and approval of shaft by a qualified testing agency.

D. Place concrete to fall vertically down the center of drilled pier without striking sides of shaft or steel reinforcement.

E. Coordinate withdrawal of temporary casings with concrete placement to maintain at least a 60-inch head of concrete above bottom of casing. Vibrate top 60 inches of concrete after withdrawal of temporary casing.

3.3 FIELD QUALITY CONTROL.

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
1. Drilled piers.
2. Excavation.
3. Concrete.
4. Steel reinforcement welding.
5. Material testing lab.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

C. Drilled-Pier Tests and Inspections: For each drilled pier before concrete placement.
1. Soil Testing: Bottom elevations, bearing capacities, and lengths of drilled piers indicated have been estimated from available soil data. Actual elevations and drilled-pier lengths and bearing capacities are determined by testing and inspecting agency. Final evaluations and approval of data are determined by Architect.

D. Concrete Tests and Inspections: ACI 301.

3.4 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 31 63 29

SECTION 32 13 13 - CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes Concrete Paving for Parking Lots and Walks.

B. Related Requirements:
   1. Section 03 30 00 "Cast-in-Place Concrete" for general building applications of concrete.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash, slag cement, and other pozzolans. B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified ready-mix concrete manufacturer.

B. Material Certificates: For the following, from manufacturer:
   1. Cementitious materials.
   2. Steel reinforcement and reinforcement accessories.
   3. Admixtures.
   4. Curing compounds.
   5. Joint fillers.

C. Material Test Reports: For each of the following:
   1. Aggregates: Include service-record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.

1.6 QUALITY ASSURANCE

A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with

ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").

1.7 FIELD CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

B. Cold-Weather Concrete Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:

1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
2. Do not use frozen materials or materials containing ice or snow.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.

C. Hot-Weather Concrete Placement: Comply with ACI 301 and as follows when hot weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 unless otherwise indicated.

2.2 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.3 STEEL REINFORCEMENT

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 plain-steel bars ; zinc coated (galvanized) after fabrication according to ASTM A 767/A 767M, Class I coating. Cut bars true to length with ends square and free of burrs.

2.4 CONCRETE MATERIALS

A. Cementitious Materials: Use the following cementitious materials, of same type, brand, and source throughout Project:
   1. Portland Cement: ASTM C 150/C 150M, gray portland cement Type I/II.

B. Normal-Weight Aggregates: ASTM C 33/C 33M, Class 4S, uniformly graded. Provide aggregates from a single source with documented service-record data of at least 10 years' satisfactory service in similar paving applications and service conditions using similar aggregates and cementitious materials.
   1. Maximum Coarse-Aggregate Size: 1 inch nominal.
   2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Air-Entraining Admixture: ASTM C 260/C 260M.

D. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
   1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
   2. Retarding Admixture: ASTM C 494/C 494M, Type B.
   3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
   4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
   5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
   6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

E. Water: Potable and complying with ASTM C 94/C 94M.

2.5 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry or cotton mats.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlappolyethylene sheet.

C. Water: Potable.

D. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. BASF Corporation; Master Kure ER 50 (Pre-2014: Confilm).
      b. ChemMasters, Inc; Spray-Film
      c. Dayton Superior; Aqua-Film Concentrate J74
      d. Euclid Chemical Company (The); an RPM company; Eucobar
      e. Kaufman Products, Inc; VaporAid
      f. Laticrete International, Inc.; E-CON
      g. Sika Corporation; SikaFilm
      h. Vexcon Chemicals Inc.; Certi-Vex EnvioAssist
      i. W.R. Meadows, Inc; EVAPRE

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. ChemMasters, Inc; Safe-Cure Clear DR
      b. Dayton Superior; Clear Cure VOC J7WB

c. Euclid Chemical Company (The); an RPM company; Aqua-Cure VOX
d. Kaufman Products, Inc; DR Cure
e. Laticrete International, Inc.; L&M CURE R
f. Vexcon Chemicals Inc.; Certi-Vex Enviocure 100
g. W.R. Meadows, Inc; 1100-CLEAR SERIES

2.6 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.
1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.

B. Cementitious Materials: Use fly ash, pozzolan, slag cement, and silica fume as needed to reduce the total amount of Portland cement, which would otherwise be used, by not less than 40 percent.

C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal weight concrete at point of placement having an air content as follows:
1. Air Content: 6 percent plus or minus 1-1/2 percent for 1-inch nominal maximum aggregate size.

D. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.

E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
1. Use water-reducing admixture high-range, water-reducing admixture high-range, water-reducing and retarding admixture plasticizing and retarding admixture in concrete as required for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

F. Concrete Mixtures: Normal-weight concrete.
1. Compressive Strength (28 Days): 4500 psi.
2. Maximum W/C Ratio at Point of Placement: 0.45.
3. Slump Limit: 5 inches, plus or minus 1 inch.

2.7 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.
1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.
   1. Completely proof-roll subbase in one direction and repeat in perpendicular direction.
   2. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 JOINTS

A. General: Form construction and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
   1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.
   1. Doweled Joints: Install dowel bars and support assemblies at joints where new pavement meets existing pavement. Space dowels at 36 inches O.C. maximum, with a minimum of 12” embedment into both new and existing pavement. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

C. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness. Space joints at 10’-0” o.c. and match jointing of existing adjacent concrete paving to greatest extent possible.
   1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.

D. Edging: After initial floating, tool edges and joints in concrete walks with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes.

3.5 CONCRETE PLACEMENT

A. Before placing concrete, inspect and complete formwork installation and items to be embedded or cast-in.

B. Remove snow, ice, or frost from subbase surface before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.

F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
   1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating dowels.

H. Screed paving surface with a straightedge and strike off.

I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

3.6 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleed water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
   1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float finished concrete surface, perpendicular to line of traffic, to provide a uniform, fine-line texture. Match existing texture of adjacent pavement to the greatest extent possible.

3.7 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing

operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
   1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
      a. Water.
      b. Continuous water-fog spray.
      c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
   2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period, using cover material and waterproof tape.
   3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

3.8 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 and as follows:
   1. Elevation: 3/4 inch.
   2. Thickness: Plus 3/8 inch, minus 1/4 inch.
   3. Surface: Gap below 10-feet- long; unleveled straightedge not to exceed 1/2 inch.
   4. Lateral Alignment and Spacing of Dowels: 1 inch.
   5. Vertical Alignment of Dowels: 1/4 inch.
   6. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches of dowel.
   7. Joint Spacing: 3 inches.
   8. Contraction Joint Depth: Plus 1/4 inch, no minus.
   9. Joint Width: Plus 1/8 inch, no minus.

3.9 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Testing Services: Testing and inspecting of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:
   1. Testing Frequency: Obtain at least one composite sample for each truckload of concrete.
   2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
   3. Air Content: ASTM C 231/C 231M, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
   4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.
   5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.

6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.
    a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.

G. Concrete paving will be considered defective if it does not pass tests and inspections.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.10 REPAIR AND PROTECTION

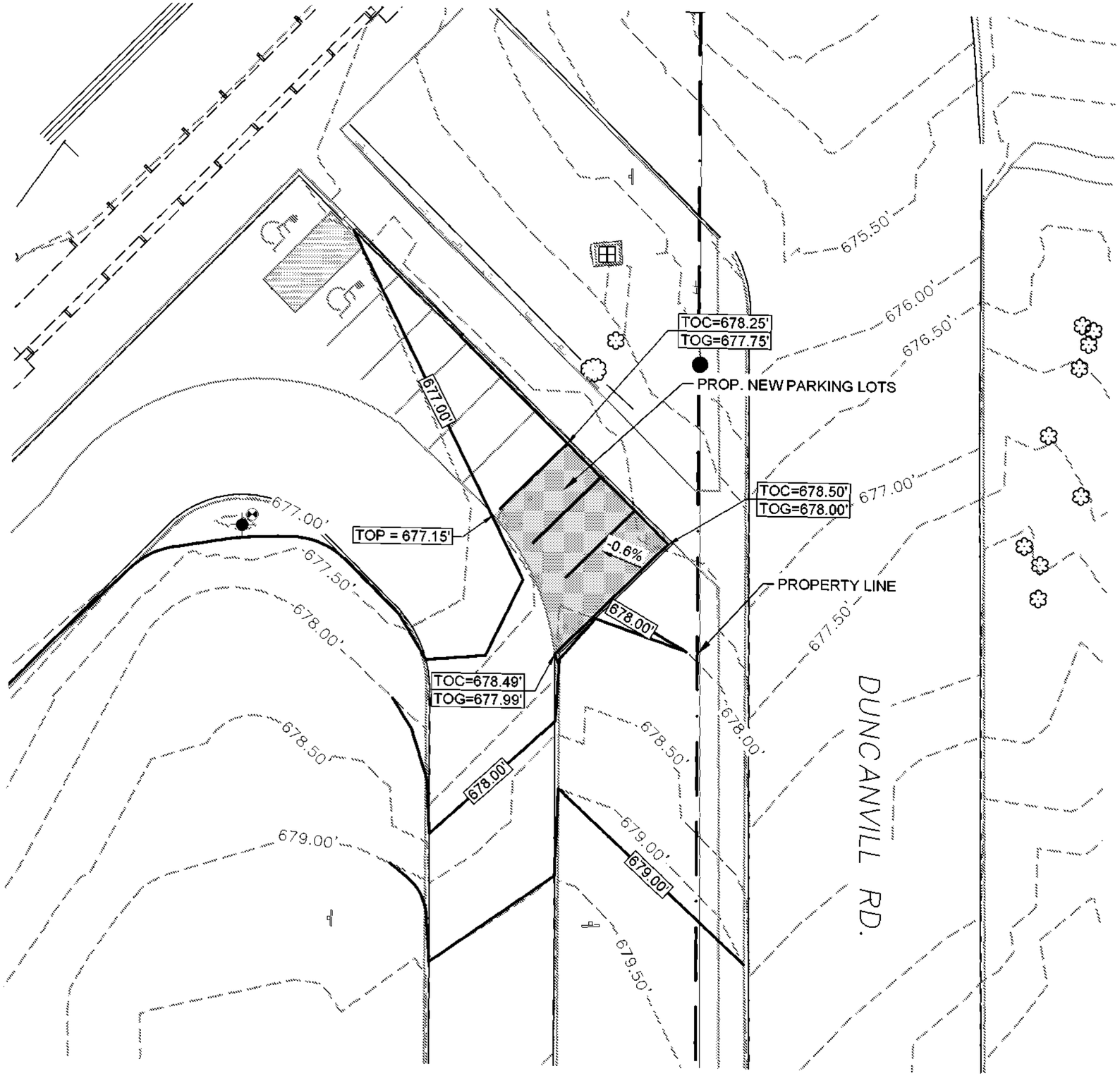
A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.

B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with Portland cement concrete bonded to paving with epoxy adhesive.

C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 32 13 13

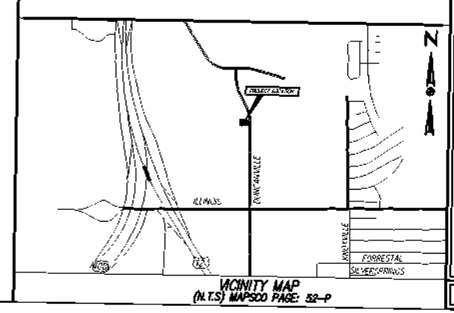


GENERAL NOTES

GRADING NOTES:

1. CONTRACTOR TO MAINTAIN POSITIVE DRAINAGE THROUGHOUT THE DURATION OF CONSTRUCTION.
2. THIS GRADING PLAN ONLY COVERS THE SHADED THREE ADDITIONAL PARKING SPACES, FOR GRADING OF THE ENTIRE SITE, PLEASE REFER TO ARCHITECT'S 1.11-01 GRADING PLAN
3. AT LIMITS OF NEW CONCRETE PAVEMENTS AND CURBS, MATCH EXISTING.

LEGEND	
	PROPERTY LINE
774.00'	EXISTING CONTOUR
775.00'	PROPOSED CONTOUR
TC 677.00' / TP 678.00'	TOP OF CURB ELEVATION / TOP OF PAVEMENT ELEVATION
778.00'	TOP OF PAVEMENT ELEVATION
2.0%	FLOW ARROW



VICINITY MAP
(N.T.S) MAPSCO PAGE: 52-P

OWNER:
DALLAS INDEPENDENT SCHOOL DISTRICT
9400 N. CENTRAL EXPRESSWAY, 8TH FLOOR
DALLAS TEXAS 75231

EJES INCORPORATED
FIRM REG F-2488
CORPORATE OFFICE
2800 NORTH CENTRAL
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EJES, INC. COPYRIGHT ©2024

CONSULTANT:

CONSULTANT SEAL:

02/07/2024

Revisions	Issues
XX/XX/XXXX	XXX

DISD - 2020 BOND PROGRAM - ORG. NO. 274
MARY MCLEOD BETHUNE
ELEMENTARY SCHOOL RENOVATIONS
1665 DUNCANVILLE ROAD - DALLAS, TX

SHEET NAME:
GRADING PLAN

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DATE: 02-07-2024
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PRF:
SHEET: C1.0
1 OF 1 SHEETS

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