

PROJECT MANUAL

FEBRUARY 14, 2019



V L K | A R C H I T E C T S

OWNER:



Birdville
Independent School District
6125 East Belknap Street
Haltom City, TX 76117

Controlled Entry at 15 Campuses

BIRDVILLE ISD
NORTH RICHLAND HILLS, HALTOM CITY, HURST
AND WATAUGA, TEXAS

VLK Project No.

1886.00

OWNER

**Birdville
Independent School District**
6125 East Belknap Street
Haltom City, TX 76117

ARCHITECT

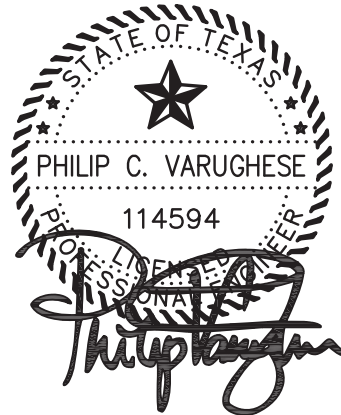
VLK Architects, Inc.
Deborah J. McDow
2821 West 7th Street, Suite 300
Fort Worth, Texas 76107
Phone: 817.633.1600
www.vlkarchitects.com



02/14/2019

CIVIL ENGINEER

Teague, Nall & Perkins, Inc.
Firm Registration Number F-230
Philip Varughese, P.E.
5237 N. Riverside Drive, Suite 100
Fort Worth, Texas 76137
Phone: 817.336.5773
www.tnppinc.com



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BIRDVILLE ISD
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MEP ENGINEER

Reed, Wells, Benson & Co.

Firm Registration Number: F-2176

Nathan P. Hart, P.E.

John West, P.E.

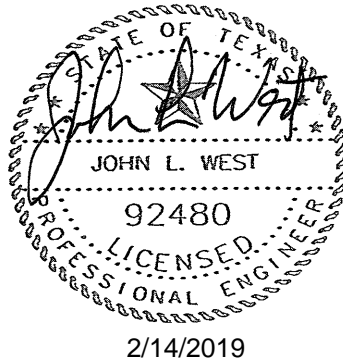
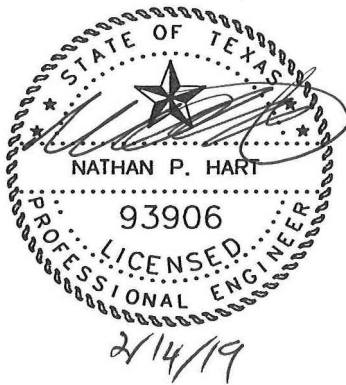
Coit Central Tower, Suite 1100, Box 103

12001 North Central Expressway

Dallas, Texas 75243

Phone: 972.788.4222

www.rwb.net



PROJECT
MANUAL

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BIRDVILLE ISD
NORTH RICHLAND HILLS, HALTOM CITY, HURST
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DOCUMENT 00 01 10

TABLE OF CONTENTS



02/14/2019

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

PROCUREMENT REQUIREMENTS

Document Birdville ISD Request for Competitive Sealed Proposals (RFCSP)

CONTRACTING REQUIREMENTS

- Document 00 52 00 - Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum - AIA Document A101-2017 (Draft)
 - Insurance and Bonds - AIA Document A101-2017 - Exhibit A (Draft)
- 00 61 13.13 - Performance Bond Form
- 00 61 13.16 - Payment Bond Form
- 00 62 00 - Affidavit of Non-Asbestos, Lead, and PCB Use in Project
- 00 65 00 - Release of Lien Documents
- 00 70 00 - General Conditions of the Contract for Construction, AIA Document A201-2017 (Modified) (Draft)
- 00 73 46 - Prevailing Wage Rate Determination Information
- 00 73 50 - Weather Table

DIVISION 01 - GENERAL REQUIREMENTS

- Section 01 11 00 - Summary of Work
 - 01 21 00 - Allowances
 - 01 23 00 - Alternates
 - 01 29 00 - Payment Procedures
 - 01 31 00 - Project Management and Coordination
 - 01 31 19 - Project Meetings
 - 01 31 19.13 - Preconstruction Meetings
 - 01 32 16 - Construction Progress Schedules
 - 01 33 23 - Shop Drawings, Product Data, and Samples
 - 01 35 00 - Alteration Project Procedures
 - 01 41 00 - Regulatory Requirements
 - 01 42 00 - References
 - 01 42 16 - Definitions
 - 01 45 00 - Quality Control
 - 01 50 00 - Temporary Facilities and Controls
 - 01 57 23 - Temporary Storm Water Pollution Control
 - 01 62 00 - Product Options
 - 01 65 00 - Product Delivery Requirements
 - 01 66 00 - Product Storage and Handling Requirements
 - 01 73 29 - Cutting and Patching
 - 01 74 13 - Cleaning
 - 01 77 00 - Closeout Procedures
 - 01 78 23 - Operation and Maintenance Data
 - 01 78 30 - Warranties and Bonds
 - 01 78 39 - Project Record Documents
 - 01 78 40 - Spare Parts, Overages and Maintenance Materials

DIVISION 02 - EXISTING CONDITIONS

Section 02 41 19 - Selective Structure Demolition

DIVISION 03 - CONCRETE

- Section 03 11 00 - Concrete Forming and Accessories
 - 03 20 00 - Concrete Reinforcing
 - 03 30 00 - Cast-in-place Concrete



02/14/2019

DIVISION 04 - MASONRY

Section 04 01 20 - Unit Masonry Restoration

DIVISION 05 - METALS

Section 05 50 00 - Metal Fabrications

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

Section 06 10 00 - Rough Carpentry
06 40 00 - Architectural Woodwork

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

Section 07 21 00 - Building Insulation
07 84 00 - Firestopping
07 92 00 - Joint Sealants

DIVISION 08 - OPENINGS

Section 08 11 00 - Hollow Metal Doors and Frames
08 14 00 - Wood Doors
08 14 23 - Plastic-laminate-faced Wood Doors
08 41 13 - Aluminum-Framed Entrances and Storefronts
08 71 00 - Door Hardware
08 80 00 - Glazing

DIVISION 09 - FINISHES

Section 09 21 16 - Gypsum Board Assemblies
09 30 13 - Ceramic Tiling
09 51 00 - Acoustical Ceilings
09 65 00 - Resilient Flooring
09 91 00 - Painting

DIVISION 10 - SPECIALTIES

Section 10 14 00 - Identifying Devices
10 99 00 - Miscellaneous Specialties

DIVISION 11 - EQUIPMENT

Section 11 31 00 - Appliances

DIVISION 12 - FURNISHINGS

Section 12 21 13 - Horizontal Blinds

DIVISION 13 - SPECIAL CONSTRUCTION

NONE IN THIS PROJECT

DIVISION 14 - CONVEYING EQUIPMENT

NONE IN THIS PROJECT

DIVISIONS 15 through 20 - Not used.

DIVISION 21 - FIRE SUPPRESSION

NONE IN THIS PROJECT

DIVISION 22 - PLUMBING

Section 22 05 00 - Common Work Results for Plumbing
22 07 00 - Plumbing Insulation
22 11 16 - Domestic Water Piping System
22 13 16 - Sanitary Waste and Vent System
22 21 13 - Plumbing Piping Systems
22 30 00 - Domestic Water Heating Equipment and Accessories
22 42 00 - Plumbing Fixtures



02/14/2019

DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

Section 23 00 00 - Heating, Ventilating, and Air Conditioning (HVAC) Work
23 05 00 - Common Work Results for HVAC
23 05 13 - Common Motor Requirements for HVAC
23 05 14 - Common Motor Starter Requirements for HVAC Equipment
23 05 48 - Vibration and Seismic Controls for HVAC Piping and Equipment
23 05 53 - Identification for HVAC Equipment and Piping
23 05 93 - Testing, Adjusting, and Balancing (TAB) for HVAC
23 07 00 - Insulation
23 09 00 - Controls and Instrumentation
23 21 13 - Hydronic Piping
23 23 00 - Refrigerant Piping
23 30 00 - HVAC Air Distribution
23 34 00 - Exhaust and Supply Air Fans
23 81 26 - Split Direct Expansion Heat Pump Air Conditioning Units

DIVISIONS 24 and 25 - Not used.

DIVISION 26 - ELECTRICAL

Section 26 00 00 - Electrical
26 05 01 - Electrical Demolition
26 05 19 - Low Voltage Electrical Power Conductors and Cables
26 05 20 - Cable Connections
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 32 - Raceways
26 05 33 - Boxes for Electrical Systems
26 05 53 - Identification for Electrical Systems
26 51 01 - Interior Lighting
26 51 05 - Lighting Controls

DIVISION 27 - COMMUNICATIONS

NONE IN THIS PROJECT

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

Section 28 10 10 - Building Card Access and Entry Management System
28 31 10 - Fire Detection and Alarm - Expansion of Existing Systems

DIVISIONS 29 and 30 - Not used.

DIVISION 31 - EARTHWORK

Reference civil drawings

Controlled Entry at 15 Campuses
Birdville ISD
North Richland Hills, Haltom City, Hurst, and Watauga, Texas

DIVISION 32 - EXTERIOR IMPROVEMENTS

Reference civil drawings

DIVISION 33 - UTILITIES

NONE IN THIS PROJECT

DIVISIONS 34 through 49 - Not used.



02/14/2019



REQUEST FOR COMPETITIVE SEALED PROPOSALS (RFCSP)

Sealed RFCSP's will be received in accordance with the attached specifications. The sealed envelope containing your RFCSP should be plainly marked with the RFCSP title, number, and opening date and time. RFCSP's are publicly opened and you are invited to attend.

PLEASE NOTE: Late RFCSP's WILL NOT be accepted.

Mail or deliver complete RFCSP Packet to:**

**Birdville ISD
Purchasing Department
3124 Carson Street, Haltom City, Texas 76117**

RFCSP Number: 058-19

RFCSP Title: Controlled Entry at 15 Campuses

Due Date: March 5, 2019

Time: 2:00pm CST

For additional information, please contact the person listed below. All questions **must be submitted in writing** (email preferred) and received on or before seventy-two (72) hours prior to the opening date. **No verbal responses will be provided.** Please note that RFCSP results are **NOT** available by telephone. Awards will be posted to the district website.

Shelley Freeman
Director of Purchasing
817-547-5629
shelley.freeman@birdvilleschools.net

TABLE OF CONTENTS

SECTION		<i>Page No.</i>
SECTION I	General Specifications	3-15
SECTION II	Scope of Work	16
SECTION III	Proposer's Return Packet/Proposal Pricing	17-18
SECTION IV	Response Checklist & RFCSP Forms	19-30
SECTION V	Standard Terms and Conditions	31-35
GENERAL PROJECT MANUAL		See Attachment
PROJECT PLANS		See Attachment

SECTION I GENERAL SPECIFICATIONS

PURPOSE

In order to be in compliance with federal, state and local purchasing laws, the Birdville Independent School District (BISD) is soliciting competitive sealed proposals for a Controlled Entry at 15 Campuses. The District plans to evaluate responses, select a vendor and enter into a contract with the successful contractor. The estimated budget is \$1,500,000.00 with a \$75,000.00 contingency.

DISTRICT BACKGROUND INFORMATION

The District currently has twenty-one (21) elementary schools, seven (7) middle schools, four (4) high schools, and one (1) career tech academy.

Birdville ISD is the fifth-largest school district in northeast Tarrant County, with more than 24,300 students. The District's 33 campuses serve the community of Richland Hills and portions of Haltom City, Hurst, North Richland Hills, Watauga, Colleyville and Fort Worth.

Additional information concerning the District may be obtained at www.birdvilleschools.net.

RFCSP PROCESS

Each Proposer shall carefully examine all documents and any and all addenda or other revisions, and thoroughly familiarize with all requirements prior to submitting a proposal. Should a Proposer find discrepancies or ambiguities in, or omissions from, the documents, or should the Proposer be in doubt as to the meaning, the Proposer shall at once (in any event not later than 72 hours prior to the due date) submit to Purchasing a written request for interpretation or correction thereof. The Proposer submitting the request will be responsible for its prompt delivery. Any oral communication by the contact person or designee concerning the RFCSP is not binding and shall in no way modify the RFCSP or the obligation of BISD or Proposer.

CONTRACT ADMINISTRATOR

All communications regarding this RFCSP must be coordinated through the BISD contract administrator. The designated contract administrator during the RFCSP process shall be:

Shelley Freeman
Director of Purchasing
3124 Carson Street
Haltom City, TX 76117

Questions may be sent to Shelley Freeman via email at shelley.freeman@birdvilleschools.net or sent via fax to 817-547-5544. The fax or e-mail must clearly identify the proposer's name and RFCSP number. Any written information given to one proposer concerning a RFCSP will be furnished as an addendum to all proposers who have been issued a RFCSP. All questions and answers will be published and provided to all potential proposers as soon as possible.

Proposer shall have no contact with other District staff or board members without permission from the designated contract administrator. Failure to adhere to this requirement will result in disqualification of the Proposer from further consideration.

UNDERSTANDING OF THE RFCSP

By submitting a signed proposal, a proposer agrees that it fully understands this RFCSP and shall abide by the terms and conditions contained therein. Further, such proposer certifies that it is in compliance with all federal and state laws and purchasing guidelines of the Birdville Independent School District. This includes all requirements as it relates to HB25 which can be found on the https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm. Required forms to be submitted by the proposer are outlined herein. Additionally, proposer certifies that neither proposer, nor any of its employees, agents, or representatives, including any subcontractors and employees, agents, or representatives of such subcontractors, to be assigned to the project hereunder has been convicted of a penal offense, or that, if such a conviction has occurred, proposer will fully advise the Board of Trustees as to the facts and circumstances. Failure to do so may result in disqualification of any subsequent proposal.

No exceptions, amendments, or deviation will be allowed in any response unless agreed to in writing and prior to the date that responses to questions are due. Unauthorized exceptions, amendments, or deviations in the response may result in disqualification of the proposal.

AUTHORIZED SIGNATURE

By signing and executing this proposal the Proposer certifies and represents to the District that the Proposer has not offered, conferred or agreed to confer any pecuniary benefit or other thing of value for the receipt of special treatment, advantage, information, recipient's decision, opinion, recommendation, vote or any other exercise or discretion concerning this RFCSP. Proposals must show Proposer name and address of Proposer and be manually signed. Failure to do so will disqualify proposal. Person signing proposal must show title or AUTHORITY TO BIND THE PROPOSER IN A CONTRACT.

RESPONSE FORMS

This RFCSP contains forms that are required to be completed and submitted along with your response. Failure to complete and submit these forms may render your proposal non-responsive. BISD may, if the form is not required to evaluate the responses, waive this requirement and have the forms signed after proposal at the sole discretion of BISD. Signing after the submission date has expired is only permissible if doing so cannot alter the evaluation scoring or does not prejudice another offer.

ADDENDA

Receipt of an Addendum must be acknowledged by signing and returning the Addendum with the RFCSP, if requested, or under separate cover prior to the due date. The Addenda containing proposal pricing should be returned in a sealed envelope marked on the outside with the Proposer's name, address, RFCSP number, and due date and time. Addenda will be posted to the Birdville ISD Purchasing website. It is the responsibility of each Proposer to obtain all addenda that pertains to this RFCSP. **Proposers who fail to check the website and submit a RFCSP without acknowledging receipt of all addenda issued may be deemed to have submitted a RFCSP not responsive to this solicitation.** Failure to receive such addenda does not relieve Proposer from any obligation under the RFCSP submitted. All formal written addenda become a part of the RFCSP documents. Proposers shall acknowledge receipt of all addenda in the RFCSP Response Form.

PROPOSAL SUBMISSION

RFCSP's must be received in the Purchasing Department **prior to** the hour and date specified in this document or any subsequent Addenda. No other published dates will be binding. The clock located in the Birdville ISD Purchasing Department is considered the official time for receiving and opening RFCSP's. It is the sole responsibility of the Proposer to ensure timely delivery of the RFCSP. BISD will not be responsible for failure of service on the part of the U.S. Postal Office, courier companies, or any other form of delivery chosen by the Proposer.

Proposers submitting RFCSP's to BISD do so at their own expense. BISD will not be held responsible for any cost associated with the process by submitting Proposers.

Please make note of our office hours (Monday thru Thursday - 8:00 AM to 4:30 PM and Friday- 8:00 AM to 4:00 PM). District offices are closed Fridays during the summer.

Late proposals will not be accepted. No verbal, telephonic, electronic mail, or faxed RFCSP's will be considered. RFCSP's received after the date and time specified **will not** be considered. The Purchasing Department will notify those Proposers submitting late RFCSP's and will hold documents for pick-up for five (5) business days following late RFCSP notification. **All late RFCSP's which are not picked up by the Proposer within five business days will be discarded.**

One (1) original and two (2) copies of the RFCSP must be sealed in an ***envelope clearly marked with closing date, company name and "RFCSP Enclosed #058-19"*** and addressed to the Purchasing Department, Birdville Independent School District, 3124 Carson Street, Haltom City, Texas 76117.

RESERVATIONS

The School District expressly reserves the right to:

1. Specify approximate quantities;
2. Extend the opening date and time;
3. Consider and accept alternates, if specified in the documents, when most advantageous to the School District;
4. Waive as an informality, minor deviations from specifications, provided they do not affect competition or result in functionally unacceptable goods or services;
5. Waive any minor informality in any RFCSP or procedure (A minor informality is one that does not affect the competitiveness of the Proposer);
6. Add additional terms or modify existing terms in the proposal;
7. Reject a proposal because of unbalanced unit proposal prices;
8. Reject or cancel any or all RFCSP's;
9. Reissue a RFCSP; and/or
10. Procure any item by other means.

SITE VISIT

During the proposal process, the contractor may request to conduct a site visit to become familiar with the physical location and access the delivery conditions. Site visits may be coordinated by contacting Conan Mathson at 817-547-5851

QUALITY OF MATERIAL

Any item that does not perform or meet tests as specified by the seller shall be replaced by the Proposer at no cost to the District.

ALTERNATE

Proposers may offer an "equal" product as an alternate. Final "approved equal" determination remains with the School District.

BRAND NAME OR EQUAL

If the proposal indicates brand name or "equal" products are acceptable; the Proposer may propose an "equal" product but must be prepared to demonstrate those features that render it equal. Final determination of a product as an "equal" solely remains with the District. The District may deem it necessary to specify Brand Name Only, "No Substitutes," after conclusive testing, prior usage or standardization.

NEW MATERIAL

Unless otherwise stated in the specifications, all supplies and components to be provided under this RFCSP shall be new (not used or reconditioned, and not of such age or so deteriorated as to impair their usefulness or safety), of current production, and of the most suitable grade for the purpose intended. If at any time during the performance of this RFCSP the Proposer believes that the furnishing of supplies or components which are not new is necessary or desirable, it shall notify the District immediately, in writing, including the reasons and proposing any consideration which will flow to the District if authorization to use such supplies or components is granted.

SAMPLES

Samples and/or product specification documents may be required for items. Product specification shall be submitted with the RFCSP, properly referenced and clearly marked so as to indicate related RFCSP item. Samples, when requested, must be furnished at no cost to the District and will not be returned. Each sample should be clearly marked with bidders/proposer's name, RFCSP number, and item number on the RFCSP. **DO NOT ENCLOSE IN OR ATTACH RFCSP TO SAMPLE.** Birdville ISD assumes no responsibility for the handling of samples in any manner. Improperly identified samples will not be considered.

When samples and/or product specifications are not required to be submitted, Birdville ISD reserves the right to request samples and/or product specification documents for any merchandise submitted for RFCSP before final selections are made. Samples and/or product specifications requested after RFCSP opening must be received within five (5) calendar days after request.

SUITABILITY FOR INTENDED USE

All chemicals must be certified lead free, non-toxic and will require a MSD sheet (chemicals defined as paints, lacquers, thinners, caulks, fillers, etc.). This documentation must be provided at time of purchase, before payment is approved. All other supply items should be comparable in quality and intended use. Suitability for intended use: (paints, pastes, inks, chemicals, markers, etc.) MSD sheet should clearly indicate item number.

RIGHT TO AMEND OR WITHDRAW RFCSP

The District reserves the right to alter, amend, or modify any provisions of this RFCSP, or to withdraw this RFCSP, at any time prior to the award of the contract pursuant hereto, if it is in the best interest of the District to do so.

The Proposer CANNOT alter or amend the RFCSP after the closing. Alterations made before the closing must be initiated by proposer, guaranteeing authenticity and approved in writing by the Director of Purchasing.

REJECTION OF RFCSP

BISD reserves the right to accept or reject in part or in whole any proposal submitted, and to waive any technicalities for the best interest of the School District.

RFCSP's may be rejected, among other reasons, for any of the following specific reasons:

- A. RFCSP received after the time limit for receiving bids as stated in the advertisement
- B. RFCSP containing any irregularities
- C. Unbalanced value of any items
- D. Improper or insufficient RFCSP guaranty, if required
- E. Where the Proposer, any Sub-Proposer or Supplier, or the surety on any bond given, or to be given, is in litigation with the District or where such litigation is contemplated or imminent, in the sole opinion of the District

DISQUALIFICATION OF PROPOSERS

Proposers may be disqualified and their RFCSP's not considered, among other reasons, for any of the following specific reasons:

- A. Reason for believing collusion exists among the Proposers
- B. Where the Proposer, any Sub-Proposer or Supplier, or the surety on any bond given, or to be given, is in litigation with the District or where such litigation is contemplated or imminent, in the sole opinion of the District
- C. The Proposer being in arrears on any existing Contract/Purchase Order or having defaulted on a previous Purchase Order
- D. Lack of competency as revealed by pertinent factors, including but not necessarily limited to, experience and equipment, financial statement and questionnaires
- E. Uncompleted work that in the judgment of the District will prevent or hinder the prompt completion of additional work if awarded
- F. Where the Proposer has failed to perform in a satisfactory manner on a previous Purchase Order/Contract

ASSURANCES

Proposers (owners, officers, employees, volunteers, etc.) may not work on district property where students may or may not be present when they have charges pending, have been convicted, received probation or deferred adjudication for the following:

- A. Any offense against a child
- B. Any sex offense
- C. Any crimes against persons involving weapons or violence
- D. Any felony offense involving controlled substances
- E. Any felony offense against property
- F. Any other offense the District believes might compromise the safety of students, staff, or property

CRIMINAL HISTORY CHECKS AND BADGING REQUIREMENTS

During the term of this agreement, the proposer's employees have access to Birdville ISD facilities while students are present which could result in contact with students. Subsequently, the proposer is responsible for complying with Texas Education Code § 22.0834. The various levels of criminal history and badging requirements are described below:

- A. All proposers who will only deliver to the front office, but not enter a school building to perform service will be required to complete Form J and submit the Certification for Criminal History Check Form with their proposal.
- B. For all proposers who perform service within the school buildings, but do not involve direct and ongoing contact with students, the proposer is instructed to follow the procedures as outlined for obtaining badging through FC Background. FC Background is an independent firm selected to perform criminal history checks for the Birdville ISD contractors and vendors who do not have direct and ongoing contact with students. In addition to FC Background's badging process, the proposer is responsible for ensuring direct access to students is prohibited. The proposer and all workers on Birdville ISD property will enforce compliance and shall certify compliance with Texas Education Code § 22.0834, see Form J. As a minimum the contractor/vendor is responsible for the following:
 - 1. Contractor/vendor shall only use restrooms designated for contractors/workers. Student restrooms are prohibited from use. The following are the only facilities for use:
 - a. Inside Birdville ISD buildings, "faculty only" facilities, if necessary, with preference for contractors to use contractor furnished "portable" facilities;
 - b. Outside Birdville ISD property, contractor/vendor furnished "portable" facilities.

2. Proposers are not allowed direct and ongoing unsupervised contact with students in areas including, but not limited to: classrooms, elevators, athletic buildings, weight rooms, gymnasiums, auditorium, practice rooms, band halls, hallways, locker rooms, office spaces where students are located.
 3. Precautions listed in this section are minimal requirements to avoid direct and unsupervised contact with students. The successful proposer is responsible for implementing additional measures to ensure direct and ongoing unsupervised contact with a student does not exist.
 4. The company recommended for award shall complete the background screening and badging process with FC Background to have all employees and sub-contractors working on-site for Birdville ISD. All costs associated with badging are the responsibility of the successful proposer.
 - a. FC Background Information:
 - i. FC Background
Phone 972-404-4479 Fax 214-306-8207
Monday-Friday 6am – 6pm (CST)
Customer.support@fcbgbackground.com
 - ii. Facility maps are available on www.fcbgbackground.com
 - iii. Cost per employee is \$30.00 per subject (additional criminal records search fees may apply)
 - b. Birdville ISD Badging Qualifications:
 - i. No felony convictions, no open or pending felony cases (no limit);
 - ii. No misdemeanor convictions involving crimes against children or crimes of moral turpitude;
 - iii. No registered sex offenders; or
 - iv. No outstanding warrants for crimes that would disqualify an individual from receiving a badge.
 5. If at any time a contractor finds themselves with direct and ongoing unsupervised contact, they should report to the administrator on duty and remove themselves from the service until requirements listed in section C can be completed.
- C. For all proposers who perform service where there is direct and ongoing unsupervised contact with students(s) Form N shall be completed and proposer shall comply with the following:
1. Individuals
 - a. Obtain a required criminal history record information through the Department of Public Safety’s Fingerprint-based Applicant Clearinghouse of Texas (FACT), regarding its employees assigned to work on Birdville ISD premises. The following steps should be followed to complete this process:
 - i. If you are an individual/sole proprietor (one-person company) you must contact Birdville ISD Shelley Freeman at shelley.freeman@birdvilleschools.net to obtain a FAST pass.
 - ii. Follow instructions on the FAST Pass to arrange an appointment to be finger printed. Contractor may select the most convenient location in their zip code.
 - iii. After fingerprinting is completed, email Shelley Freeman, Director of Purchasing at shelley.freeman@birdvilleschools.net and provide the following: RFCSP number, full name and date of birth date for person assigned to work on site during the contract term. If it is not possible to verify an employee based on the name and date of birth, it may be necessary to provide a driver’s license number or state identification card.
 2. Contractor Personnel
 - a. For all contractors/vendors/subcontractors who will have direct and ongoing unsupervised contact with students(s) and have multiple personnel working for that contractor, the following will apply.

- i. Awarded contractor/vendor/subcontractor will receive an award letter from Birdville ISD and/or contract from the general contractor prior to contact the Department of Public Safety.
- ii. Contact the Department of Public Safety at 512-424-2474. Select option 2 to establish a vendor account and obtain a FAST Pass. This process can take up to seven to ten business days.
- iii. Follow instructions on the FAST Pass to arrange an appointment for employees to be finger printed. Employers may select the most convenient location based on your zip code.
- iv. After fingerprinting is completed, email Shelley Freeman, Director of Purchasing at shelley.freeman@birdvilleschools.net and provide the following: RFCSP number, full name and date of birth for all personnel assigned to work on site during the contract term. If it is not possible to verify an employee based on the name and date of birth, it may be necessary to provide a driver's license number or state identification card.
- v. If an employee is arrested while under contract, the contractor must contact Shelley Freeman, Director of Purchasing, at 817-547-5626 immediately. The incident must be reported within three (3) business days of the arrest. The employee shall be removed from work on Birdville ISD for the duration of the contract. Failure to do so will make the contract null and void.

CONFLICT OF INTEREST

Each proposer must disclose any existing or potential conflict of interest relative to the performance of the requirements of this RFCSP. Examples of potential conflicts may include an existing business or personal relationship between the proposer, its principal, or any affiliate or subcontractor, with the District or any other entity or person involved in any way in the project that is the subject of the RFCSP.

Similarly, any personal or business relationship between the proposer, the principals, or any affiliate or subcontractor, with any employee of the District or its suppliers must be disclosed. Any such relationship that might be perceived or represented as a conflict should be disclosed. Failure to disclose any such relationship or reveal personal relationships with district employees may be cause for contract termination. The District will decide if an actual or perceived conflict should result in proposal disqualification.

By submitting a proposal in response to this RFCSP, all proposers that they have not given, nor intend to give, at any time hereafter any economic opportunity, future employment, gift, loan, gratuity, social discount, trip, favor, or service to a board member, a public servant or any employee or representative of the District, in connection with this procurement. The CONFLICT OF INTEREST QUESTIONNAIRE is included in this specification. For further information, a proposer can review the requirements as provided under HB 1491.

SELECTION PROCESS

The District's Selection Committee will evaluate and rank each submittal in relation to the selection criteria described in the RFCSP. Only those receiving the highest scores on the analysis may be interviewed or contacted for further information. Negotiations with the selected Proposer may cover scope of work, contract schedule, contract terms and conditions, technical specifications, level of effort and price.

The award of the contract will be to the responsible Proposer whose proposal is deemed to be the best and whose proposal best meets the needs of the school district.

A responsive proposer shall have submitted a complete sealed proposal packet within the stated timeline and in accordance with the proposal specifications. A responsible proposer shall demonstrate the ability to successfully deliver the supplies, equipment and/or services being procured.

Results will become available after approval by the Board of Trustees.

SELECTION CRITERIA

The District reserves the right to award this RFCSP to a single Proposer, multiple Proposers, each line item separately, or in any combination it determines to be in the best interest of the District. If the Proposer chooses to bid/propose “all or none” or is not agreeable to multiple or split awards, it must be noted on the Deviation/Compliance Form and included with the RFCSP.

RFCSP’s must remain open for acceptance for a period of **ninety (90) days** subsequent to the opening of RFCSP’s, unless otherwise indicated, to allow time for the offer(s) to be evaluated and Board of Trustees action, if required.

Regardless of the award of RFCSP hereunder, the District retains the right to purchase the same or similar materials or items from other sources should it be determined that doing so would be in the District's best interest. Based upon the proposal material submitted, the following criteria will be used in evaluation.

Extensions of unit prices shown will be subject to verification by the district. In case of variation between the unit price and the extension, the unit price will be considered to be the proposal.

Per Texas Education Code, Subchapter B, Sec. 44.031(b) *ALL CONTENTS PROVIDED IN THIS SOLICITATION, WILL BE CONSIDERED AS AN EVALUATION FACTOR

EVALUATION FACTORS	PERCENTAGE OF POINTS
A. The Purchase Price - Fees and Associated Costs	51%
B. The reputation of the Proposer and the Proposer’s goods or services – Based on demonstrated expertise and experience; references (availability of contract items, reliability of deliveries, condition of delivered product and wholesomeness, accurate invoices)	20%
C. The quality of the Proposer’s goods or services – ability to perform all requirements and unique abilities of the Proposer	10%
D. The extent to which the services meet the district’s needs (based on ability to meet delivery schedule, lead time for orders, offer products specified)	5%
E. The Proposer’s past relationship with the District	5%
F. The impact on the ability of the district to comply with laws and rules relating to historically underutilized businesses; (1 point given for completion of form) “Federal Requirements for Procurement and Contracting with small and minority businesses, women’s business enterprises, and labor surplus area firms.”	1%
G. The total long term cost to the District to acquire the Proposer’s goods or services	0%
H. For a contract for goods and services, other than goods and services related to telecommunications and information services, building construction and maintenance, or instructional materials, whether the Proposer or the Proposer's ultimate parent company or majority owner: a. has its principal place of business in this state; or b. employs at least 500 persons in this state (Form E)	0%
I. Any other relevant factor specifically listed in the request for bids or proposals a. Schedule	8%

TIME LINE FOR RFCSP

Subject to change if in the best interest of the district.

RFCS Release Date	February 15, 2019
Advertising Dates	February 18, 2019 and February 25, 2019
Pre-Proposal Meeting	February 28, 2019 at 10:00 am CST
Deadline for Questions and Clarifications	March 1, 2019 at 10:00 am CST
Due Date	March 5, 2019 at 2:00 pm CST
Board Approval Date	March 28, 2019

CONTRACT

The proposal document, addenda and any negotiated documents, returned and awarded by the Birdville ISD shall constitute the contract. The contract will be put into effect by means of executed purchase order(s) after proposals have been awarded unless otherwise specified.

CONTRACT TERM

This proposal shall be effective upon School Board approval until completion of the project.

OPEN RECORDS

Following the award of a contract, responses to this RFCSP are subject to release as public information unless the response or specific parts of the response can be shown to be exempt from the Texas Open Records Act. Proposers are advised to consult with their legal counsel regarding disclosure issues and take the appropriate precautions to safeguard trade secrets or any other proprietary information. The District assumes no obligation or responsibility for asserting legal arguments on behalf of potential proposers.

If a proposer believes that a proposal or part(s) of a proposal is confidential, then the proposer must so specify. The proposer must stamp in bold red letters the term 'CONFIDENTIAL' on that part of the proposal which the proposer believes to be confidential. The proposer must submit in writing specific detailed reasons, including any relevant legal authority, stating why the proposer believes the material to be confidential. Vague and general claims as to confidentiality will not be accepted. The District will be the sole judge as to whether a claim is general and/or vague in nature.

ASBESTOS

Proposers who perform work inside the Birdville ISD facilities are hereby notified that our buildings may contain asbestos containing materials. This notification is required by both the State of Texas Department of State Health Services and the Federal EPA Asbestos regulations. These guidelines cover both Birdville ISD's responsibilities and the Employer's responsibility to their employees. As a Proposer it is your responsibility to check each building prior to performing any work in that facility. These building materials may include but are not limited to: ceiling tile, floor tile and mastic, sheetrock, tape and bed compound, thermal pipe insulation, spray-on ceiling material, calks, and roofing products. As there have been numerous asbestos containing products manufactured over the years, you must check each building's Asbestos Management Plan. This plan is normally kept in the main office. Check with the school secretary and she will allow you to look at it. It is the Proposer's responsibility to notify all employees working for them that Birdville ISD facilities may contain asbestos and where their employees may find the facility's Asbestos Management Plan. Again, it is the Proposer's responsibility to check the Asbestos Management Plan for each facility prior to working in the facility and then to notify their employees performing the actual work. The information is found in section eight (8) for all asbestos that are remaining in the building. If after looking in the Asbestos Management Plan you are uncertain about whether the area you will be working in contains asbestos or not, please contact the Environmental Department at 817-871-3300 for further assistance.

QUANTITIES

RFCSP's must be submitted on units of quantity specified. Any suggestions as to quantity to secure a better price are welcome. The quantities appearing in this RFCSP are approximate only, and the District reserves the right to increase, decrease or delete any or all items. If the quantities of materials to be furnished are increased, such increase shall be paid for according to the unit prices established for the item. The successful Proposer shall have no claims against the District for anticipated profits for the quantities called for, diminished or deleted. Estimated quantity change of products on bid shall be no more than 25% as is the statutory change order amount in Texas law.

DELIVERY OF GOODS

A specific delivery date may be required to be a part of each RFCSP. The District considers delivery time to be that period elapsing from the time the individual order is placed until that order or work thereunder is received by the District at the specified delivery location.

All items covered by this RFCSP shall be delivered F.O.B Destination to Birdville ISD, from point of assembly to the District location(s) specified on each purchase order. **RFCSP pricing shall include all freight/delivery charges.** The District shall not be liable for any deliveries of merchandise unless same has been received at the specified delivery location within the Birdville ISD, inspected and accepted as in full compliance with the Specifications. Risk of theft, destruction, loss or damage to any work, materials, shipment, or deliveries will be borne exclusively by the successful Proposer until after the District completes its inspection and acceptance of said work, material, shipments, or deliveries; the burden and cost of insurance against such risks shall be assumed by the successful Proposer.

Deliveries will be made only upon authorization of the Birdville ISD, and shall be made if, as, and when required and ordered by the District, at such intervals as directed by the District. It is important that each supplier understand the following information:

- All purchases made by the District will be made via Birdville ISD purchase order.
- Do not provide goods/services absent a bona fide, signed purchase order.
- Do not provide goods/services exceeding the quantities contained on the purchase order.
- The District will only pay invoices which match the purchase order description, quantity, and price.

Deliveries shall be to the location identified in each purchase order. Each proof of delivery shall list the Birdville ISD purchase order number, exact quantity delivered, back orders (if any) and number of pallets.

Proposer warrants that all deliveries made under the purchase order will be of the type and quality specified; and the District may reject and/or refuse any delivery that falls below the quality specified in the Specifications. The District shall not be held to have accepted any delivery until after an inspection of same has been made and an opportunity to exercise its right of rejection has been afforded.

Failure by the Proposer to make reasonable delivery as and when requested shall entitle the District to acquire quantities from alternate sources wherever available, with the right to seek reimbursement from the Proposer for amounts, if any, paid by the District over and above the RFCSP price.

All materials delivered shall be free of any and all liens and shall upon acceptance thereof become the property of the District, free and clear of any liens.

Acceptance by the District of any delivery shall not relieve the Proposer of any guarantee or warranty, express or implied, nor shall it be considered an acceptance of material not in accordance with the Specifications and shall not waive the District's right to request replacement of defective material.

ADDITION OR DELETION OF LOCATIONS

The District, by written notice at any time during the term of the contract, may add or delete locations as deemed necessary. Any such written notice shall take effect on the date stated in the notice from the District. Any added or deleted items will be reflected in the cost in accordance with the proposal unit price for that location. The District shall determine if any adjustments are needed to the proposed schedule and shall provide any changes in writing to the Contractor.

SUBCONTRACTORS

The Contractor will not subcontract or enter into any subcontracting agreements pertaining to this contract, without obtaining approval from the Purchasing Department. If you are subcontracting any part of this contract, the following must be provided: name(s) of the subcontractor(s), addresses, points of contact and phone numbers.

In no event will any subcontracting by the Contractor relieve the Contractor from any of the obligations or conditions of this contract. As between the parties hereto, any of the Contractor's subcontractors will be considered the agent and employee of the Contractor, and the acts or omission of the subcontractors and any person directly or indirectly acting for them will be deemed to be the acts or omission of the Contractor, and the Contractor will remain liable and responsible to the District as if no subcontract had been made. All submittals required of the Contractor shall also be required of any subcontractors.

CANCELLATION

The District shall not pay for services or supplies that are deemed by BISD to be unsatisfactory. Proposers will be given reasonable opportunity, before termination, to correct any deficiencies; however, this in no way may be construed as negating the basis for cancellation. The District reserves the right to cancel the contract, without cause, upon thirty (30) days' written notice.

Birdville ISD reserves the right to cancel the entire contract and/or buy in the open market at the current price and charge the vendor the difference between the price so paid and the proposal in the following events:

- a. Brands of merchandise other than brands name on the proposal are delivered without prior approval.
- b. Formulation of the product is changed and the district is not contacted for prior approval.
- c. Orders are not delivered within the specified time period.
- d. Pack changes in which written notification has not been made at least two weeks prior to the delivery.
- e. In the case that the product deviates from the specification or is found to be inferior or not wholesome.

WARRANTY INFORMATION

Any information regarding warranties and/or maintenance agreements pertaining to said item(s) are to be included in the proposal.

Warranty – Product: Manufacturers' standard warranty for parts and labor must be included in the prices bid/proposed and must meet or exceed any additional warranty requirements specified herein. All manufacturers' warranties shall be enforced to benefit the District, and replacement of defective materials shall be made promptly upon request.

Warranty – Price: The price to be paid by the District shall be that contained in Seller's RFCSP which Seller warrants to be no higher than Seller's current prices on orders by others for products of the kind and specification covered by this RFCSP for similar quantities under similar or like conditions and methods of purchase. In the event Seller breaches this warranty, the prices of the items shall be reduced to the Seller's current prices on orders by others. Or in the alternative, the District may cancel the Purchase Order(s) without liability to seller for breach of Seller's actual expense.

Warranty – Safety: Seller warrants that the product sold to the District shall conform to the standards promulgated by the U.S. Department of Labor under the Occupational Safety and Health Act of 1970. In the event the product does not conform to OSHA standards, the District may return the product for correction or replacement at the Seller's expense. In the event Seller fails to make the appropriate correction within a reasonable time, correction made by the District will be at Seller's expense.

INSURANCE REQUIREMENTS

These requirements apply to all non-Capital Improvement Program construction projects and to the other bids/proposals as required. The successful Proposer will submit the following Certificates of Insurance naming the Birdville ISD as Certificate Holder and named additional insured on General Liability Certificates. Certificates may be faxed to Birdville ISD, Purchasing Department at 817-831-5662 or emailed to shelley.freeman@birdvilleschools.net. The selected Proposer will be required to supply the insurance certificate(s) prior to the start of the project. The selected Proposer agrees to provide insurance policies or contracts for insurance, when requested, in addition to Certificates of Insurance. **The District reserves the right to require higher limits of coverage depending on the size, scope, and nature of a RFCSP.**

The Proposer shall agree to waive all right of subrogation against the District, its officials, employees and volunteers for losses arising from work performed by the contractor for the District.

INSURANCE REQUIREMENTS ARE AS OUTLINED IN AIA DOCUMENT A101-2017 EXHIBIT A, WHICH IS INCLUDED IN DRAFT FORM IN THIS RFCSP

BID SECURITY REQUIREMENT

RFCSP's shall be accompanied by either an **original** cashier's check, certified check, or money order upon a state bank in the amount not less than five percent (5%) of the total maximum RFCSP price payable without recourse to the Birdville ISD, or an **original** bid bond in the same amount from a reliable surety company licensed to do business in the State of Texas. Bid Security serves as a guarantee that the Proposer will enter into a contract and execute a payment and performance bond on any or all projects \$25,000 or above within fifteen (15) days after notice of award.

PAYMENT BOND

For projects in excess of \$25,000, an **original** payment bond will be required of the successful Proposer and shall be executed by a surety company acceptable to the District and authorized to do business in Texas. The payment bond shall be in an amount equal to one hundred percent (100%) of the total sum for all projects in excess of \$25,000. **Original** bonds shall be delivered to the District no later than fifteen (15) days after receiving the notice of award.

PERFORMANCE BOND

For projects in excess of \$100,000, BOTH an **original** performance bond and an **original** payment bond will be required of the successful Proposer and shall be executed by a surety company acceptable to the District and authorized to do business in the State of Texas. The performance and payment bond shall be in an amount equal to one hundred percent (100%) of the total sum for all projects in excess of \$100,000. Failure to deliver the performance bond and payment as specified shall be considered as having abandoned the contract and the bid bond will be retained by the District as liquidated damages. **Original** bonds shall be delivered to the District no later than fifteen (15) days after receiving the notice of award.

PROPOSER PRICES

Proposal prices must be firm for the duration of the contract, unless other time stipulations are noted elsewhere in the Special Conditions and Instructions as listed in the package.

PROCUREMENT CARD ORDERING CAPABILITY

The District may, at their discretion, elect to use a MasterCard Procurement Card to procure goods in lieu of a Purchase Order for payment resulting from the award of this contract.

TAXES

The Birdville Independent School District is exempt from Federal Excise, State Sales and Transportation Taxes. TAX MUST NOT BE INCLUDED IN RFCSP. Birdville ISD Federal ID Number is 75-6000193. Tax exemption certificates will be executed by the District upon request.

INVOICING

Pay applications shall be submitted to the Architect for review and approval per SECTION 01 29 00 - PAYMENT PROCEDURES. Pay applications will then be forwarded to Birdville ISD by the Architect.

PROTEST PROCEDURES FOR VENDOR/PROPOSER PROTESTS

Vendors/proposers are encouraged to discuss purchasing concerns with the Director of Purchasing. Concerns should be expressed as soon as possible to allow for early resolution at the lowest possible administrative level.

If a vendor desires to protest a decision by Birdville ISD Purchasing Department, the vendor must submit a letter notifying of the intent to protest and include in the letter the reason for the protest along with any evidence available supporting the vendor's position. Submit the letter to: Birdville ISD Purchasing Department, 3124 Carson Street, Haltom City, TX 76117.

The Director shall respond to the vendor within fifteen (15) business days from receipt with an explanation or offer a compromise. If the vendor is not satisfied, the vendor may submit a formal complaint under Board Policy GF (LOCAL).

Even after initiating a formal complaint process, individuals are encouraged to seek informal resolution of their concerns. An individual whose concerns are resolved may withdraw a formal complaint at any time.

SECTION II SCOPE OF WORK

SCOPE OF SERVICES

GENERAL REQUIREMENTS FOR CONTRACTORS

1. Contractor personnel shall be clean in appearance and in uniform for easy identification on BISD premises.
2. Contractor will interview, screen, hire, control, supervise, train and pay for sufficient qualified personnel as may be necessary to perform the services contained herein. A criminal history check is required.
3. Contractor shall thoroughly investigate the background of each employee assigned to the BISD property and shall not assign any employee on full or part-time basis who has been convicted of a felony or crime involving moral turpitude or any relationship with a child.
4. Contractor shall be responsible for all materials delivered to the job site. Contractor shall store materials in a secure location to prevent injury from any district staff or students.
5. The use of tobacco and alcohol is prohibited on BISD property.
6. Successful contractor is responsible for any damages done to the ceilings, walls, etc. due to negligence.
7. Proposals will be considered from contractors who are experienced in generator installation.
8. Contractor is responsible for verifying exact specifications prior to submitting proposal.
9. Contractor shall agree to rework any defective workmanship during one (1) year warranty period following original installation at no charge to the District.

SPECIFICATIONS OF WORK

Refer to Project Manual, trade specifications and drawings attached herein for all work and products required for turnkey project.

PROPOSER'S RETURN PACKET

SECTION III COVER PAGE



**RFCSP: #058-19
CONTROLLED ENTRY AT 15 CAMPUSES**

**DUE DATE: MARCH 5, 2019
TIME: 2:00 pm CST**

PROPOSER IDENTIFICATION: (Please print information clearly.)

Company Name:		Date:	
Address:		Phone:	
		Fax:	
City/St/Zip		Email:	
<p><i>I hereby acknowledge receipt of the following addenda (if applicable) which have been issued and incorporated into the RFCSP Document. (Please initial in ink beside each addendum received.)</i></p>			

Addendum No. 1		Addendum No. 3	
Addendum No. 2		Addendum No. 4	

**SECTION III
PROPOSAL PRICING**

Company Name _____

Item No.	Item Description	Project Cost	Contingency Allowance
1	Base Proposal	\$ _____	\$75,000.00
2	Add Alternate #1: For substantial completion, including General, Mechanical, and Electrical Work (including any alternates elected by the Owner) by August 1, 2019.	\$ _____	
3	Add Alternate #2: For providing NIJ Level IIA bullet resistant film as outlined in Section 08 80 00 and located per the drawings.	\$ _____	
4	Add Alternate #3: For providing NIJ Level III bullet resistant film as outlined in Section 08 80 00 and located per the drawings.	\$ _____	
5	Add Alternate #4: For providing an exterior accessible ramp at Green Valley Elementary School.	\$ _____	
Total Lump Sum Proposal (Include contingency calculated amount)			\$ _____
Total Lump Sum Proposal (Include alternate and contingency calculated amount)			\$ _____

The Proposer agrees, if this proposal is accepted, to commence work on or before a date to be established in the written "Notice-to-Proceed" of the Owner and to attain substantial completion of all Work within _____ consecutive calendar days, subject to extensions of time as described in Article 8.3 of the General Conditions.

**FORM A
PROPOSER INFORMATION RESPONSE FORM**

The undersigned, in submitting this RFCSP and endorsement of same, represents that he/she is authorized to obligate his/her Proposer, that he/she is an equal opportunity employer and will not discriminate with regard to race, color, religion, national origin, sexual orientation, or age or disability unrelated to job performance of this RFCSP; and that he/she has read this entire RFCSP package and are aware of the covenants contained herein and will abide by and adhere to the expressed requirements in *all* sections of this RFCSP.

SUBMITTED BY

Primary Contact/Title:

**SECTION IV
RFCSP RESPONSE CHECKLIST**

To be considered for award of **this** solicitation, all pages contained in the “Packet” (including but not limited to forms A – J, the Cover Page, plus any/all attachments, must be completed with all requested information, **SIGNED** and **RETURNED** in a sealed envelope or other appropriate package adequate to conceal and contain the contents prior to the RFCSP date and time. Each RFCSP shall be placed in a separate envelope and properly identified with the RFCSP Number, RFCSP Title, Name of Company submitting RFCSP, and the established time and date to be opened.

Please verify that the documents listed below have been completed, signed, and included in your RFCSP prior to submittal. **TO BE CONSIDERED FOR AWARD, ALL MANDATORY FORMS MUST BE COMPLETED, SIGNED AND RETURNED WITH THIS SOLICITATION.**

Mandatory Forms (required to be considered for the Award of this solicitation):

- Proposer Return Packet and Addendum(s) (Submittals as detailed in the specifications)
 - Insurance
 - References
- Completed – Packet Cover Page
- Completed – Proposer Information Response Form – Form A
- Completed – Deviation/Compliance Signature Form – Form B
- Completed – Non-Collusion Statement – Form C
- Completed – Criminal Background Check and Felony Conviction Notification – Form D
- Completed – Resident/Nonresident Bidder’s Certification – Form E
- Completed – References – Form F
- Completed – Senate Bill 9 Proposer Certification – Form G
Not required for this proposal.
- Completed – Conflict of Interest Questionnaire – Form H
- Completed – Historically Underutilized Business (HUB) Certification – Form I
- Completed – Certification for Criminal History Check – Form J
- Completed – W-9, Tax Payer Identification Number & Certification (not included in packet)

Company name:			
Phone:	Fax:	E-mail:	
Registered company address:			
City:	State:	ZIP Code:	
Website:			HUB:
M/WBE:	EIN or SS#:	DUN:	

REMIT INFORMATION

Contact Person:			
Address:			
City:	State:	ZIP Code:	
Phone:	Fax:	E-mail:	

Division/Bid#:

ADDITIONAL REMIT ADDRESSES

Location Name/Type:			
Address:			
City:	State:	ZIP Code:	
Phone:	Fax:	E-mail:	

Division/Bid#:

PROPOSER QUALIFICATIONS

How many years has your company been in this type of business?	
Number of staff in your organization?	
Are you willing to accept a split or multiple award?	
Are you willing to accept procurement card payment?	
Are criminal and civil arrest/charge records checked?	
Is random drug testing performed?	
Are your employees required to wear uniforms, name tags/badges and company identifications?	

HOW WOULD YOU LIKE TO RECEIVE YOUR PURCHASE ORDERS? EMAIL, FAX OR US MAIL
CHECK ALL THAT APPLY

<input type="checkbox"/> Fax	<input type="checkbox"/> E-mail	<input type="checkbox"/> U S Mail
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PLEASE LIST ANY CURRENT AWARDED BIDS YOU HAVE WITH OTHER DISTRICTS OR CO-OPS

Bid or Co-op#:	Contact:	Phone:
Bid or Co-op #:	Contact:	Phone:
Bid or Co-op #:	Contact:	Phone:

SIGNATURES OF COMPANY OFFICIAL

Print Name: _____

Signature: _____

Print Title:

Date:

**FORM B
DEVIATION/COMPLIANCE SIGNATURE FORM**

If the undersigned Proposer intends to deviate from the Item(s) Specifications listed in this RFCSP document, all such deviations must be listed on this page, with complete and detailed conditions and information included or attached. **The District will consider any deviations in its RFCSP award decisions, and the District reserves the right to accept or reject any RFCSP based upon any deviations indicated below or in any attachments or inclusions.**

In the absence of any deviation entry on this form, the Proposer assures the District of his/her full compliance with the Terms and Conditions, Item Specifications, and all other information contained in this RFCSP document.

No Deviation **Yes Deviations**

Signature _____
Date

If yes is checked, please list below. Attach additional sheet(s) if needed.

**FORM C
NON-COLLUSION STATEMENT**

“The undersigned affirms that he/she is duly authorized to execute this RFCSP, that this company, corporation, Proposer, partnership or individual has not prepared this RFCSP in collusion with any other Proposer, and that the contents of this RFCSP as to prices, terms or conditions of said RFCSP have not been communicated by the undersigned nor by any employee or agent to any other person engaged in this type of business prior to the official opening of this RFCSP.”

Proposer hereby assigns to purchaser any and all claims for overcharges associated with this RFCSP which arise under the antitrust laws of the United States, 15 USCA Section 1 and which arise under the antitrust laws of the State of Texas, Business and Commerce Code, Section 15.01.

Does vendor agree? Yes _____ Initials of authorized company representative

FORM D
CRIMINAL BACKGROUND CHECK AND FELONY CONVICTION NOTIFICATION

(a) CRIMINAL BACKGROUND CHECK

Proposer will obtain history record information that relates to an employee, applicant for employment, or agent of the Proposer 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 Proposer certifies to the Birdville ISD before beginning work and at no less than an annual basis thereafter that criminal history record information has been obtained. Proposer shall assume all expenses associated with the background checks, and shall immediately remove any employee or agent who was convicted of a felony, or misdemeanor involving moral turpitude, as defined by Texas law, from Birdville ISD’s property or other location where students are regularly present. Birdville ISD shall be the final decider of what constitutes a “location where students are regularly present.” Proposer’s violation of this section shall constitute a substantial failure.

If the Proposer 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.

(b) 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 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.

I, the undersigned agent for the Proposer named below, certify that the information concerning criminal background check and notification of felony convictions has been reviewed by me, the following information furnished is true to the best of my knowledge, and I acknowledge compliance with this section. Proposer is responsible for the performance of the persons, employees and/or sub-Proposers. Proposer agrees to provide services for the Birdville ISD pursuant to this RFCSP on any and all Birdville ISD campuses or facilities. Proposer will not assign individuals to provide services at a Birdville ISD campus or facility who have a history of violent, unacceptable, or grossly negligent behavior or who have a felony conviction, without the prior written consent of the Birdville ISD Purchasing Department.

THE FELONY CONVICTION NOTICE IS NOT REQUIRED OF A PUBLICLY-HELD CORPORATION.

Proposer’s Name:			
A. <i>My firm is a publicly-held corporation; therefore, this reporting requirement is not applicable.</i>		Y	N
B. <i>My firm is not owned or operated by anyone who has been convicted of a felony.</i>		Y	N
C. <i>My firm is owned or operated by the following individual(s) who has/have been convicted of a felony:</i>			
Name of Felon(s):			
Details of Conviction(s):			
Signature of Company Official:		Date:	
<i>NOTE: Name and signature of company official should be the same as initials on the affidavit.</i>			

FORM E
RESIDENT/NONRESIDENT CERTIFICATION

Texas Government Code Chapter 2252 relates to bids by nonresident Proposers. The pertinent portions of the Act are as follows:

Section 2252.001(3) "Nonresident bidder" means a bidder who is not a resident (of the State of Texas).

Section 2252.001(4) "Resident bidder" means a bidder whose principal place of business is in this state, including a Proposer whose ultimate parent company or majority owner has its principal place of business in this state.

Section 2252.002

A governmental entity may not award a governmental contract to a nonresident bidder unless the nonresident underbids the lowest bid submitted by a responsible resident bidder by an amount that is not less than the amount by which a resident bidder would be required to underbid the nonresident bidder to obtain a comparable contract in the state in which the nonresident's principal place of business is located.

Company Name: _____ is/isn't a Resident Bidder of Texas as defined in Texas Government Code Section 2252.001(4).

Yes - Resident **No - Nonresident**

If the Bidder is a Nonresident Bidder of Texas, please answer the following:

Does the Proposer's ultimate parent company or majority owner employ at least 500 persons in Texas?	Yes _____	No _____
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Does Proposer agree? Yes _____ Initials of authorized company representative

FORM F REFERENCES

Proposers must provide at least three (3) references for which they have performed similar services within the past twenty-four (24) months. Two (2) of the references shall be school districts serviced. The references should be of like size and nature as the BISD. The references shall include the name of the company, contact person, phone number, fax number and e-mail address, length of time work has been performed, types of tasks performed and service provided. See attached reference sheet.

1.	Company Name:			
	Address:			
	City/State/Zip:			
	Contact Person:		Email:	
	Business Phone:		Fax:	
	Description of project or work completed:			
2.				
	Company Name:			
	Address:			
	City/State/Zip:			
	Contact Person:		Email:	
	Business Phone:		Fax:	
	Description of project or work completed:			
3.				
	Company Name:			
	Address:			
	City/State/Zip:			
	Contact Person:		Email:	
	Business Phone:		Fax:	
	Description of project or work completed:			

FORM G
MODEL SB 9 PROPOSER CERTIFICATION FORM

Criminal History Record Information Review of Certain Contract Employees

Introduction: Texas Education Code Chapter 22 requires service Proposers to obtain criminal history record information regarding covered employees and to certify to the District that they have done so. Covered employees with disqualifying convictions are prohibited from serving at a school district.

Definitions:

Covered employees: Includes all employees of a Proposer (to include any subcontractors and/or independent Proposers) who have or will have continuing duties related to the service to be performed at the District and have or will have direct contact with students. The District will be the final arbiter of what constitutes direct contact with students.

Disqualifying conviction: One of the following offenses, if at the time of the offense: (a) a felony offense under Title 5, Texas Penal Code; (b) an offense for which a defendant is required to register as a sex offender under Chapter 62, Texas Code of Criminal Procedure; or c) an equivalent offense under Federal law or the laws of another state.

On behalf of _____ ("Name of Proposer"),

I First Name: _____ Last Name: _____

Certify that [check one]:

None of the Proposer's employees are *covered employees*, as defined above.

Or

Some or all of the Proposer's employee are *covered employees*. If this box is selected, I further certify that:

Proposer has obtained all required criminal history record information, through the Texas Department of Public Safety, regarding its covered employees. None of the covered employees has a disqualifying conviction. Proposer has taken reasonable steps to ensure that its employees who are not covered employees do not have continuing duties related to the contract services or direct contact with students.

If Proposer receives information that a covered employee has a disqualifying conviction, Proposer will immediately remove the covered employee from contract duties and notify the District in writing within three (3) business days.

Upon request, Proposer will make available for the District's inspection the criminal history record information of any covered employee. If the District objects to the assignment of a covered employee on the basis of the covered employee's criminal history record information, Proposer agrees to discontinue using that covered employee to provide services at the District.

Noncompliance by the Proposer with this certification may be grounds for contract termination.

Signature Date

FORM H

CONFLICT OF INTEREST QUESTIONNAIRE For vendor doing business with local governmental entity	FORM CIQ
<p>This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.</p> <p>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).</p> <p>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.</p> <p>A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.</p>	OFFICE USE ONLY Date Received
<p>1 Name of vendor who has a business relationship with local governmental entity.</p>	
<p>2 <input type="checkbox"/> 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.)</p>	
<p>3 Name of local government officer about whom the information is being disclosed.</p> <p style="text-align: center;">_____</p> <p style="text-align: center;">Name of Officer</p>	
<p>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.</p> <p style="text-align: center;">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?</p> <p style="text-align: center;"> <input type="checkbox"/> Yes <input type="checkbox"/> No </p> <p style="text-align: center;">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?</p> <p style="text-align: center;"> <input type="checkbox"/> Yes <input type="checkbox"/> No </p>	
<p>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.</p>	
<p>6 <input type="checkbox"/> 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).</p>	
<p>7</p> <p style="text-align: center;"> _____ Signature of vendor doing business with the governmental entity </p> <p style="text-align: right;"> _____ Date </p>	

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 I

**HISTORICALLY UNDERUTILIZED BUSINESS (HUB)
CERTIFICATION**

Companies that have been certified by the Texas Building and Procurement Commission (TBPC) as Historically Underutilized Business (HUB) entities are encouraged to indicate their HUB status when responding to this Bid Invitation. The electronic catalogs will indicate HUB certification for vendors that properly indicate and document their HUB certification on this form.

I certify that my company has been certified by the Texas Building and Procurement Commission as a Historically Underutilized Business (HUB), and I have attached a copy of our HUB Certification to this form. (Required documentation for recognition as a HUB).

Minority

Small Business

Woman Owned

My company has NOT been certified by the Texas Building and Procurement Commission as a Historically Underutilized Business (HUB).

SIGNATURE OF AUTHORIZED REPRESENTATIVE

NAME (PLEASE PRINT)

TITLE

DATE

FORM J

**CERTIFICATION FOR CRIMINAL HISTORY CHECK
(In compliance with Texas Education Code § 22.0834(A))**

“Covered employee” - A “covered employee” is a person who is an employee, applicant, agent or Subcontractor of the Contractor or of any Subcontractor of the Contractor, if (a) the person has or will have work duties related to the Project that will be performed on District property or at another location on a regular or repeated basis, (b) students are regularly present at such location, and (c) the person will have verbal or physical interaction with, or be in direct proximity to, one or more students.

“Direct contact with students”-The contact that results from activities that provide substantial opportunity for verbal or physical interaction with students that is not supervised by a certified educator or other professional district employee. Contact with students that results from services that do not provide substantial [the] opportunity for unsupervised interaction with a [an individual] student or students, such as addressing an assembly, officiating a sports contest, or judging an extracurricular event, is not, by itself, direct contact with students. However, direct contact with students does result from any activity that provides substantial [the] opportunity for unsupervised contact with students, which might include [such as], without limitation, the provision of [individualized] coaching, tutoring, or other services to students.

“Disqualifying conviction” - A “disqualifying conviction” is a conviction of (a) any felony under the Texas Penal Code, (b) any offense for which the person is required to register as a sex offender under Chapter 62 of the Texas Code of Criminal Procedure, (c) any equivalent offense under the laws of the United States or any other state, (d) any offense against a child, (e) misdemeanor possession of a controlled substance within 10 years, (f) any weapon offense, (g) theft, larceny, fraud, issuance of a bad check, theft by check above the class C misdemeanor level, or more than one offense at the class C level, (h) forgery, (i) altering an Official Document, (j) perjury, or (k) securing executing of a document by deception.

On behalf of _____ (“Contractor”), I certify that [check one]:

None of Contractor’s employees are covered employees, as defined above. The service contractor shall also certify that it will take reasonable steps to ensure that the conditions or precautions that have resulted in a determination that any person is not a covered contract employee continue to exist throughout the time that the contracted services are provided.

Or

Some or all of Contractor’s employee are covered employees. If this box is selected, I further certify that:

(1) Contractor has obtained all required criminal history record information, through the Texas Department of Public Safety, regarding its covered employees. None of the covered employees has a disqualifying conviction.

(2) If Contractor receives information that a covered employee has a disqualifying conviction, Contractor will immediately remove the covered employee from contract duties and notify the District in writing within 3 business days that it has done so. Noncompliance by Contractor with this certification may be grounds for contract termination.

Signature Title Date

**SECTION V
BIRDVILLE INDEPENDENT SCHOOL DISTRICT
STANDARD TERMS AND CONDITIONS**

The words “bids,” “request for proposals,” “quotes,” “RFPs,” “RFCSPs,” “solicitation,” “procurement,” and their derivatives may be used interchangeably in these terms and conditions. These terms and conditions apply to all procurement types to which they are attached. The term vendor, contractor or firm means each vendor chosen for award by Birdville ISD.

These Standard Terms and Conditions are part of the final contract and part of the terms and conditions of each purchase order issued in connection with this solicitation.

1. **INDEPENDENT PROPOSER** - Proposer shall operate hereunder as an independent Proposer and not as an officer, agent, servant or employee of Birdville ISD. Proposer shall have exclusive control of, and the exclusive right to control, the details of its operations hereunder and all persons performing same, and shall be solely responsible for the acts and omissions of its officers, agents, employees, Proposers, subcontractors and consultants.
2. **ASSIGNMENT** - The Proposer shall not sell, assign, transfer or convey any interest in this contract in whole or in part without the prior written consent of the Birdville ISD. No assignment, transfer or conveyance under this contract will be effective without the prior written consent of the School District.
3. **CONFLICT OF INTEREST** – The Proposer covenants and agrees that Proposer and its officers, employees, and agents will have no interest, including personal financial interest, and will acquire no interest, either directly or indirectly, which will conflict in any manner with the performance of the services called for under this Contract. No officer or employee of the School District shall have a financial interest, direct or indirect, in any contract with the BISD, or be financially interested, directly or indirectly, in the sale to the School District of any land, materials, supplies or services, except on behalf of the BISD or in compliance with the provisions of the Birdville ISD Policies and Procedures Manual. Any violation of this provision shall render this contract voidable at the discretion of the School District.
4. **SEVERABILITY** - In case any one or more of the provisions contained in this contract shall for any reason be held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality or unenforceability shall not affect any other provision of this contract, and this contract shall be construed as if such invalid, illegal or unenforceable provision had never been contained herein.
5. **MODIFICATIONS** - This contract can be modified only by written agreement of the parties.
6. **GRATUITIES** - The District may, by written notice to the Proposer, cancel this RFCSP without liability to Proposer if it is determined by the District that gratuities, in the form of entertainment, compensation, gifts, or otherwise, were offered or given by the Proposer, or any agent or representative of the Proposer, to any Board Member, officer, or employee of the Birdville ISD with a view toward securing a RFCSP or securing favorable treatment with respect to the awarding or amending, or the making of any determinations with respect to the performing of such an agreement.
7. **JURISDICTION** - The Purchase Order(s) resulting from this RFCSP shall be enforceable in Tarrant County, Texas, and if legal action is necessary by either party with respect to the enforcement of any and all of its terms and conditions, exclusive venue for same shall lie in Tarrant County, Texas.
8. **COMPLIANCE WITH LAWS** – Vendor shall comply with all federal, state and local laws, statutes, ordinances, rules and regulations, including, if applicable, worker’s compensation laws, minimum and maximum salary and wage statutes and regulations, prompt payment and licensing laws and regulations. For the entire duration of this contract, Vendor shall maintain all required licenses, certifications, permits and any other documentation necessary to perform this Agreement. When required or requested by Birdville ISD, Vendor shall furnish proof of Vendor’s compliance with this provision.

9. **EQUAL OPPORTUNITY** – It is the policy of Birdville ISD not to discriminate on the basis of race, color, national origin, gender, limited English proficiency or handicapping conditions in its programs. Vendor agrees not to discriminate against any employee or applicant for employment to be employed in performance of this Agreement, with respect to hire, tenure, terms, conditions and privileges of employment, or matter directly or indirectly related to employment, because of age (except where based on bona fide occupational qualification) or race, color, religion, national origin, or ancestry. Vendor further agrees that every subcontractor entered into for the performance of this Agreement shall contain a provision requiring non-discrimination in employment herein specified, binding upon each subcontractor. Breach of this covenant may be regarded as a material breach of the agreement.
10. **MINORITY & WOMEN’S BUSINESS ENTERPRISE (MWBE), HISTORICALLY UNDERUTILIZED BUSINESS (HUB) AND SMALL BUSINESS ENTERPRISE (SBE) PARTICIPATION** – Birdville ISD encourages the use of MWBE, HUB and SBE as prime and subcontractors. However, these entities must meet the same minimum standards and requirements of the prime contractor. It will be the responsibility of the prime contractor to pre-qualify any subcontractors offered as MWBE, HUB or SBE participants. Proposers shall indicate on their submitted proposals whether or not they are WMBE, HUB or SBE vendor and whom they are certified e.g. City, State, Federal. Complete the enclosed HUB Certification and provide a copy of the certificate(s) with the proposal. Please note that Birdville ISD does not have any percentage of participation or a disparity study completed.
11. **SAFETY** – Vendors, its subcontractors, and their respective employees shall comply fully with all applicable federal, state, and local safety and health laws, ordinances, rules and regulations in the performance of services under this Agreement, including without limitation, those promulgated by Birdville ISD and by the Occupational Safety and Health Administration (OSHA). All items must meet all applicable OSHA standards and regulations and all electrical items must bear appropriate listing from UL, FMRC or NEMA. In case of conflict, the most stringent safety requirements shall govern. Vendor shall comply with all other safety guidelines and standards as required by Birdville ISD. Vendor shall indemnify and hold Birdville ISD, harmless from all claims, demands, suits, actions, judgments, fines, penalties and liability of every kind arising from the breach of Vendor’s obligations under this provision.
12. **MATERIAL SAFETY DATA SHEET** – Vendor must provide, at no cost, at least one copy of any applicable Manufacturer’s Material Safety Data Sheet(s) (MSDS) with each shipment during the term of the contract. If OSHA or Federal or State laws provide for additional requirements, those requirements are in addition to the MSDS required.
13. **RECYCLED MATERIALS** – Texas state law requires that a purchasing preference be given to any product made from recycled material if it meets written specifications as to quality and quantity. If a product bid on this solicitation contains recycled material, identify the item number and report the percent of the recycled material in the product and the percent of the post-consumer material used in the product. “Post-consumer” means material that has been recycled after sale to a consumer as opposed to reuse of manufacturing waste prior to sale. In addition, identify any products that meet the criteria of “Environmentally Sensitive.”
14. **REMEDIES** - No right or remedy granted herein or reserved to the parties is exclusive of any right or remedy herein by law or equity provided or permitted; but each shall be cumulative of every right or remedy given hereunder. No covenant or condition of this contract may be waived without consent of the parties. Forbearance or indulgence by any party shall not constitute a waiver of any covenant or condition to be performed pursuant to this contract.
15. **NON-APPROPRIATION CLAUSE** – In accordance with Texas Local Government Code 271.903 concerning non-appropriation of funds for multi-year contracts, the proposer recognizes that the continuation of any contract after the close of any given fiscal year of the School District, which fiscal year ends on June 30 of each year, shall be subject to School Board budget approval. Should funding not be approved by the School Board for any given budget year during the contract term, the contract will terminate and become null and void.

16. **PROPOSER TO PACKAGE GOODS** - Proposer will package goods in accordance with good commercial practice. Each shipping container, shall be clearly and permanently marked as follows: (a) Proposer's name and address; (b) Consignee's name, address and purchase order or purchase change order number; (c) Container number and total number of containers, e.g., box 1 of 4 boxes; and (d) Number of the container bearing the packing slip. Proposer shall bear cost of packaging unless otherwise provided. Goods shall be suitably packed to secure lowest transportation costs and to conform to requirements of common carriers and any applicable specifications. District's count or weight shall be final and conclusive on shipments not accompanied by packing list.
17. **PLACE OF DELIVERY** - The place of delivery shall be set forth in the block of the purchase order or purchase change order entitled "Ship To."
18. **TITLE AND RISK OF LOSS** - The title and risk of loss of goods shall not pass to the Birdville ISD until the School District actually receives and takes possession of the goods at the point(s) of delivery, after inspection and acceptance of goods.
19. **FORCE MAJEURE** - Neither Proposer nor the District shall be responsible or deemed to be in default of its obligations to the other to the extent any failure to perform or delay in performing its obligations under this RFCSP is caused by events or conditions beyond the reasonable control of that party, and are not due to the negligence or willful misconduct of such party (hereinafter, "Force Majeure events"). For purposes of this RFCSP, Force Majeure events shall include, but not be limited to, acts of God or public enemy, war, riot or civil commotion, strikes, epidemic, fire, earthquake, tornado, hurricane, flood, explosion, or other catastrophes, or events or conditions due to governmental law, regulations, ordinances, order of a court of competent jurisdiction, executive decree or order. However, in the event of such delay(s) or nonperformance, the party so delayed shall furnish prompt written notice to the other party (including the date of inception of the Force Majeure event and the extent to which it will affect performance) and shall undertake all efforts reasonably possible to cure the delay or nonperformance and mitigate its effects or to otherwise perform. The District shall not be responsible for payment for any product or service delayed or foreclosed by any Force Majeure event unless and until such delayed or foreclosed product or service is provided. The provisions of this section shall not preclude the District from canceling or terminating any resulting award (or any order for any goods or services included herein), or from revising the scope of the Work, as otherwise permitted under this RFCSP.
20. **RIGHT OF INSPECTION** - BISD shall have the right to inspect the goods upon deliver before accepting them. Proposer shall be responsible for all charges for the return to Proposer of any goods rejected as being nonconforming under the specifications.
21. **RIGHT TO AUDIT** - Proposer agrees that the BISD shall, until the expiration of three (3) years after final payment under this Contract, have access to and the right to examine any directly pertinent books, documents, papers and records of the Proposer involving transactions relating to this Contract. Proposer agrees that the School District shall have access, during normal working hours, to all necessary Proposer facilities, and shall be provided adequate and appropriate workspace, in order to conduct audits in compliance with the provisions of this section. The BISD shall give Proposer reasonable advance notice of intended audits.
22. **PRODUCT GUARANTEE** - Proposer guarantees equipment or product offered will meet or exceed specifications identified in this proposal invitation. The proposer shall, upon request, replace any equipment or product proved to be defective and make any and all adjustments necessary without any expense to the District. If at any time, the equipment or product cannot satisfactorily meet the requirements of the specifications, the proposer shall, upon written request from the District, promptly remove such equipment or product without any further expense to the District.

23. **GEOGRAPHIC PREFERENCE** – Birdville ISD may apply preference to agricultural products produced, processed, or grown in Texas if the cost to the school district is equal and the quality is equal; if agriculture products produced, processed, or grown in Texas are not equal in cost and quality to other products, the school district give preference to agriculture products produced, processed, or grown in other states of the United States over foreign products if the cost to the school district is equal and the quality is equal; a school district that purchases vegetation for landscaping purposes, including plants, shall give preference to Texas vegetation if the cost to the school district is equal and the quality is not inferior. Preferences must be explicitly claimed by Vendor and may not be applicable in procurements and/or contracts involving federal funds unless the procurement and/or contract involves unprocessed locally grown or locally raised agricultural products for use by Birdville ISD, in a Child Nutrition Program. See Texas GOV'T Code 2252.001-.004; 2 C.F.R 200.319.
24. **COPYRIGHT** – All contracts paid from State or Federal grants administered by a State or Federal agency must retain copyright for the State and Federal government (if a Federally funded contract) unless otherwise negotiated in writing with the State or Federal agency pursuant to the provisions in 2 CFR 200.315, title to intangible property vents the Birdville ISD, as long as such property is used for authorized purposes. However, the State and Federal awarding agency reserve a royalty-free, non-exclusive and irrevocable right to reproduce, publish, or otherwise use the work for Federal purposes, and to authorize others to do so. The Vendor agrees to protect Birdville ISD, from any claim involving infringement of patents or copyrights.
25. **PRICE WARRANTY** - The price to be paid by the BIRD shall be that contained in Proposer's proposal, which Proposer warrants to be no higher than Proposer's current prices on orders by others for products of the kind and specification covered by this contract for similar quantities under like conditions and methods of purchase. In the event Proposer breaches this warranty, the prices of the items shall be reduced to Proposer's current prices on orders by others, or in the alternative upon School District's option, BIRD shall have the right to cancel this contract without liability to Proposer for breach or for Proposer's actual expense.
26. **SILENCE OF SPECIFICATION** - The apparent silence of these specifications as to any detail or to the apparent omission from it of a detailed description concerning any point shall be regarded as meaning that only the best commercial practices are to prevail. All interpretations of these specifications shall be made on the basis of this statement.
27. **INDEMNIFICATION** – Proposer does hereby agree to waive all claims, release, indemnify and both hold harmless the School District, its officials, agents and employees, in both their public and private capacities, from and against any and all liability, claims, losses, damages, suits, demands or causes of action, including all expenses of litigation and/or settlement, court costs and attorney fees, which may arise by reason of death or injury to persons or loss of, damage to, or loss of use of any property occasioned by any error, omission, or negligent act of the Proposer, its officers, agents, employees, subcontractors, invitees, or other persons for whom the Proposer is legally liable, arising out of or in connection with the performance of this contract, and Proposer will at its own cost and expense defend and protect the School District against any and all such claims and demands.
28. **NON-DISCRIMINATION** - Proposer shall not discriminate against any employee or applicant for employment of Proposer or of the School District because of race, age, color, religion, sex, national origin, ancestry, disability, or place of birth. Proposer shall take action to ensure that all persons are employed and/or treated without regard to their race, age, color, religion, sex, national origin, ancestry, disability, or place of birth. This action shall include, but not be limited to the following: employment, promotion, demotion, transfer, working conditions, recruitment, layoff, termination, rates of pay or other forms of compensation, and training opportunities.

29. **DISABILITY** - In accordance with the provisions of the Americans With Disabilities Act of 1990 (ADA), Proposer warrants that it, and any and all of its subcontractors, will not unlawfully discriminate on the basis of disability in the provision of services to the general public, nor in the availability, terms and/or conditions of employment for applicants for employment with, or employees of Proposer or any of its subcontractors. **Proposer warrants it will fully comply with ADA's provisions and any other applicable federal, state and local laws concerning disability and will defend, indemnify and hold the School District harmless against any claims or allegations asserted by third parties or subcontractors against School District arising out of Proposer's and/or its subcontractor's alleged failure to comply with the above-referenced laws concerning disability discrimination in the performance of this contract.**
30. **DRUG POLICY** - All BISD property and facilities are a “drug-free zone.” No one may use, consume, carry, transport, or exchange tobacco, cigarettes or illegal drugs while in a School District building or while on School District property. The responding company and its employees shall adhere to this policy.
31. **TERMINATION FOR DEFAULT** - BISD reserves the right to terminate the contract without prior notice in the event the Proposer defaults or breaches any of the terms and conditions of this contract, or otherwise fails to perform in accordance with the proposal specifications. In the event of termination the School District reserves the right to complete the work or services in any manner it deems desirable, including engaging the services of other parties therefore and/or awarding the proposal to the next lowest responsible proposer. Any such act by the School District shall not be deemed a waiver of any other right or remedy. If after exercising any such remedy, the cost to the School District of the performance of the balance of the work or services is in excess of that part of the contract sum, which has not therefore been paid to the Proposer hereunder, Proposer shall be liable for and shall reimburse the School District for such excess. Proposers shall, for this purpose, keep their proposals open and prices fixed for a period of 90 days following the award of this proposal.
32. **TERMINATION WITHOUT CAUSE** - BISD shall have the right to terminate the contract, in whole or in part, without cause any time upon thirty (30) days' prior written notice. Upon receipt of a notice of termination, the Proposer shall promptly cease placing orders and all further work pursuant to the Contract, with such exceptions, if any, specified in the notice of termination. BISD shall pay the Proposer, to the extent funds are appropriated or otherwise legally available for such purposes, for all goods delivered and services performed and obligations incurred prior to the date of termination in accordance with the terms hereof.
33. **NO THIRD-PARTY BENEFICIARY** – For purposes of this contract, including its intended operation and effect, the parties to this contract specifically agree and contract that: (1) the agreement only affects matters/disputes between the parties to this contract, and is in no way intended by the parties to benefit or otherwise affect any third person or entity, notwithstanding the fact that such third person or entity may be in a contractual relationship with School District or Proposer or both; and (2) the terms of this contract are not intended to release, either by contract or operation of law, any third person or entity from obligations owing by them to either School District or Proposer.
34. **ENTIRE AGREEMENT** – This contract embodies the complete agreement of the parties hereto, superseding all oral or written previous and contemporary agreements between the parties relating to matters herein and, except as otherwise provided herein, cannot be modified without written agreement of the parties.

DRAFT AIA® Document A101™ – 2017

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

AGREEMENT made as of the « » day of « » in the year « »
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

«Birdville Independent School District» « »
«6125 East Belknap Street»
«Haltom City, Texas 76117»

and the Contractor:
(Name, legal status, address and other information)

« » « »
« »
« »
« »

for the following Project:
(Name, location and detailed description)

« »
« »
« »

The Architect:
(Name, legal status, address and other information)

« » « »
« »
« »
« »

The Owner and Contractor agree as follows.

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.

The parties should complete A101™-2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201™-2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.



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TABLE OF ARTICLES

- 1 THE CONTRACT DOCUMENTS
- 2 THE WORK OF THIS CONTRACT
- 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
- 4 CONTRACT SUM
- 5 PAYMENTS
- 6 DISPUTE RESOLUTION
- 7 TERMINATION OR SUSPENSION
- 8 MISCELLANEOUS PROVISIONS
- 9 ENUMERATION OF CONTRACT DOCUMENTS

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

§ 1.1 The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), all sections of the Project Manual and Construction Documents, Drawings, Specifications, Geotechnical Reports, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9. Any reference to Contract Documents or any documents included in the Contract Documents and/or supplemented for this Project, shall refer to the Contract Documents as amended for this Project. (Warning: Make sure that any Supplementary Conditions do not contradict the provisions of the A201.)

"Construction Documents" means: all Drawings, specifications, 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.

§ 1.2 This Agreement 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 this Agreement 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 Agreement signed by Contractor and the authorized representative of Owner's Board of Trustees. In the event of conflict, terms and conditions contained in the Agreement shall take precedence over terms and conditions contained in the General Conditions and the terms and conditions in the General Conditions shall take precedence over all other terms and conditions contained in the other Contract Documents. If the Request for Proposals and the Proposal are included in the Contract Documents, then the Request for Proposals shall take precedence over the Proposal, unless specifically agreed otherwise herein.

§ 1.3 The Board of Trustees, by majority vote, is the only representative of the Owner, an independent school district, having the power to enter into or amend a contract, to approve changes in the scope of the Work, to approve and execute a Change Order or Construction Change Directive modifying the Contract Sum, or to agree to an extension to the date of Substantial or Final Completion or to terminate a contract. The Owner designates the following as the individual authorized to sign documents on behalf of the Board of Trustees, following appropriate Board action: C. Richard Davis, Jr., President, Board of Trustees, or other Board designee.

§ 1.4 The Board designates the authorized representatives identified in Paragraph 8.3 to act on its behalf in other respects.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:

(Check one of the following boxes.)

- [« »] The date of this Agreement.
- [« »] A date set forth in a notice to proceed issued by the Owner.
- [« X-»] Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

«The commencement date will be the first business day after the Contractor's receipt of the written notice to proceed. The notice to proceed shall not be issued by Architect until the Agreement has been signed by the Contractor, approved by the Owner's Board of Trustees, signed by the Owner's authorized representative, and Owner and Architect have received all required payment and performance bonds and insurance, in compliance with Article 11 of AIA Document A201-2017.»

~~If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.~~

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall diligently prosecute and achieve Substantial Completion of the entire Work:

(Check one of the following boxes and complete the necessary information.)

- [« »] Not later than « » (« ») calendar days from the date of commencement of the Work.
- [« »] By the following date: « »

Final Completion shall be 30 calendar days after the date of Substantial Completion, subject to adjustments of the Contract Time as provided in the Contract Documents.

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be « » (\$ « »), subject to additions and deductions as provided in the Contract Documents.

(Note: Optional Paragraph)

§ 4.1.1 The Contract Sum contains an Owner's Contingency in the amount of \$. This contingency is for the sole use of the Owner to be used for changes in the scope of the Work and for the betterment of the Project.

Owner's authorized representative may approve any expenditure from Owner's Contingency without further Board of Trustees approval. If the Owner's Contingency is not expended or not fully expended, then any unused portion shall belong to the Owner and shall be credited to the Owner in calculating final payment.

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price

§ 4.2.2 [Paragraph Deleted]. ~~Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.~~

~~(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)~~

Item	Price	Conditions for Acceptance
------	-------	---------------------------

§ 4.3 Allowances, if any, included in the Contract Sum:

(Identify each allowance.)

Item	Price

§ 4.4 Unit prices, if any:

(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit (\$0.00)

§ 4.5 Liquidated damages, if any:

(Insert terms and conditions for liquidated damages, if any.)

§ 4.5.1 Substantial Completion. Time is of the essence in all phases of the Work. It is specifically understood and agreed by and between Owner and Contractor that time is of the essence in the Substantial Completion of the Project and Owner shall sustain damages as a result of Contractor's failure, neglect or refusal to achieve said deadlines. Such damages are, and will continue to be, impracticable and extremely difficult to determine. Execution of this Agreement under these specifications shall constitute agreement by Owner and Contractor that the amounts stated below are the minimum value of the costs and damages caused by failure of Contractor to complete the Work within the allotted or agreed extended times of Substantial Completion, that such sums are liquidated damages and shall not be construed as a penalty, and that such sums may be deducted from payments due Contractor if such delay occurs. It is expressly understood that the said sum per day is agreed upon as a fair estimate of the pecuniary damages which will be sustained by the Owner in the event that the Work is not completed within the agreed time, or within the agreed extended time, if any, otherwise provided for herein. Said sum shall be considered as liquidated damages only and in no sense shall be considered a penalty, said damages being caused by, but not limited to, additional compensation for personnel, attorneys fees, architectural fees, engineering fees, program management fees, inspection fees, storage costs, food service costs, transportation costs, utilities costs, costs of temporary facilities, loss of interest on money, and other increased costs, all of which are difficult to exactly ascertain. Failure to complete the Work within the designated or agreed extended dates of Substantial Completion, shall be construed as a breach of this Agreement. It is expressly agreed as a part of the consideration inducing the Owner to execute this Agreement that the Owner may deduct from any Payment made to the Contractor a sum equal to \$1,000 per day for each and every additional calendar day beyond the agreed date of Substantial Completion.

§ 4.5.2. Final Completion. In addition, timely Final Completion is an essential condition of this Agreement. Contractor agrees to achieve Final Completion of the Agreement within 30 calendar days of the designated or agreed extended date of Substantial Completion. It is specifically understood and agreed by and between Owner and Contractor that time is of the essence in the Final Completion of the Project and Owner shall sustain additional

damages as a result of Contractor's failure, neglect or refusal to achieve said deadline. Such damages are, and will continue to be, impracticable and extremely difficult to determine. Execution of this Agreement under these specifications shall constitute agreement by Owner and Contractor that the amounts stated below are the minimum value of the costs and damages caused by failure of Contractor to complete the Work within the allotted or agreed extended times for Final Completion, that such sums are liquidated damages and shall not be construed as a penalty. It is expressly understood that the said sum per day is agreed upon as a fair estimate of the pecuniary damages which will be sustained by the Owner in the event that the Work is not finally completed within the agreed time, or within the agreed extended time, if any, otherwise provided for herein. Said sum shall be considered as liquidated damages only and in no sense shall be considered a penalty, said damages being caused by, but not limited to, additional compensation for the following categories of damages to the Owner: potential hazards to students, staff and visitors, additional architectural, engineering, program management fees (and fees of any other consultants); increased administrative or operational expenses; additional attorney's fees; increased maintenance and custodial costs and additional, utilities, security and clean-up costs, and other increased costs. Failure to complete the Work within the designated or agreed extended dates of Final Completion, shall be construed as a breach of this Agreement. Owner and Contractor agree that should Contractor fail to achieve Final Completion of the Agreement by the deadline, Owner shall continue to be damaged to a greater degree by such delay. Contractor and Owner agree that the amount of liquidated damages for each calendar day Final Completion is delayed beyond the date set for Final Completion shall be the sum of \$1,000 per day. Owner may deduct such liquidated damages from any Payment made to Contractor before or at Final Payment; or, if sufficient funds are not available, then Contractor shall pay Owner, the amounts specified per day for each and every calendar day the breach continues after the deadline for Final Completion of the Work.

§ 4.5.3 Such damages shall be in addition to, and not in lieu of, any other rights or remedies Owner may have against Contractor for failure to timely achieve Final Completion, and damages for failure to achieve Substantial Completion and failure to achieve Final Completion may run concurrently. If the Work is not finally completed by the time stated in the Agreement, or as extended, no payments for Work completed beyond that time shall be made until the Project reaches Final Completion. »

§ 4.6 Other:

(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

<< >>

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

<< >>

~~§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the <> day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the <> day of the <> month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than <> (<>) days after the Architect receives the Application for Payment. The Contractor shall submit monthly Applications for Payment to the Architect on AIA Form G702 for approval. Continuation sheets shall be submitted on AIA Form G703. If the Architect approves the application, then they shall submit a Certificate for Payment to the Owner. The Architect may require any additional information deemed necessary and appropriate to substantiate the Application for Payment. Materials that are verified to be on the jobsite or other approved location for use in the Project may also be incorporated into the Application for Payment. The Architect shall have seven (7) days from date of receipt from the Contractor of an Application for Payment to approve or reject all or any part of the Application for Payment. The Owner shall pay the undisputed amounts certified by the Architect to the Contractor within forty-five (45) days of receipt of the Certificate for Payment from the Architect unless otherwise provided in the Contract Documents. Undisputed~~

amounts unpaid after the date on which payment is due shall bear interest pursuant to Texas Government Code Section 2251.025.

(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum, less any unused Owner's contingency, among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- .1 That portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values;
- .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- .3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified to the extent approved by the Owner in writing, as provided in Article 7.3.9 of AIA Document A201™–2017, General Conditions of the Contract for Construction.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017 or amounts certified by the Architect and disputed by the Owner; and
- .5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner ~~may~~ shall withhold the following amount, as retainage, from the payment otherwise due:

(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

«Five percent (5%) [If the retainage is over 5%, then the retainage shall be deposited in an interest-bearing account and the interest earned on the retainage shall be paid to the Contractor upon completion of the Project, pursuant to Texas Government Code Section 2252.032]»

§ 5.1.7.1.1 ~~[Paragraph Deleted.] The following items are not subject to retainage:~~

~~(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)~~

↔

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:

(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

«NONE.»

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon ~~Substantial-Final~~ Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. ~~The Application for Payment submitted at Substantial Completion shall not include retainage as follows:~~
(Insert any other conditions for release of retainage upon Substantial Completion.)

«»

§ 5.1.8 ~~[Paragraph Deleted.] If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201-2017.~~

§ 5.1.9 Except with the Owner's prior written approval, or as otherwise provided in Section 9.3.2 of the AIA Document A201-2017, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.1.10 If Owner is entitled to deduct liquidated damages, or any other damages or amounts provided in the Contract Documents, including clean-up fees, then Owner shall be entitled to deduct such liquidated damages, amounts and fees at any time.

§ 5.1.11 If Contractor fails or refuses to complete the Work, or has unsettled claims with Owner, any payment to Contractor shall be subject to deduction for such amounts as the Architect if applicable, shall determine as the cost for completing incomplete Work and the value of unsettled claims.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, minus disputed sums, authorized deductions and liquidated damages, shall be made by the Owner to the Contractor ~~whenever~~

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct nonconforming Work as provided in Article 12 of AIA Document A201-2017, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 the Contractor has provided all documents required by Sections 3.5 et seq. and 9.10.2 et seq. of AIA Document A201-2017
- .3 a final Certificate for Payment has been issued by the Architect; and
4. Owner's Board of Trustees has voted to accept the Work and approve the Final Payment.

§ 5.2.2 The Owner's final payment of undisputed sums to the Contractor shall be made no later than 30 days after Owner's Board of Trustees' vote approving Final Payment, ~~the issuance of the Architect's final Certificate for Payment, or as follows:~~

«»

§ 5.3 Interest

Payments due and unpaid under the Contract shall bear interest pursuant to Texas Government Code Section 2251.025, ~~from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.~~
(Insert rate of interest agreed upon, if any.)

«» % «»

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

All disputes relating to this Agreement shall be resolved pursuant to the terms of Article 15 of the AIA Document A201-2007, as amended. The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA

~~Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)~~

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:
(Check the appropriate box.)

Arbitration pursuant to Section 15.4 of AIA Document A201–2017

Litigation in a court of competent jurisdiction

Other (Specify)

« »

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

~~§ 7.1.1 [Paragraph Deleted] If the Contract is terminated for the Owner’s convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:
(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner’s convenience.)~~

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner’s representative:
(Name, address, email address, and other information)

«Conan Mathson
Senior Officer – Design and Construction, or his successor
Birdville Independent School District »
«6125 East Belknap Street »
«Haltom City, Texas 76117 »
«conan.mathson@birdvilleschools.net
Office: (817) 547-5851 »

§ 8.3 The Contractor’s representative:
(Name, address, email address, and other information)

« »
« »
« »
« »
« »
« »

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior written notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

<< >>

§ 8.7 Other provisions:

§ 8.7.1 The Agreement 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 shall be in Tarrant County, Texas, or, if no county is specified, then in the county in which the Owner's main administrative office is located.

§ 8.7.2 As a material consideration of the making of this Agreement, the modifications to this Agreement shall not be construed against the maker of said modifications.

§ 8.7.3 Notwithstanding anything to the contrary in this Agreement, or in any document forming a part hereof, there shall be no mandatory arbitration for any dispute arising hereunder.

§ 8.7.4 Section 1.5 of AIA Document A201-2017 shall govern Contractor's use of the Construction Documents.

§ 8.7.5 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. 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.

§ 8.7.6 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.

§ 8.7.7 Contractor shall require all construction workers, whether Contractor's own forces or the forces of Contractor's subcontractors, 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.

§ 8.7.8 Contractor shall follow, and shall require all employees, agents or subcontractors to follow, applicable ordinances of the municipality in which the Project is located. In addition, if not covered by the municipality's tree ordinance, Contractor shall barricade and protect all trees on the Project.

§ 8.7.9 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 or connecting or adjacent property of Owner.

§ 8.7.10 The Contractor may not assign its responsibilities, duties, obligations and rights under this Agreement, without the express written consent of the Owner. This does not prevent Contractor from engaging subcontractors to perform various phases of the Project, but Contractor shall be fully responsible to Owner for the work, actions and omissions of all such subcontractors

§ 8.7.11 This Agreement, in its entirety, shall be binding upon all the parties hereto, their respective successors, heirs, executors, administrators or assigns.

§ 8.7.12 Execution of this Agreement shall constitute approval and acceptance of all terms, covenants and conditions as modified and contained in the Contract Documents.

§ 8.7.13 This Agreement is subject to all applicable federal and state laws, rules, and regulations. Invalidity of any portion of this Agreement under the laws of the State of Texas or of the United States shall not affect the validity of the remainder of this Agreement.

§ 8.7.14 By signing this Agreement, the undersigned certifies as follows: "Under Section 231.006, Texas Family Code, the vendor or applicant certifies that the individual or business entity named in the 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."

§ 8.7.15 Unless otherwise noted, terms in this Agreement shall have the same meaning as those in the edition of AIA Document A201-2007, General Conditions of the Contract for Construction, as amended for the Project.

§ 8.7.16 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 Section 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; and
- .3 Any geotechnical information obtained by Owner for use by the Contractor in the design of the trench safety system.
- .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 used. Said cost shall be included within the Contract Sum.

§ 8.7.17 No delay or omission by Owner in exercising any right or power accruing upon the noncompliance or failure of performance by Contractor of any of the provisions of this Agreement shall impair any such right or power or be construed to be a waiver thereof. A waiver by Owner of any of the covenants, conditions or agreements hereof to be performed by Contractor shall not be construed to be a waiver of any subsequent breach thereof or of any other covenant, condition or agreement herein contained.

§8.7.18 Contractor stipulates that Owner is a political subdivision of the State of the Texas, and, as such, enjoys immunities from suit and liability as provided by the constitution and laws of the State of Texas. By entering into this Agreement, 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.

§ 8.7.19 By executing this Agreement, Contractor verifies that it does not boycott Israel, and it will not boycott Israel during the terms of this Contract.

§ 8.7.20 Contractor verifies and affirms that it is not a foreign terrorist organization as identified on the list prepared and maintained by the Texas Comptroller of Public Accounts. If Contractor has misrepresented its inclusion on the Comptroller's list, such omission or misrepresentation will void this Contract »

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds
- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction
- ~~.4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:
(Insert the date of the E203–2013 incorporated into this Agreement.)~~

« »

- .5 Drawings

Number	Title	Date

- .6 Specifications

Section	Title	Date	Pages

- .7 Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

- .8 Other Exhibits:

(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[] AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

« »

[] The Sustainability Plan:

Title	Date	Pages

[] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

- .9 Other documents, if any, listed below:

(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™–2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or

proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

«RFP/CONTRACTOR PROPOSAL.»

This Agreement entered into as of the day and year first written above.

OWNER (Signature)

« »
«President, Board of Trustees
Birdville Independent School District »

(Printed name and title)

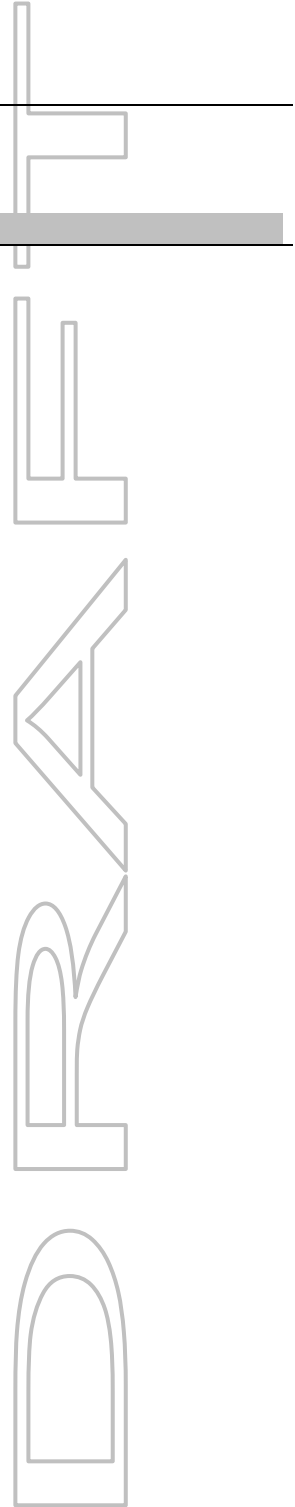
CONTRACTOR (Signature)

« »« »

(Printed name and title)

ATTEST:

Secretary, Owner's Board of Trustees
Birdville Independent School District



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 « »
(In words, indicate day, month and year.)

for the following **PROJECT**:
(Name and location or address)

« »
« »

THE OWNER:
(Name, legal status and address)

«Birdville Independent School District »
«6125 East Belknap Street »
«Haltom City, Texas 76117 »

THE CONTRACTOR:
(Name, legal status and address)

« »« »
« »

TABLE OF ARTICLES

- A.1 GENERAL
- A.2 OWNER'S INSURANCE
- A.3 CONTRACTOR'S INSURANCE AND BONDS
- A.4 SPECIAL TERMS AND CONDITIONS

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 and, upon the Contractor's request, provide a copy of the property insurance policy or policies required by Section A.2.3. 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.

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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§ 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. Unless this obligation is placed on the Contractor pursuant to Section A.3.3.2.1, the Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a 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. The Owner'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 Substantial Completion and thereafter as provided in Section A.2.3.1.3, 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.~~

~~§ A.2.3.1.1 [NOT USED] Causes of Loss. The insurance required by this Section A.2.3.1 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.)~~

Causes of Loss	Sub Limit
---------------------------	----------------------

~~§ A.2.3.1.2 [NOT USED] Specific Required Coverages. The insurance required by this Section A.2.3.1 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.)~~

Coverage	Sub Limit
---------------------	----------------------

~~§ A.2.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section A.2.3.1 or, if necessary, replace the insurance policy required under Section A.2.3.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.~~

~~§ A.2.3.1.4 Deductibles and Self-Insured Retentions. If the insurance required by this Section A.2.3.1.3 is subject to deductibles or self-insured retentions, the Owner shall be responsible for all loss not covered because of such deductibles or retentions.~~

~~§ 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.2.3.1.3 have consented in writing to the continuance of 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 shall 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, ~~“all risks”~~ 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.3.2.3.21, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties. *(NOTE: Although this paragraph has been revised to make the District’s purchase of property insurance optional, Districts are strongly advised to purchase such insurance if the District does not already have such insurance.)*

§ A.2.4 Optional Extended Property Insurance.

~~[NOT USED] The Owner shall purchase and maintain the insurance selected and described 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. 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 **Loss of Use, Business Interruption, and Delay in Completion Insurance**, to reimburse the Owner for loss of use of the Owner’s property, or the inability to conduct normal operations due to a covered cause of loss.~~

~~↔~~

~~[] § A.2.4.2 **Ordinance or Law Insurance**, for the reasonable and necessary costs to satisfy the minimum requirements of the enforcement of any law or ordinance regulating the demolition, construction, repair, replacement or use of the Project.~~

~~↔~~

~~[] § A.2.4.3 **Expediting Cost Insurance**, for the reasonable and necessary costs for the temporary repair of damage to insured property, and to expedite the permanent repair or replacement of the damaged property.~~

~~↔~~

~~[] § A.2.4.4 **Extra Expense Insurance**, to provide reimbursement of the reasonable and necessary excess costs incurred during the period of restoration or repair of the damaged property that are over and above the total costs that would normally have been incurred during the same period of time had no loss or damage occurred.~~

~~↔~~

~~[] § A.2.4.5 **Civil Authority Insurance**, for losses or costs arising from an order of a civil authority prohibiting access to the Project, provided such order is the direct result of physical damage covered under the required property insurance.~~

~~↔~~

~~[] § A.2.4.6 **Ingress/Egress Insurance**, for loss due to the necessary interruption of the insured’s business due to physical prevention of ingress to, or egress from, the Project as a direct result of physical damage.~~

~~↔~~

~~[] § A.2.4.7 **Soft Costs Insurance**, to reimburse the Owner for costs due to the delay of completion of the Work, arising out of physical loss or damage covered by the required property insurance: including construction loan fees; leasing and marketing expenses; additional fees, including those of architects, engineers, consultants, attorneys and accountants, needed for the completion of the construction, repairs, or reconstruction; and carrying costs such as property taxes, building permits, additional interest on loans, realty taxes, and insurance premiums over and above normal expenses.~~

~~↔~~

§ A.2.5 Other Optional Insurance.

The Owner ~~may~~shall 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 the Contractor's Commercial General Liability and excess or umbrella liability policy or policies 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 by 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 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.

§ 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 may be 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, unless a different duration is stated below:

(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 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.)

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§ 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 » (\$ «1,000,000.00 ») each occurrence, «One Million Dollars and no/100 » (\$ «1,000,000.00 ») general aggregate, and «Two Million Dollars and no/100 » (\$ «2,000,000.00 ») 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 \$1,000,000 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 \$2,000,000.00;
- .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 subcontractors, and Owner;

; and

- .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 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.3.2.3 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)	\$1,000,000
.2	Bodily Injury (per accident)	\$1,000,000
.3	Property Damage	\$1,000,000

§ 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, ~~provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and i~~n 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	\$5,000,000	each occurrence
.2	\$5,000,000	aggregate
.3	Aggregate Per Project Endorsement	

§ A.3.2.5 Workers' Compensation ~~at statutory limits.~~

.1	State:	Statutory Benefits
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<u>.2</u>	<u>Employer's Liability:</u>	<u>\$1,000,000</u>	<u>per accident</u>
		<u>\$1,000,000</u>	<u>disease, policy limit</u>
		<u>\$1,000,000</u>	<u>disease, each employee</u>

§ 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 workers' 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 includes 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-operators, 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 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.

§ 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 statutory 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 whom 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 personal delivery, within ten 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 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 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 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 for 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 «One Million Dollars and no/100 » (\$ «1,000,000.00») each accident, «One Million Dollars and no/100 » (\$ «1,000,000.00 ») each employee, and «One Million Dollars and no/100 » (\$ «1,000,000.00 ») policy limit.

§ A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks

§ 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» (\$ «1,000,000.00») per claim and «Two Million Dollars and no/100» (\$ «2,000,000.00») in the aggregate.

§ 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 «» (\$ «») per claim and «» (\$ «») in the aggregate.

§ 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 «» (\$ «») per claim and «» (\$ «») in the aggregate.

§ A.3.2.11 Insurance for maritime liability risks associated with the operation of a vessel, if the Work requires such activities, with policy limits of not less than «» (\$ «») per claim and «» (\$ «») in the aggregate.

§ 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 «» (\$ «») per claim and «» (\$ «») 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.)

- [] § A.3.3.2.1 ~~Builder's Risk~~ Property insurance ~~of the same type and scope satisfying the requirements identified in Section A.2.3,~~ 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 comply with all obligations of the Owner under Section A.2.3 except to the extent provided below.~~ The Contractor shall disclose to the Owner the amount of any deductible, and the ~~Owner~~ Contractor shall be responsible for losses within the deductible. ~~Upon request, t~~ 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:

(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 a 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 Substantial Completion; and thereafter, as provided in Section A.2.3.1.3, 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.

.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 Coverage Sub-Limit. Unless the parties agree otherwise, upon Substantial Completion, the Contractor shall continue the insurance required by Section A.2.3.1 or, if necessary, replace the insurance policy required under Section A.2.3.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.

.5 Adjustment of Loss. 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, then replacement of damaged property shall be performed by the Contractor with the insurance proceeds upon issuance of a Notice to Proceed from the Owner.

.6 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.2.3.1 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.

.7 Insurance for Existing Structures If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Contractor shall 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, “all-risks” 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.2.3.1, notwithstanding the undertaking of the Work. The Contractor shall be responsible for all co-insurance penalties.

.8 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.

.9 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.

.10 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.

.11 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 **Railroad Protective Liability Insurance**, with policy limits of not less than « » (\$ « ») per claim and « » (\$ « ») in the aggregate, for Work within fifty (50) feet of railroad property.

[« »] § A.3.3.2.3 **Asbestos Abatement Liability Insurance**, with policy limits of not less than « » (\$ « ») per claim and « » (\$ « ») in the aggregate, for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos-containing materials.

[« »] § 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 Property insurance on an “all-risks” completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.

[« »] § 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 11.1.2.31, as follows:

(Specify type and penal sum of bonds.)

Type	Penal Sum (\$0.00)
Payment Bond	
Performance Bond	

The form of Payment and Performance Bonds shall be subject to the requirements of Texas law AIA Document A312™, Payment Bond and Performance Bond, or contain provisions identical to AIA Document A312™, 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 (Signature)

« »

«President, Board of Trustees »

(Printed name and title)

Birdville Independent School

CONTRACTOR (Signature)

« »« »

(Printed name and title)

DOCUMENT 00 61 13.13

PERFORMANCE BOND FORM

Bond No.: _____

(Penalty of this bond must be 100% of contract amount)

KNOW ALL MEN BY THESE PRESENTS, that: _____
(hereinafter called the Principal), as principal, and
a corporation organized and existing under the laws of the State of _____ authorized and admitted to
do business in the State of Texas and licensed by the State of Texas to execute bonds as Surety (hereinafter called the Surety), as
Surety, are held and firmly bound unto

(hereinafter called the Obligee) in the amount of _____

Dollars(\$ _____) 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 this _____ day of
_____, _____.

**CONTROLLED ENTRY AT 15 CAMPUSES
BIRDVILLE I.S.D.
NORTH RICHLAND HILLS, HALTOM CITY, HURST AND WATAUGA, TEXAS**

which contract is hereby referred to and made a part hereof as fully and the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall faithfully perform
the work in accordance with the plans, specifications and contract documents, then this obligation shall be void; otherwise to
remain in full force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Chapter 22.53 of the Texas Government Code
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.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this Instrument this _____ day of
_____, _____.

Principal (Seal)

Surety Address By: _____

Surety (Seal)

Surety Telephone Number By: _____
Attorney-in-Fact

Controlled Entry at 15 Campuses
Birdville I.S.D.
North Richland Hills, Haltom City, Hurst and Watauga, Texas

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DOCUMENT 00 61 13.16

PAYMENT BOND FORM

Bond No.: _____

(Penalty of this bond must be 100% of contract amount)

KNOW ALL MEN BY THESE PRESENTS, that: _____
(hereinafter called the Principal), as principal,
a corporation organized and existing under the laws of the State of _____ authorized and admitted to
do business in the State of Texas and licensed by the State of Texas to execute bonds as Surety (hereinafter called the Surety), as
Surety, are held and firmly bound unto

_____ (hereinafter called the Obligee) in the amount of _____

Dollars(\$ _____) 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 this _____ day of _____, _____.

**CONTROLLED ENTRY AT 15 CAMPUSES
BIRDVILLE I.S.D.
NORTH RICHLAND HILLS, HALTOM CITY, HURST AND WATAUGA, TEXAS**

which contract is hereby referred to and made a part hereof as fully and the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall pay all claimants
supplying labor and material to him or a Subcontractor in the prosecution of the work provided for in said contract, then this
obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Chapter 22.53 of the Texas Government Code
and all liabilities on this bond to all such claimants shall be determined in accordance with the provisions of said Chapter to the
same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this Instrument this _____ day of _____, _____.

Witness: _____ (Seal)
Principal

_____ By: _____

Witness: _____ (Seal)
Surety

_____ By: _____
Attorney-in-Fact

_____ Surety Address

_____ Surety Telephone Number

Controlled Entry at 15 Campuses
Birdville I.S.D.
North Richland Hills, Haltom City, Hurst and Watauga, Texas

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Controlled Entry at 15 Campuses
Birdville I.S.D.
North Richland Hills, Haltom City, Hurst and Watauga, Texas

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DOCUMENT 00 65 00
RELEASE OF LIEN DOCUMENTS

APPENDIX INDEX:

1. **CONDITIONAL WAIVER FOR PROGRESS PAYMENTS**
2. **UNCONDITIONAL WAIVER FOR PROGRESS PAYMENTS**
3. **CONDITIONAL WAIVER FOR FINAL PAYMENT**
4. **UNCONDITIONAL WAIVER FOR FINAL PAYMENT**

[Note: the attached forms are duplicated *verbatim* (without editing) from HB 1456.]

FORM 1: CONDITIONAL WAIVER FOR PROGRESS PAYMENTS

* * * * *

CONDITIONAL WAIVER AND RELEASE ON PROGRESS PAYMENT

Project: _____

Job No.: _____

On receipt by the signer of this document of a check from _____

(maker of check) in the sum of \$ _____
payable to _____

(payee or payees of check) and when the check has been properly endorsed and has been paid by the bank on which it is drawn, this document becomes effective to release any mechanic's lien right, any right arising from a payment bond that complies with a state or federal statute, any common law payment bond right, any claim for payment, and any rights under any similar ordinance, rule, or statute related to claim or payment rights for persons in the signer's position that the signer has on the property of _____

(owner) located at (location) to the following extent: _____

_____ (job description).

This release covers a progress payment for all labor, services, equipment, or materials furnished to the property or to _____
(person with whom signer contracted) as indicated in the attached statement(s) or progress payment request(s), except for unpaid retention, pending modifications and changes, or other items furnished.

Before any recipient of this document relies on this document, the recipient should verify evidence of payment to the signer.

The signer warrants that the signer has already paid or will use the funds received from this progress payment to promptly pay in full all of the signer's laborers, subcontractors, materialmen, and suppliers for all work, materials, equipment, or services provided for or to the above referenced project in regard to the attached statement(s) or progress payment request(s).

Date: _____

_____ (Company name)

By _____ (Signature)

_____ (Title)

FORM 2: UNCONDITIONAL WAIVER FOR PROGRESS PAYMENTS

* * * * *

NOTICE: THIS DOCUMENT WAIVES RIGHTS UNCONDITIONALLY AND STATES THAT YOU HAVE BEEN PAID FOR GIVING UP THOSE RIGHTS. IT IS PROHIBITED FOR A PERSON TO REQUIRE YOU TO SIGN THIS DOCUMENT IF YOU HAVE NOT BEEN PAID THE PAYMENT AMOUNT SET FORTH BELOW. IF YOU HAVE NOT BEEN PAID, USE A CONDITIONAL RELEASE FORM.

UNCONDITIONAL WAIVER AND RELEASE ON PROGRESS PAYMENT

Project: _____

Job No.: _____

The signer of this document has been paid and has received a progress payment in the sum of \$ _____ for all labor, services, equipment, or materials furnished to the property or to _____ (person with whom signer contracted) on the property of _____ (owner) located at _____ (location) to the following extent: _____

_____ (job description). The signer therefore waives and releases any mechanic's lien right, any right arising from a payment bond that complies with a state or federal statute, any common law payment bond right, any claim for payment, and any rights under any similar ordinance, rule, or statute related to claim or payment rights for persons in the signer's position that the signer has on the above referenced project to the following extent: _____

This release covers a progress payment for all labor, services, equipment, or materials furnished to the property or to _____ (person with whom signer contracted) as indicated in the attached statement(s) or progress payment request(s), except for unpaid retention, pending modifications and changes, or other items furnished.

The signer warrants that the signer has already paid or will use the funds received from this progress payment to promptly pay in **full** all of the signer's laborers, subcontractors, materialmen, and suppliers for all work, materials, equipment, or services provided for or to the above referenced project in regard to the attached statement(s) or progress payment request(s).

Date: _____

_____ (Company name)

By _____ (Signature)

_____ (Title)

FORM 3: CONDITIONAL WAIVER FOR FINAL PAYMENT

* * * * *

CONDITIONAL WAIVER AND RELEASE ON FINAL PAYMENT

Project:

Job No.:

On receipt by the signer of this document of a check from _____

_____ (maker of check) in the sum of

\$ _____ payable to

_____ (payee or payees of check) and when the check has been properly endorsed and has been paid by the bank on which it is drawn, this document becomes effective to release any mechanic's lien right, any right arising from a payment bond that complies with a state or federal statute, any common law payment bond right, any claim for payment, and any rights under any similar ordinance, rule, or statute related to claim or payment rights for persons in the signer's position that the signer has on the property of _____

_____ (owner) located at _____

_____ (location) to the following extent: _____

_____ (job description).

This release covers the final payment to the signer for all labor, services, equipment, or materials furnished to the property or to _____ (person with whom signer contracted).

Before any recipient of this document relies on this document, the recipient should verify evidence of payment to the signer.

The signer warrants that the signer has already paid or will use the funds received from this final payment to promptly pay in full all of the signer's laborers, subcontractors, materialmen, and suppliers for all work, materials, equipment, or services provided for or to the above referenced project up to the date of this waiver and release.

Date: _____

_____ (Company name)

By _____ (Signature)

_____ (Title)

FORM 4: UNCONDITIONAL WAIVER FOR FINAL PAYMENT

* * * * *

NOTICE: THIS DOCUMENT WAIVES RIGHTS UNCONDITIONALLY AND STATES THAT YOU HAVE BEEN PAID FOR GIVING UP THOSE RIGHTS. IT IS PROHIBITED FOR A PERSON TO REQUIRE YOU TO SIGN THIS DOCUMENT IF YOU HAVE NOT BEEN PAID THE PAYMENT AMOUNT SET FORTH BELOW. IF YOU HAVE NOT BEEN PAID, USE A CONDITIONAL RELEASE FORM.

UNCONDITIONAL WAIVER AND RELEASE ON FINAL PAYMENT

Project: _____

Job No.: _____

The signer of this document has been paid in full for all labor, services, equipment, or materials furnished to the property or to _____

_____ (person with whom signer contracted) on the property of _____

_____ (owner) located at _____

_____ (location) to the following extent _____

_____ (job description). The signer therefore waives and releases any mechanic's lien right, any right arising from a payment bond that complies with a state or federal statute, any common law payment bond right, any claim for payment, and any rights under any similar ordinance, rule, or statute related to claim or payment rights for persons in the signer's position.

The signer warrants that the signer has already paid or will use the funds received from this final payment to promptly pay in full all of the signer's laborers, subcontractors, materialmen, and suppliers for all work, materials, equipment, or services provided for or to the above referenced project up to the date of this waiver and release.

Date: _____

_____ (Company name)

By _____ (Signature)

_____ (Title)

Controlled Entry at 15 Campuses
Birdville I.S.D.
North Richland Hills, Haltom City, Hurst and Watauga, Texas

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DRAFT AIA® Document A201™ – 2017

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

« »

THE OWNER:

(Name, legal status and address)

«[Birdville Independent School District](#) »

«[6125 East Belknap Street](#)
[Haltom City, Texas 76117](#) »

THE CONTRACTOR:

(Name, legal status and address)

« »« »

THE ARCHITECT:

(Name, legal status and address)

« »« »

TABLE OF ARTICLES

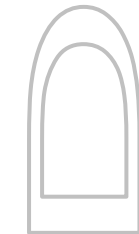
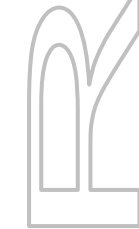
1	GENERAL PROVISIONS
2	OWNER
3	CONTRACTOR
4	ARCHITECT
5	SUBCONTRACTORS
6	CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
7	CHANGES IN THE WORK
8	TIME
9	PAYMENTS AND COMPLETION
10	PROTECTION OF PERSONS AND PROPERTY
11	INSURANCE AND BONDS
12	UNCOVERING AND CORRECTION OF WORK
13	MISCELLANEOUS PROVISIONS

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.

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™, Guide for Supplementary Conditions.



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14 TERMINATION OR SUSPENSION OF THE CONTRACT

15 CLAIMS AND DISPUTES



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, 2.3.3.2.4, 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 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 §1.1.3 below) including Drawings, Specifications, and Addenda issued prior to execution of the Contract, other documents listed in the Agreement, 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, 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. Any reference to Contract Documents herein shall include the Construction Documents, and any other documents included in the Contract Documents, as amended and/or supplemented for this Project.~~

§ 1.1.1.1 The Agreement, 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 Agreement 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 Agreement signed by Contractor and the authorized representative of Owner's Board of Trustees. In the event of conflict, terms and conditions contained in the Agreement, shall take precedence over terms and conditions contained in the General Conditions, and the terms and conditions in the General Conditions, shall take precedence over all other terms and conditions contained in the other Contract Documents. If the Request for Proposals and the Proposal are included in the Contract Documents, then the Request for Proposals shall take precedence over the Proposal, unless specifically agreed otherwise herein.

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction. 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 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 construed 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, (3) 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.~~

§ 1.1.2.1 To be effective, all Contract Documents requiring signatures must be signed first by the Contractor and then by the Owner's authorized representative, after approval by Owner's Board of Trustees. If an approved Contract 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 of Contractor's responsibilities as to all labor, parts, supplies, skill, supervision, transportation services, storage requirements, and other facilities and things necessary, proper or incidental to the carrying out and completion of the terms of the Contract Documents and the Construction Documents and all other items of cost or value needed to produce, construct and fully complete the public Work identified by the Contract Documents and the Construction 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 Section 61.1036 and the standards set forth in 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 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 of Service~~ Construction Documents

~~Instruments of Service~~ Construction Documents ~~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. ~~Instruments of Service~~ Construction Documents may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Initial Decision Maker

~~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 instruments issued 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 Agreement 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 (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.

§ 1.1.12 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.

§ 1.1.13 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 document 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.

§ 1.1.14 Bids or Bidding The terms "Bids" or "Bidding" shall include any kind of competitive purchasing under Texas Government Code Chapter 2269.

§ 1.1.15 Miscellaneous Other Words

§ 1.1.15.1 Business Day

The term "business day" is a day the 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.

§ 1.1.15.2 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.

§ 1.1.15.3 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.

§ 1.1.15.4 Work Day

Work days are all calendar days except Holidays.

§ 1.1.15.5 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.

1.1.16 Contract Sum

"Contract Sum" shall have the same meaning as in Section 5.1 of the Agreement (A133-2009), for the Project when the Project is a Construction Manager at Risk Project, and the same meaning as in Article 4 of the Agreement (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.

§ 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 party 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 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. Certain specified 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 functioning 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 equality of equipment and materials that deviate from any of the indicated and specified requirements.

§ 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 Agreement by the last party to execute said Agreement 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 Agreement and until Final Completion, pursuant to the terms of the Agreement between Owner and Architect. Requirements of public authorities apply as minimum requirements only and do not supersede more stringent specified requirements.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, 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~~ Construction Documents

~~§ 1.5.1 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. All ownership rights, whether common law, statutory, or other reserved rights, including copyright ownership of the Construction Documents, are controlled by the Agreement between the Owner and the Architect. 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 Instruments of Service Construction Documents provided to them, subject to any protocols established pursuant to Sections 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 Instruments of Service Construction Documents. 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.~~

§ 1.6 Notice ~~Transmission of Data in Digital Form~~

~~If the parties intend to transmit Construction Documents or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents~~

~~§ 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

~~The parties shall agree upon protocols governing the transmission 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. If the parties intend to transmit Construction Documents or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents~~

§ 1.8 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 identified in the Contract Documents. person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner 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. 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 A-133 Exhibit A; approve changes in the scope of 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 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 representative shall be the Superintendent of Schools, who may delegate responsibilities as appropriate. Owner's Board of Trustees hereby delegates to the Superintendent of Schools or designee the authority to approve changes to the Work where such changes are within the Owner's contingency or the Contractor's contingency, and which do not exceed \$25,000.00, or will not increase the dates for Substantial or Final Completion by more than ten (10) days. Any such change shall be confirmed in writing between the Contractor and Owner's Superintendent or designee, and notice of such approved changes shall be given to the Board at its next regular meeting. 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.~~

~~§ 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 or 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 third 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 relationships 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 Agreement 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, 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. 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. 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 the Contract Documents.~~

~~§ 2.2.2 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 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 in the Agreement 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 a new successor Architect has been employed by Owner.

§ 2.3.4 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. Other than the metes and bounds noted in the survey, if any, Owner does not guarantee or warrant the accuracy of surveys provided, including the locations of utility lines, cables, pipes or pipelines, or the presence or absence of easements.~~

§ 2.3.5 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 at least one copy of the ~~Contract Construction~~ 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 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.

§ 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 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.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement 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 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 obligations 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 Contractor's failure to visit the site, or for any additional Work caused by the Contractor's fault, by improper construction, or by Contractor's failure to visit the site or to carefully study and compare the Contract Documents 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 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 ~~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.

§ 3.2.4 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, 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, 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 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, omission or difference and failed to report it to the Architect. Contractor shall not be entitled to additional compensation for 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 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 the 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 evaluate 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.

§ 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. 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 any controlled substance, 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 Agreement 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 subcontractors, 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 or connecting or adjacent 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.

§ 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-sub-contractors.

§ 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 Section 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; and
- .3 Any geotechnical information obtained by Owner for use by the Contractor in the design of the trench safety system.
- .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 used.

§ 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 obligation 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 Occupational 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 Agreement or inferable from this Agreement 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 results the Owner desires to obtain from the Work, and shall in no way affect Contractor's independent contractor status.

§ 3.3.8 Pursuant to Texas Labor Code Sec. 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 Agreement. Any Contractor or subcontractor who fails to properly classify such an individual may be subject to the penalties of Texas Labor Code Sec. 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. 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 Section 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 the 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 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 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 substitutions 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 Owner's request. Contractor shall place similar language in its subcontract agreements, requiring its 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 requirements 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 worker 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 Section 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 Owner may terminate this Agreement 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 Contractor shall obtain all criminal history information required by Texas Education Code Chapter 22 regarding its "covered employees", as defined below. If Contractor is required by Chapter 22 to obtain the information from the Fingerprint-based Applicant Clearinghouse of Texas, then Contractor will also subscribe to that person's criminal history record information. Before beginning any Work on the Project, Contractor will provide written certification to the District that Contractor has complied with the statutory requirements as of that date. Upon request by Owner, Contractor will provide, in writing: updated certifications and the names and any other requested information regarding covered employees, so that the Owner may obtain criminal history record information on the covered employees. Contractor shall assume all expenses associated with obtaining criminal history record information.

§ 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 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 Section 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 Offenses 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.

§3.4.6.4 Subcontractors or any subcontractor entity, as defined by Texas Education Code §22.08341(a)(3), shall be required by the terms of their contract with Contractor or any other contracting entity (as defined in Texas Education Code §22.08341(a)(1)), and by Texas law, to obtain the required criminal history record information on their employees, agents, or applicants, to give required certifications to Owner and the contracting entities, and to obtain required certifications from the subcontracting entity's subcontractors.

§3.4.6.5 On request of Owner, Contractor shall provide all necessary identifying information to allow Owner to obtain criminal history record information for covered employees of the Contractor and all subcontractors. Contractor shall update this list on Owner's request.

§ 3.4.7 OWNER'S ADDITIONAL REQUIREMENTS RELATED TO CRIMINAL HISTORIES

In addition, 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."

§ 3.4.8 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 Agreement. 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 Section 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, then the parties shall use the wage rate determined by the US Department of Labor in accordance with the Davis-Bacon Act, 40 USC Section 276a, which can be accessed on the internet at www.gpo.gov/davisbacon/.

§ 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. 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 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 Section 61.1036.

§ 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 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.

§ 3.5.4 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 in the name of the owner, or assign to the Owner at Final Completion of the Work, such assignment to be effective no later than Final Completion, any and all material, equipment, fixtures and furniture (if supplied or installed by Contractor or its subcontractors), 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 manufacturers' warranties. All forms will be required to be submitted prior to Final Payment.

§ 3.5.6 The warranties of Contractor provided in Subparagraphs 3.5.1, 3.5.2, and 3.5.3 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 for 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 should 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 Contractor; 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; and
- .7 Separate each warranty with index tab sheets keyed to the Table of Contents listing.
- .8 Deliver warranties and bonds in the form described above, to the Architect who will review same prior to submission to the Owner.

§ 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; 3.287. For the purpose of establishing exemption, 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.~~

§ 3.7 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 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.~~

~~§ 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 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 knowing when Contractor knows 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 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 (3) business¹⁴ 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, and 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 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, then payment for temporary and/or permanent utility services shall be the responsibility of the Contractor until Substantial Completion.

§ 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, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection, 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, 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 , 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.

§ 3.8.4 When performing Work under allowances, Contractor shall solicit and receive not less than three 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 at all times 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 communications 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 Subcontractors, Sub-Subcontractors 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 shall 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. Contractor's superintendent shall be present full-time on the site as soon as possible after commencement of the Work, and shall remain 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.~~

§ 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 from 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 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.

§ 3.10.2 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 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. Progress of the work shall be reported at said meetings 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.

§ 3.11 Documents and Samples at the Site

The Contractor shall maintain and make available at all times, at the Project site, the Contract Construction 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 submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 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. 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 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 of 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 forms as required of the Architect on 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 additional sets for the Architect, one additional set for the Owner and one 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 high quality reproducible transparency and one opaque print of the shop drawing for the Architect, plus one 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 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.

§ 3.12.14 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.

§ 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 promptly 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 subcontractors 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 public areas 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 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 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 carpeted 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 systems if units were 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 and Architect and their designated representatives with access to the Work in preparation and progress wherever located. 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, SHALL WAIVE AND RELEASE CLAIMS AGAINST THE OWNER AND ARCHITECT, AND SHALL INDEMNIFY AND HOLD HARMLESS THE OWNER AND ARCHITECT FROM LOSS ON ACCOUNT THEREOF, PROVIDED, HOWEVER, CONTRACTOR 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 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 a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Owner and Architect in writing. ~~The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for 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. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.~~

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, 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 (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, 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 indemnified hereunder. 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. TO THE FULLEST EXTENT PERMITTED BY LAW, THE CONTRACTOR SHALL WAIVE AND RELEASE CLAIMS AGAINST AND SHALL INDEMNIFY AND HOLD HARMLESS THE OWNER, ARCHITECT, OWNER'S TRUSTEES, ARCHITECT'S CONSULTANTS, OWNER'S CONSULTANTS 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 WILLFUL OR NEGLIGENT ACTS OR OMISSIONS OF THE CONTRACTOR, A SUB-CONTRACTOR, 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 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 RENDERING 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 EXPENSE THAT ARISES 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.

§ 4.1.2 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner. ~~Contractor, and Architect. Consent shall not be unreasonably withheld.~~

§ 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 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 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 will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, 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 Contract Documents. 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 will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents. Architect 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 other intervals appropriate to the stage of construction, to inspect the progress, quantity and quality of the work completed, to reject any observed nonconforming Work, and to determine if the Work is being performed in a manner indicating that the Work, when 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 the 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 observations 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 observations 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 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 actions taken or recommended. The Architect, however, shall not have control over or responsibility for the Contractor's construction means, methods, techniques, sequences, procedures, or safety programs, but this does not relieve Architect of Architect's responsibilities under this Agreement. Any services by Contractor made necessary by Contractor's construction defect or nonconforming Work shall be performed at no additional cost to Owner.

~~§ 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

~~The Owner and Contractor shall 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. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, 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 the Contractor and Subcontractors. 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 authority to require will recommend to Owner additional inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3 the provisions 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 inspections 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 such 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 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 prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4. The Architect 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 may authorize minor changes in the Work not involving an 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 shall review properly prepared, timely requests by the Contractor for changes 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 to make a reasonable determination 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 Contract 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 systems such as: Heating, Ventilation and Air Conditioning ("HVAC"); roof; foundation; outward appearance; color schemes; floor plans; building materials; drainage or mechanical equipment without Owner's prior written consent.~~

~~§ 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; 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 issue a final Certificate for Payment pursuant to Section 9.10.

~~§ 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.

~~§ 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.

~~§ 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~~Owner's decisions on matters relating to aesthetic effect ~~will~~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 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 ~~may~~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 Architect to provide notice within the 14-day period 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 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 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. ~~If the proposed but rejected~~When the parties agree on a proposed substitute Subcontractor ~~was reasonably capable of performing the Work, then~~ the Contract Sum and Contract Time ~~shall~~may 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 substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 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.

§ 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, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. 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 insure 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 a 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 or convenience 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 sSuch assignment shall, if the Work has been suspended for more than 30 days, the Subcontractor's compensation be equitably adjusted for increases in cost resulting from the suspension. 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.

§ 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 assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract. Owner shall only be 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.

§ 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.

§ 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.

§ 6.1.3 The ~~Owner Contractor~~ shall ~~provide for coordination of~~coordinate 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 ~~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 Contractor's ~~mutual~~ 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. 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 site access and introduction and storage or staging 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 is required to provide additional services as provided in the Agreement between the Owner 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 the Owner's Agreement 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.

§ 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 the 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 detail, 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 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 Architect-Owner will allocate the cost among those responsible.

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 or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents. 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.

§ 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.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents or Construction 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. 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 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.

§ 7.1.6 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.

§ 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.

§ 7.3 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 If the Construction Change Directive provides for an adjustment to the Contract Sum or Guaranteed Maximum Price, 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;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon (additional mark-ups for overhead, profit, and fees will not be allowed);

- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee, subject to the limitations of subparagraph 7.1.4; or
- .4 As provided in Section 7.3.4, subject to the limitations of subparagraph 7.1.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum or Guaranteed Maximum Price, then Architect shall determine the adjustment on the basis of the amount by which the Contractor's direct costs have actually been increased over the direct cost of performing the Work without the Change in the Work. Direct costs shall be limited to the following: 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 Actual Costs of labor, including applicable payroll taxes, ~~fringe benefits required by agreement or custom, and workers' compensation insurance, and other employee costs approved by the Architect;~~
- .2 Actual Costs of materials, supplies, and equipment, including cost of transportation, used in performing the Change in the Work whether incorporated or consumed;
- .3 Actual Rental costs of machinery and equipment rented from third parties, exclusive of hand tools; ~~whether rented from the Contractor or others;~~
- .4 Actual Costs of premiums for all bonds and insurance, and 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.~~

The Contractor shall keep and present, in such form as the Architect or Owner may prescribe, an itemized accounting of the items listed above, together with appropriate supporting documentation.

§ 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 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum or Guaranteed Maximum Price, and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost plus the Contractor's allocated percent of profit and overhead, all as confirmed by the Architect. ~~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 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, ~~the~~ the Architect may order minor changes in the Work that are consistent with the ~~intent of the~~ Contract Documents or Construction Documents and do not involve an adjustment in the Contract Sum or Guaranteed Maximum Price, or an extension of the Contract Time. 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, 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, the Contractor waives any adjustment to the Contract Sum or Guaranteed Maximum Price, or extension of the Contract Time. ~~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 ~~Substantial-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 Agreement (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.

§ 8.1.3 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, the Contractor ~~stipulates and confirms~~ that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 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 Agreement, 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 of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of 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 Architect and Owner determines, may justify delay, then the Contract Time ~~shall~~ may be extended for such reasonable time as the Architect and Owner may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

~~§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents. This Agreement does not permit 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.~~

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement 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 ~~may shall~~ be equitably adjusted by prior written agreement.

§ 9.2 Schedule of Values

§ 9.2.1 Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect 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 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 Documents 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 If the project is a Construction Manager at Risk project, in order to facilitate the review of Applications 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 items.

.2 Contractor's costs for various construction items shall be detailed. For example, concrete work shall be subdivided 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 Contractor shall submit to the Architect an itemized Application for Payment 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 requires, 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 7.3.9, 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. Contractor agrees that, for purposes of Texas Government Code Sections 2251.021 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 2251.021 and 2251.042.~~

~~§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay has not been invoiced by a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay. Contractor has self-performed the Work.~~

~~§ 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 in Section 9.4.3 or 9.5, as amended. The retainage shall be paid with the Final Payment. (Note: if more than 5% is retained, under Texas law, then the retainage must be placed in an interest-bearing account, and the contractor must be paid the interest earned on the retainage upon completion of the Work. Texas Government Code Section 2252.032).~~

~~§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location 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. Payments will be made on the basis of invoices for specific materials or equipment incorporated in the Work and specific materials or equipment (1) suitably stored at the site or (2) suitably stored at some off-site location, provided the following conditions are met for off-site storage:~~

~~.1 The location must be agreed to, in writing, by the 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 payments, deposits, or other advance payments 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.

§ 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 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. 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. 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 Contractor has made the necessary on-site inspections to confirm the accuracy of the Applications for Payment; that there are no known mechanics' or materialmen's liens outstanding at the date of the Application 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 materialmen's 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 Application 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 Application for Payment and, when appropriate, return the Application for Payment to the Contractor as provided in Section 9.3.4. If the Application for Payment is 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 Application 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 determines is properly due, and notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner in writing of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. Architect's written reasons for withholding certification shall be construed as the notice required by Texas Government Code Section 2251.042 et seq.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect 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 to the Owner that the Architect has, carefully evaluated and certified that the amounts requested in the Application 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 in writing to the Owner. However, the issuance of a Certificate for Payment will not be a representation that the Architect 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 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 opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect 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 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 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 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

~~§ 9.5.4 If the Architect withholds certification for 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 Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment. 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, then Architect may withhold any further Certificate for Payment from Contractor to the extent necessary to preserve sufficient funds to complete the construction of the Project and to cover liquidated damages. The Owner shall not be deemed in default by reason of withholding payment as provided for in Sections 9.3.4, 9.4.3, 9.5.1, or this Section.~~

§ 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 for Payment pursuant to Texas Government Code Section 2251.042 et seq., listing the specific reasons 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 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 payment 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 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 the 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, the~~ 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 a 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, 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 ten (10) seven additional days' written notice to the Owner 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 undisputed 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 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.

§ 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 Contract, 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 from 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 of 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 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 shall be completed within 30 days. Contractor shall complete Owner's Substantial Completion Certificate.

§ 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 Contractor shall prepare and submit to the Architect 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 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 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 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 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.

§ 9.9 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. 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 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 finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect 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 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 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 payments shall be made by the Owner in accordance with Owner's regular schedule for payments.

§ 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 evidence 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 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 USC 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 writing by Owner and Architect.

§ 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. ~~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.

§ 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 and Architect all accidents arising out of or in connection with the Work which cause 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 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.

§ 10.2.118 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.

§ 10.3.2 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 ~~To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from 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. IF CONTRACTOR IMPORTS HAZARDOUS MATERIALS ONTO THE PROJECT SITE, THEN CONTRACTOR HEREBY INDEMNIFIES AND HOLDS HARMLESS THE OWNER, ITS CONSULTANTS, TRUSTEES, OFFICERS, AGENTS AND EMPLOYEES, AGAINST ANY CLAIMS ARISING OUT OF OR RELATED TO SUCH IMPORTATION, INCLUDING BUT NOT LIMITED TO 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.~~

§ 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 ~~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 ~~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.~~

§ 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 for 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 Contractor.

§ 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 and Architect in writing of any proposed nonconformity with these requirements, and shall notify Owner 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 Agreement.

§ 11.0.2 Satisfactory evidence of insurance required by this Article shall be provided to Owner and Architect not later than five business days after execution of the Contract by Owner. 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 in the State of Texas by the Texas Department of Insurance, and shall be underwritten by a company rated not 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.

§ 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.

§ 11.0.6 Any failure of Contractor to comply with the reporting provisions 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.

§ 11.0.8 Nothing contained in this Article shall limit or waive Contractor's legal or contractual responsibilities to Owner or others.

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor and the Contractor's Subcontractors shall purchase and maintain such insurance as will protect them and 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, or elsewhere in the Contract Documents. ~~The Contractor 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. 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.~~ Such insurance shall include the following:

- .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 limits 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 damage 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; and
- .9 Claims for damages to the Work itself, through builder's risk insurance, pursuant to AIA 101-2017, Exhibit A.

§ 11.1.2 ~~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.~~

§ 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 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 contract 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 day after the date 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 bonds 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 percent (10%) 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 percent (10%) of the surety company's capital and surplus with one or more reinsurers who are duly authorized and admitted to do business in Texas and that amount reinsured by a reinsurer does not exceed ten percent (10%) of the reinsurer's capital 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.

§ 11.1.2.2 The Contractor shall deliver copies of the required bonds to the Owner and Architect not later than five 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 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.

§ 11.1.2.4 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 Contractor may be withheld until the Contractor provides additional surety or security.

§ 11.1.3 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.

§ 11.1.4 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 Insurance

~~§ 11.2.1 The Owner shall purchase and maintain insurance 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. The Owner 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. The Owner shall be responsible for purchasing and maintaining property and casualty insurance no later than the date of Substantial Completion and such date of Owner responsibility shall be documented in the Certificate of Substantial Completion. If Owner occupies or uses any completed or partially-completed portion 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.~~

§ 11.2.2 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.

§ 11.3 Waivers of Subrogation

§ 11.3.1 All insurance required herein shall contain a waiver of subrogation in favor of Owner on all claims arising out of the Project. The policies shall provide such waivers of subrogation by endorsement or otherwise. 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 whether or not: (1) ~~even though~~ that person or entity would otherwise have a duty of indemnification, contractual or otherwise; (2) ~~even though~~ that person or entity paid or 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.

§ 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.~~

§ 11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement 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~~ does 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 ~~shall~~ may 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 Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or Work failing to conform to the requirements of the Contract Documents, discovered before 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 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 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 Contractor 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 completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall ~~not~~ be extended by corrective Work performed by the Contractor pursuant to this Section 12.2, but only as to the corrected Work.

§ 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 ~~of 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.

§ 12.2.5 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.

§ 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 any other 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 of 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 the county in which the Project is located, place where 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.

§ 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, in whole or in part, as a whole 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.

~~§ 13.2.2 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. The Contractor shall execute all consents reasonably required to facilitate the assignment. 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.~~

§ 13.3 Rights and Remedies

§ 13.3.1 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.

§ 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 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. The Contractor shall give the Architect timely written notice of when and where tests and inspections are to be made so that the Architect may 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 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 Payments due and unpaid under the Contract Documents shall bear interest from the date payment is overdue at the rate as 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 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 meets more than once per month. Any such payment shall be deemed overdue on the forty-sixth day after Owner receives Architect's invoice or Contractor's Certificate for Payment from the Architect, if Owner's Board of Trustees meets once a month or less frequently. No interest shall be due on sums properly retained by Owner, except 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, or 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 at least twelve (12) years after the date of Final Completion of the Project. Within 10 days of Owner's request, Contractor shall make such Job Records available for inspection, copying and auditing by the Owner, Architect or their 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 proper 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.

§ 13.8 PROPRIETARY INTERESTS AND CONFIDENTIAL INFORMATION

§ 13.8.1 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.

§ 13.8.2 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 deployment of security

devices; security access codes; student likenesses; student record information; employee information; or any other information deemed confidential by law.

§ 13.8.3 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.

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~~ 390 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, for any of the following reasons:

- .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, 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 ~~seventen~~ (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.

§ 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, 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 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 ~~seven~~ twenty ~~(20)~~ 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.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 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~~
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents; ~~or~~
- .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;
- .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 Contract 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' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession 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 termination.

~~§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. 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 Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract. If the costs of finishing the Work, including compensation for the Architects' 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), then the Contractor and/or its Surety shall pay the difference to the Owner. The amount to be paid to the Owner shall be certified by Architect upon application. The 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 an assignment 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.

§ 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 Owner, 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 ~~shall may~~ 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.~~ 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; ~~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, and for proven unrecoverable loss with respect to materials, equipment, tools, and construction equipment and machinery incurred to the date of termination. 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 OF CONTRACTOR

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by ~~the Contractor one of the parties~~ seeking, as a matter of right, payment of ~~money additional compensation under the Contract Documents, 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 ~~party Contractor 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.

§ 15.1.2 Time Limits on Litigation Claims

The Owner and Contractor shall commence all ~~litigation Claims 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 ~~any the~~ 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.

§ 15.1.3 Notice of Claims

§ 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 ~~Contractor claimant~~ first knew or should have known ~~recognizes~~ the condition giving rise to the Claim, whichever is earlier ~~later~~. 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 a 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. A notice of intent to sue for monetary damages must be given within ninety-one (91) days after the occurrence of the event giving rise to such claim or within ninety-one (91) days after the Contractor first knew or should have known of the condition giving rise to the cause of action, whichever is earlier or the cause of action for monetary damages shall be waived. Pursuant to Texas Civil Practices and Remedies Code Section 16.071, Contractor agrees that this is a reasonable notice requirement.

§ 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.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 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.

§ 15.1.5 Claims for Additional Cost or An Increase in the Contract Sum or Guaranteed Maximum Price

If the Contractor wishes to make a Claim for additional cost or an increase in the Contract Sum or Guaranteed Maximum Price, written notice as provided in Section 15.1.3 shall be given to Owner and Architect before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4. The Architect will promptly investigate such Claim and report findings and a recommended resolution in writing to the Owner and Contractor. If the Claim is approved by Owner's Board of Trustees, or Owner's representative if provided for herein, then Contractor shall proceed with the execution of the Work that is the subject matter of the Claim. If the Claim is rejected by the Owner, then Contractor may pursue alternative dispute resolution as provided for in the Contract Documents.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 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. "Adverse weather conditions" means unusually severe weather which is beyond the normal weather recorded and expected for the locality and/or the season or seasons of the year.

§ 15.1.6.3 The Contractor shall anticipate and include in the construction schedule rain days due to adverse weather conditions in accordance with the rainfall table below. A rain day is defined as a day when rainfall exceeds one-half (.5) inch during a 24-hour period. The number of rain days expected for each month is as follows:

Note: Prior to the execution of the Contract, Owner shall fill in the blanks below:

January	[5] calendar days	July	[4] calendar days
February	[4] calendar days	August	[4] calendar days
March	[5] calendar days	September	[5] calendar days
April	[6] calendar days	October	[4] calendar days

May	[6] calendar days	November	[4] calendar days
June	[4] calendar days	December	[4] calendar days

§ 15.1.6.4 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.

§ 15.1.6.5 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.

§ 15.1.6.6 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 ~~Owner~~ ~~each 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.~~

§ 15.2 Initial Decision Resolution of Claims and Disputes

~~§ 15.2.1 Claims, excluding those 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 Initial Decision Maker for initial decision. The Architect will 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 decision has not been rendered within 30 days after 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.~~

Claims by the Contractor against the Owner, including those alleging an error or omission by the Architect, shall be referred initially to the Architect for written recommendation. 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 30 days have passed after the Claim has been referred to the Architect with no recommendation having been rendered by the Architect.

~~§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) 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. The Architect shall review Claims and within ten days of the receipt of the Claim take one of the following actions: (1) request additional supporting data from the Contractor, or (2) make a written recommendation to the Owner, with a copy to the Contractor.~~

~~§ 15.2.3 In evaluating Claims, the Architect Initial 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 Architect Initial Decision Maker in making a written recommendation rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.~~

~~§ 15.2.4 If the Architect Initial 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 Architect Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Architect Initial 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 adjustment 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 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1. 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.~~

~~§ 15.3 Mediation Alternative Dispute Resolution~~

~~§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution. Any Claim arising out of or related to the Contract, except Claims relating to aesthetic effect and except those waived under the terms of the Contract Documents, shall, after written recommendation by the Architect or 30 days after submission of the Claim to the Architect, be subject to mediation at the request of either party. Owner and Contractor expressly agree that mediation shall be a condition precedent to the initiation of any litigation arising 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 which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings. 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 and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof. 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 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded. 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 Agreement, 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 Agreement, reasonable and necessary attorneys' fees may be awarded to the prevailing party.

EXECUTED this _____ day of _____, _____.

OWNER:

CONTRACTOR:

(Printed Name)

By:

Title: President, Board of Trustees

Title:

Birdville Independent School District

ATTEST:

By:

Title: Secretary, Board of Trustees

Birdville Independent School District

Prevailing Wage Rate Determination Information

The following information is from Chapter 2258 Texas Government Code:

2258.021. Right to be Paid Prevailing Wage Rates.

- (a) A worker employed on a public work by or on behalf of the state or a political subdivision of the state shall be paid:
 - (1) not less than the general prevailing rate of per diem wages for work of a similar character in the locality in which the work is performed; and
 - (2) not less than the general prevailing rate of per diem wages for legal holiday and overtime work.
- (b) Subsection (a) does not apply to maintenance work.
- (c) A worker is employed on a public work for the purposes of this section if the worker is employed by a contractor or subcontractor in the execution of a contract for the public work with the state, a political subdivision of the state, or any officer or public body of the state or a political subdivision of the state.

2258.023. Prevailing Wage Rates to be Paid by Contractor and Subcontractor; Penalty.

- (a) The contractor who is awarded a contract by a public body or a subcontractor of the contractor shall pay not less than the rates determined under Section 2258.022 to a worker employed by it in the execution of the contract.
- (b) A contractor or subcontractor who violates this section shall pay to the state or a political subdivision of the state on whose behalf the contract is made, \$60 for each worker employed for each calendar day or part of the day that the worker is paid less than the wage rates stipulated in the contract. A public body awarding a contract shall specify this penalty in the contract.
- (c) A contractor or subcontractor does not violate this section if a public body awarding a contract does not determine the prevailing wage rates and specify the rates in the contract as provided by Section 2258.022.
- (d) The public body shall use any money collected under this section to offset the costs incurred in the administration of this chapter.
- (e) A municipality is entitled to collect a penalty under this section only if the municipality has a population of more than 10,000.

2258.051. Duty of Public Body to Hear Complaints and Withhold Payment.

A public body awarding a contract, and an agent or officer of the public body, shall:

- (1) take cognizance of complaints of all violations of this chapter committed in the execution of the contract; and
- (2) withhold money forfeited or required to be withheld under this chapter from the payments to the contractor under the contract, except that the public body may not withhold money from other than the final payment without a determination by the public body that there is good cause to believe that the contractor has violated this chapter.

Prevailing Wage Rates - School Construction Trades

Texas - Dallas / Fort Worth Area

CLASSIFICATION	HOURLY RATE	NOTES
Asbestos Worker	\$15.95	
Bricklayers; Masons	\$20.25	
Carpenter/Caseworker	\$17.78	
Concrete Finishers	\$16.50	
Data Comm / Telecom Installers	\$23.33	
Drywall/Ceiling Installers	\$17.85	
Electricians	\$22.35	
Elevator Mechanics	\$38.01	
Fire Proofing Installer	\$19.75	
Glaziers	\$19.08	
Heavy Equipment Operator	\$20.89	
Insulators	\$17.00	
Iron Workers	\$19.95	
Laborers	\$13.08	
Lather / Plasterer	\$16.42	
Light Equipment Operators	\$14.74	
Metal Building Assemblers	\$16.57	
Millwrights	\$19.33	
Painters/Wall Covering Installers	\$16.70	
Pipefitters	\$24.68	
Plumbers	\$24.06	
Roofers	\$19.31	
Sheet Metal Workers	\$17.55	
Sprinkler Fitters	\$20.17	
Steel Erector	\$21.75	
Terrazzo Workers	\$15.67	
Tile Setters	\$16.33	
Water Proofers / Caulkers	\$14.60	

This document was developed by PBK Architects, Inc. in strict accordance with the Texas Government Code Chapter 2258.

Prevailing Wage Rates
Worker Classification Definition Sheet

Asbestos Worker	Worker who removes & disposes of asbestos materials.
Carpenter	Worker who builds wood structures or structures of any material which has replaced wood. Includes rough & finish carpentry, hardware and trim.
Carpet Layer/Floor Installer	Worker who installs carpets and/or floor coverings-vinyl tile.
Concrete Finisher	Worker who floats, trowels and finishes concrete.
Data Comm/Telecom Installer	Worker who installs data/telephone & television cable and associated equipment and accessories.
Drywall/Ceiling Installer	Worker who installs metal framed walls & ceilings, drywall coverings, ceiling grids & ceilings.
Electrician	Skilled craftsman who installs or repairs electrical wiring & devices. Includes fire alarm systems & HVAC electrical controls.
Elevator Mechanic	Craftsman skilled in the installation & maintenance of elevators.
Fire Proofing Installer	Worker who sprays or applies fire proofing materials.
Glazier	Worker who installs glass, glazing and glass framing.
Heavy Equipment Operator	Includes, but not limited to, all Cat tractors, all derrick-powered, all power operated cranes, back-hoe, back-filler, power operated shovel, winch truck, all trenching machines.
Insulator	Worker who applies, sprays or installs insulation.
Iron Worker	Skilled craftsman who erects structural steel framing & installs structural concrete Rebar.
Laborer/Helper	Worker qualified for only unskilled or semi-skilled work. Lifting, carrying materials & tools, hauling, digging, clean-up.
Lather/Plasterer	Worker who installs metal framing & lath. Worker who applies plaster to lathing and installs associated accessories.
Light Equipment Operator	Includes, but not limited to, air compressors, truck crane driver, flex plane, building elevator, form grader, concrete mixer (less than 14cf), conveyer.
Mason	Craftsman who works with masonry products, stone, brick, block or any material substituting for those materials & accessories.
Metal Building Assembler	Worker who assembles pre-made metal buildings.
Millwright	Mechanic specializing in the installation of heavy machinery, conveyance, wrenches, dock levelers, hydraulic lifts & align pumps.
Painter/Wall Covering Inst.	Worker who prepares wall surfaces & applies paint and/or wall coverings, tape and bedding.
Pipefitter	Trained worker who installs piping systems, chilled water piping & hot water (boiler) piping, pneumatic tubing controls, chillers, boilers & associated mechanical equipment.
Plumber	Skilled craftsman who installs domestic hot & cold water piping, waste piping, storm system piping, water closets, sinks, urinals, and related work.
Roofer	Worker who installs roofing materials, Bitumen (asphalt & coal tar) felts, flashings, all types roofing membranes & associated products.
Sheet Metal Worker	Worker who installs sheet metal products. Roof metal, flashings & curbs, ductwork, mechanical equipment and associated metals.
Sprinkler Fitter	Worker who installs fire sprinkler systems & fire protection equipment.
Terrazzo Worker	Craftsman who places & finishes Terrazzo.
Tile Setter	Worker who prepares wall and/or floor surfaces & applies ceramic tiles to these surfaces.
Waterproofer/ Caulker	Worker who applies water proofing material to buildings. Products include sealant, caulk, sheet membrane, liquid membranes, sprayed, rolled or brushed.

END OF DOCUMENT

DOCUMENT 00 73 50

WEATHER TABLE

MONTH	AVERAGE DAYS RAIN (1)	INCHES RAINFALL (2)	SNOW/ICE PELLETS (3)
JANUARY	6.5	2.13	0.1
FEBRUARY	6.4	2.67	0.3
MARCH	7.8	3.47	0.1
APRIL	6.7	3.03	0.0
MAY	9.1	4.90	0.0
JUNE	8.0	3.85	0.0
JULY	4.5	2.17	0.0
AUGUST	4.7	1.91	0.0
SEPTEMBER	5.4	2.55	0.0
OCTOBER	7.4	4.21	0.0
NOVEMBER	6.4	2.71	0.0
DECEMBER	6.7	2.58	0.1
ANNUALLY	79.6	36.18	0.6

(1) Mean number of days rainfall, 0.01" or more.

(2) Average normal precipitation, in inches.

(3) Mean number of days 1.0" or more.

* Less than 0.05".

This table is based on information reported from Dallas/Fort Worth International Airport, Texas. Latitude 32.898° N, longitude 97.019° W, elevation (ground) 560 feet.

Means are based on records covering a period of 30 years. Normals based on record for the 1981-2010 period.

END OF SECTION

Controlled Entry at 15 Campuses
Birdville I.S.D.
North Richland Hills, Haltom City, Hurst and Watauga, Texas

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SECTION 01 11 00

SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

A. Related Requirements:

1. Document - Birdville ISD Request for Competitive Sealed Proposals (RFCSP).
2. Document 00 70 00 - General Conditions of the Contract for Construction: Provisions for use of site; Owner occupancy; Relations of Contractor - subcontractors.
3. Section 01 32 16 - Construction Progress Schedules: Format of work schedule.
4. Section 01 50 00 - Temporary Facilities and Controls.

1.2 DESCRIPTION

- A. The work comprises the construction of Controlled Entry at 15 Campuses for Birdville Independent School District, North Richland Hills, Haltom City, Hurst and Watauga, Texas, as shown on the drawings and described in the specifications. The work will be done under one lump sum contract.
- B. Indication on the drawings or mention in the specifications of articles, materials, operations or methods requires that the Contractor provide each item indicated or mentioned of the quality or subject to the qualifications noted, and perform according to the conditions stated each operation described and provide therefor all necessary labor, equipment, services and incidentals.
1. Subcontractors are responsible for examining the architectural drawings for structural, mechanical, electrical, and plumbing items. Items shown on these drawings shall be furnished by the appropriate subcontractor.

1.3 CONDITIONS OF THE CONTRACT

- A. The General Conditions (Modified), bound herewith as preceding portions of these specifications, form a part thereof and shall govern the work under each section.

1.4 EXISTING SITE CONDITIONS

- A. Visit and examine the site. Upon award of the Contract, the Contractor shall accept the condition of the site before beginning the work required.

1.5 SPECIAL REQUIREMENTS

- A. The present building houses an operating facility that must continue in operation during the construction period, except as the Architect and Owner may otherwise direct. Plumbing, heating, ventilating, electrical and telephone systems shall continue to function with a minimum of interruptions in service. Do not block required fire exits.
- B. Assume responsibility for the protection of areas of work and provide and maintain protections required. Protect existing surfaces of the building and equipment, both interior and exterior, as required during the construction period. Provide necessary dust screens, drop cloths and temporary walls and/or coverings as may be required for protection. Existing surfaces that are damaged due to construction shall be patched or replaced to original condition.
- C. Where designated on the drawings, salvage, relocate and reinstall certain items. Existing items so designated shall be properly installed, securely fastened as required, set plumb and level and left complete and operational. Exercise extensive care in relocating such items so as to prevent damage. Other existing building materials indicated to be removed or demolished, unless noted otherwise or claimed by the Owner shall become property of the Contractor and shall be removed from the site immediately.
- D. Execute Certificate of Substantial Completion for each designated portion of work prior to Owner occupancy. Following execution of a Substantial Completion Certificate for a designated portion of the work, the Contractor shall permit:
1. Access for Owner personnel.
 2. Operation of HVAC and electrical systems for the benefit of the Owner.

Despite partial Owner occupancy, the Contractor shall remain responsible for portions of the work which have not attained Substantial Completion and for which a Substantial Completion Certificate, which shall designate the date on which the Owner shall become responsible for utilities, maintenance, security, damage to the work and insurance, has not been executed.

1.6 SEQUENCE OF CONSTRUCTION

- A. Work shall be started upon formal "Notice-to-Proceed" on approximately April 4, 2019, and shall be substantially complete in the number of calendar days as stated in the Proposal Form.
 - 1. Alternate proposal for early completion shall be August 15, 2019.

1.7 CONTRACTOR USE OF PREMISES

- A. Limit use of premises for work, for storage and for access, to allow for Owner occupancy.
- B. Coordinate use of premises under direction of Owner.
- C. Assume full responsibility for protection and safekeeping of products under this contract.
- D. Obtain and pay for use of additional storage or work areas needed when required for operations under this Contract.
- E. During construction the Owner will continue to perform normal activities in and around the adjacent existing building. Proper and safe access to the Owner-occupied areas shall be maintained. Interruption of mechanical and electrical services to the building shall be only at such times and for lengths of time as approved by the Owner.
- F. There shall be no storage of materials or equipment in the occupied portions of the existing building. There shall be no fires on the site or in the building. There shall be no dumping on Owner's property.
- G. Worker Identity Badging Requirements: Reference "REQUEST FOR COMPETITIVE SEALED PROPOSALS (RFCSP)" Document.

1.8 WORK RESTRICTIONS

- A. Work Restrictions within Existing Building(s):
 - 1. Work shall be generally performed inside the existing building during the summer break and weekends.
 - 2. Work is permitted after normal school hours Monday through Friday unless it disrupts the building to the point it affects operations.
 - 3. Work required during school hours is required to be approved and coordinated with BISD in advance.
 - 4. During student holidays when the faculty and staff may be on campus, extent of work and utility interruption shall be coordinated with the Owner in advance.
 - 5. On dates designated as STAAR testing days, work within the existing building is not permitted and Contractor should allow for this in their schedule.

1.9 OWNER-FURNISHED PRODUCTS

- A. Contractor Responsibilities
 - 1. Protect products from damage.
 - 2. Repair or replace items damaged by Contractor.
- B. Schedule of Owner-furnished items
 - 1. Refer to Drawings.

1.10 COORDINATION

- A. Drawing details and other sections of these specifications covering work connected with or relating to that specified under a specific heading shall be examined for conditions which may affect that part of the work. Failure to do so will not relieve those furnishing materials and/or labor under a specification heading from supplying materials or performing work reasonably necessary to properly coordinate their work with that of other trades.

1.11 LAYING OUT WORK, MEASUREMENTS

- A. Verify measurements at the building. No extra compensation will be allowed for differences between actual dimensions and dimensions indicated on the drawings. Figured dimensions and measurements taken at the site shall take precedence over scaled dimensions.

1.12 DISCREPANCIES

- A. In case of discrepancies within the drawings, within the specifications, or between the drawings and specifications, the better quality and greater quantity, in the opinion of the Architect, shall be furnished and installed.

1.13 PIPING

- A. Should active piping or conduit be encountered below grade within the building structure and be found at variance with the known conditions indicated by the drawings and specifications, said piping and/or conduit shall be relocated as required by the Architect, and the contract sum shall be fairly adjusted on the basis of the cost of labor and materials. The Contractor shall provide temporary support of active piping and conduit encountered in the excavations until permanently supported or removed. The Contractor shall cut off and cap or plug abandoned lines at least 3 ft. outside the building lines. Conform to the applicable requirements of the locality or governing agency.

1.14 PROTECTION

- A. General: Limit use of the premises to construction activities in areas indicated; allow for Owner occupancy in adjacent spaces and around the site.
 - 1. Confine operations to areas within Contract limits indicated. Portions of the building which are outside the areas construction operations are indicated, are not to be disturbed.
 - 2. Keep driveways and entrances serving the premises clear and available to the Owner and the Owner's employees. Do not use these areas for parking or storage of materials without prior approval. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.
 - 3. Do not dispose of organic and hazardous material on site, either by burial or by burning. Disposable material and trash must be removed properly.
- B. Assume responsibility for the premises and provide and maintain protections required by the governing laws, regulations and ordinances. The Contractor shall be responsible for loss or damage caused by him or his workmen to the property of the Owner or to the work or materials installed, and shall make good loss, damage or injury without cost to the Owner.
- C. The protection of adjacent property shall include but will not necessarily be limited to the erection and maintenance of shoring, underpinning and fences as necessary to protect and support existing work to be left in place.
- D. Finished floors shall be protected against damage by workmen and equipment during the work. Where materials are carried into the building, the building floors shall be covered to protect the work against dirt or grit being ground in.
- E. Where work is being done on the existing building, the furniture, fixtures and equipment in the building shall be covered with heavy plastic sheeting or clean tarpaulins to protect the property against damage and stains. The furniture and equipment shall not be removed from the building.
- F. Send proper notices, make necessary arrangements and perform other services required for the care, protection and maintenance of Public Utilities, including fire plugs and wires and other items of this character on and around the building site.
- G. Maintain accessible building exits required by the City during construction. Protection of these exits shall include dust-proof enclosures, illumination and exit lighting required.
- H. While school is in session, provide appropriate measures to control the migration of dust and odors into occupied areas of the school.

1.15 CUTTING AND PATCHING

- A. Cutting and chasing of existing construction for relocation of mechanical and electrical work and for installation of pipes and ducts will be done by the trades concerned. Patching and finishing shall be done by the Contractor. This work shall be done with proper tools and by careful workmen of the particular trade to which such work belongs and shall be done without extra cost to the Owner.

1.16 RECORD DRAWINGS

- A. Maintain a complete clean set of drawings and Project Manual in the project field office for the sole purpose of recording "installed" conditions. Installed conditions shall include addendum items, change orders, or other items which come up during the construction phase which deviate from the Construction Documents. Changes made in these drawings and Project manual in connection with the final construction and installation shall be neatly made in red ink. Upon completion of the project, the marked set of drawings and Project Manual shall be delivered to the Architect for subsequent transmittal to the Owner. These drawings shall be maintained to reflect the current conditions of the work and changes shall be reviewed on a monthly basis with the Architect's representative. The Contractor's updating of the "installed" condition drawings and Project Manual shall be a prerequisite to the monthly review of the Contractor's payment request by the Architect's representative.

1.17 INSTRUCTIONS CONCERNING ASBESTOS

- A. In the event the Contractor encounters on the site material reasonably believed to be asbestos which has not been rendered harmless, the Contractor shall immediately stop work in the area affected and report the condition to the Owner in writing. If, in fact the material is asbestos and has not been rendered harmless, the work in the affected area shall not thereafter be resumed until the asbestos has been removed or rendered harmless by the Owner. The work in the affected area shall be resumed in the absence of asbestos, or when it has been rendered harmless, by written agreement of the Owner and Contractor.
- B. The Contractor will not be required to perform without consent work relating to asbestos.

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

Not used

END OF SECTION

SECTION 01 21 00

ALLOWANCES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Administrative and procedural requirements governing allowances.
 - 1. Certain materials and equipment 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 additional information is available for evaluation. If necessary, additional requirements will be issued by change order.
- B. Related Requirements:
 - 1. General Conditions of the Contract for Construction.
 - 2. Section 01 32 16 - Construction Progress Schedules: Product delivery and installation dates.
 - 3. Individual Specifications Sections Listed Under Schedule of Allowances: Specification of products and installation under allowances.

1.2 COSTS INCLUDED IN ALLOWANCES

- A. Cost of product to Contractor or subcontractor, less applicable trade discounts.
- B. Delivery to site.
- C. Applicable taxes.

1.3 CONTRACTOR COSTS INCLUDED IN CONTRACT SUM

- A. Products handling at site, including unloading, uncrating and storage.
- B. Protection of products from elements and from damage.
- C. Labor for installation and finishing.
- D. Other expenses required to complete installation.
- E. Contractor overhead and profit.

1.4 ADJUSTMENT OF COSTS

- A. Should the net cost be more or less than the specified amount of the allowance, the contract sum will be adjusted accordingly by change order.
- B. Submit any claims for anticipated additional costs at the site, or other expenses caused by the selection under the allowance, prior to execution of the work.
- C. Submit documentation for actual additional costs at the site, or other expenses caused by the selection under the allowance, prior to execution of the work.
- D. Failure to submit claims within the designated time will constitute a waiver of claims for additional costs.

1.5 ARCHITECT RESPONSIBILITIES

- A. Consult with Contractor in consideration of products, suppliers and installers.
- B. Select products, obtain Owner's written decision, and transmit full information to Contractor as follows
 - 1. Manufacturer, product, model or catalog number, accessories, attachments and finishes.
 - 2. Supplier and installer as applicable.
 - 3. Cost to Contractor, delivered to site (and installed, if so specified).

1.6 CONTRACTOR RESPONSIBILITIES

- A. At the earliest practical date after award of the contract, advise Architect 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. Assist Architect in determining suppliers; and installers; obtain proposals when requested.
- C. Make recommendations for Architect consideration.
- D. Promptly notify Architect of any reasonable objections against supplier or installer.
- E. On notification of selection execute purchase agreement with designated supplier and installer.
- F. Arrange for and process shop drawings, product data and samples.
- G. Arrange for delivery. Promptly inspect products upon delivery for completeness, damage and defects. Submit claims for transportation damage.
- H. Install, adjust and finish products.
- I. Provide warranties for products and installation.

1.7 CORRELATION WITH CONTRACTOR SUBMITTALS

- A. Schedule shop drawings, product data, samples and delivery dates, in progress schedule for products selected under allowances.

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 allowance work with related work to ensure proper integration and interface.

3.3 SCHEDULE OF ALLOWANCES

- A. Allowance No. 1: Allow the lump sum of \$3,000.00 for the purchase and delivery of room identification signs.
- B. Allowance No. 2: Allow the lump sum of \$20,000.00 for HVAC Testing and Air Balancing.
- C. Allowance No. 3: Allow the lump sum of \$75,000.00 Owner's Contingency for the changes requested by the Owner.

END OF SECTION

SECTION 01 23 00

ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

- A. Requirements Included:
 - 1. Identification and description of alternate work.
 - 2. The amount shown in the proposal form for each alternate shall include all overhead, profit, insurance and other costs incidental to the performance under the alternate.
- B. Related Requirements:
 - 1. Proposal Form: Quotation of cost of each alternate.
 - 2. Contract Form: Alternates accepted by Owner for incorporation into the work.
 - 3. Section of specifications identified in each alternate.

1.2 PROCEDURES

- A. Proposers are required to submit alternate amounts to add work or to deduct work from the base proposal as described below. Failure to submit alternate amounts in spaces provided on proposal form shall be basis for disqualification of proposal.
- B. The successful proposer shall not modify, withdraw or cancel any of the alternate proposals or any part thereof for 30 days after date of receipt of proposals, unless specifically noted otherwise.
- C. 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.
- D. Refer to drawings and technical specifications sections for items of work affected by alternates.
- E. Election of alternates will be exercised at the option of Owner.
- F. Coordinate related work and modify or adjust surrounding work as required to complete the Work, including changes under each alternate.
 - 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 include cost of related coordination, modification, or adjustment.
- G. Notification: Immediately following the award of contract, Contractor shall prepare and distribute to each entity or person to be involved in the performance of the 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.

1.3 SELECTION AND AWARD OF ALTERNATES

- A. Indicate variation in base proposal amount as a result of the prices for the alternates described below and listed on the proposal form document or any supplement to it, by adding to, or deducting from, the base proposal amount or by indicating "No Change."
- B. Indicating "No Proposal" as an alternate is unacceptable and is reason for rejection of proposal.

1.4 SCHEDULE OF ALTERNATES

- A. Alternate No. 1: State in the proposal form the amount to be added to the base proposal for substantial completion, including general, mechanical and electrical Work (including any alternates elected by the Owner) by August 15, 2019.
- B. Alternate No. 2: State in the proposal form the amount to be added to the base proposal for providing NIJ Level IIA bullet resistant film as outlined in Section 08 80 00 and located per the drawings.
- C. Alternate No. 3: State in the proposal form the amount to be added to the base proposal for providing NIJ Level III bullet resistant film as outlined in Section 08 80 00 and located per the drawings.
- D. Alternate No. 4: State in the proposal form the amount to be added to the base proposal for providing an exterior accessible ramp at Green Valley Elementary School.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01 29 00

PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Applications and Certificates for Payment.
 - 2. Change Order Procedures.
 - 3. Schedule of Values: Submit to the Architect the Schedule of Values allocated to various portions of the work within five days after "Notice-to-Proceed". Upon request of Architect, support values with data which will substantiate their correctness.
- B. Related Requirements:
 - 1. Conditions of the Contract for Construction.
 - 2. Section 01 32 16 - Construction Progress Schedules.
 - 3. Section 01 77 00 - Closeout Procedures.
 - 4. Section 01 78 39 - Project Record Documents.

1.2 APPLICATIONS AND CERTIFICATES FOR PAYMENT

- A. Provide a separate Application for Payment for each school.
- B. Progress payments shall be made as the work proceeds at intervals stated in the Contract.
- C. Work covered by progress payments shall, at the time of payment, become the property of the Owner.
- D. Form of Application and Certificate for Payment shall be notarized AIA Document G702 - Application and Certification for Payment, supported by AIA document G703 - Continuation Sheet. Submit two hard copies. Architect will retain a digital copy and return signed hard copies to the Owner and Contractor.
- E. Conditions governing regular schedule for applications, payment and retainage are as stated in the Contract.
- F. With each Application for Payment, Contractor shall certify that such Application for Payment represents a just estimate of cost reimbursable to Contractor under terms of Contract.

1.3 CONSTRUCTION CHANGE ORDER PROCEDURES

- A. Contractor to submit to Architect within five days of execution of Owner/Contractor Agreement name of individual authorized to accept changes on behalf of Contractor, and to be responsible for informing others in Contractor's employ of changes in the work.
- B. Change Order forms will be furnished and issued by Architect.
- C. Contractor Documentation of Changes:
 - 1. Maintain detailed records of work done on an accounting basis acceptable to Architect and Owner. Provide full information required for evaluation of proposed changes.
 - 2. Document each quotation for a change in cost or time with sufficient data to allow evaluation of quotation.
 - 3. On request, provide additional data to support computations:
 - a. Quantities of products, labor and equipment.
 - b. Insurance and bonds.
 - c. Overhead and profit.
 - d. Justification for any change in Contract Time.
 - e. Credit for deletions from Contract, similarly documented.
 - 4. Support each request for additional costs, and for work proposed on a time and material basis, with description of products, equipment, cost of labor and subcontracts, completely documented.
 - 5. Computation for changes in work will be computed in one of the manners described in the Conditions of the Contract.

- D. Initiation of Changes:
 - 1. Architect may submit Proposal Request which includes detailed description of change with supplementary or revised drawings and specifications.
 - 2. Contractor may initiate a proposed change by submittal of a request to Architect describing proposed change with statement of reason for change, and proposed effect on Contract Sum and Contract Time with full documentation and a statement of the effect on work of separate contractors. Document any requested substitutions in accordance with SECTION 01 62 00 - PRODUCT OPTIONS. Submission of such requests and receipt of same by Architect does not mean acceptance, or approval of proposed change.
- E. Authorization:
 - 1. The Owner may request, through the Architect, a Construction Change Directive, in writing, instructing Contractor to proceed with changes of all or in part of work, for subsequent inclusion in a Change Order that is pending. Directive will propose basis for necessary adjustments, if any, to Contract Sum or Time.
 - 2. Changes that affect Contract Sum and/or Contract Time will require a Change Order signed by the Owner and the Architect. Contractor's signature indicates agreement. Other orders, written or oral, by the Owner through the Architect or by the Architect shall be treated as a Change Order only if Contractor gives Owner proper written notice as described in Conditions of Contract.
 - 3. Promptly execute the change in work only upon receipt of approved Change Order or Owner's written Construction Change Directive.
- F. Execution:
 - 1. Architect will issue Change Orders for signatures of parties as provided in Conditions of Contract.
 - 2. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust Contract Sum as shown on Change Order.
 - 3. Promptly revise Progress Schedules to reflect change in Contract Time, revise sub-schedules to adjust times for other items of work affected by Change, and resubmit Schedule.
 - 4. Promptly enter Changes in Project Record Documents.

1.4 SCHEDULE OF VALUES FORM AND CONTENT

- A. Provide a separate Schedule of Values for each school and provide a breakdown between additions and renovations for major items of work.
- B. Type schedule on 8-1/2" x 11" white paper; Contractor's standard forms and automated printout will be considered for approval by Architect upon Contractor's request. Identify schedule with:
 - 1. Title of project and location.
 - 2. Architect and Architect's project number.
 - 3. Name and address of Contractor.
 - 4. Contract designation.
 - 5. Date of submission.
- C. Follow the table of contents of this project manual as the format for listing component items.
 - 1. Identify each line item with the number and title of the respective major section of the specifications.
- D. For each major line item list sub-values of major products or operations under the item.
- E. For the various portions of the work:
 - 1. Each item shall include a directly proportional amount of the Contractor's overhead and profit.
 - 2. For items on which progress payments will be requested for stored materials, break down the value into:
 - a. Cost of the materials, delivered and unloaded, with taxes paid.
 - b. Total installed value.
- F. The sum of values listed in the schedule shall equal the total contract sum.
- G. Indicate separate value associated with materials and labor.
- H. Re-submittal: After review by Architect, revise and resubmit schedule as necessary.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

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SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Coordination of work of the contract.
- B. Related Requirements:
 - 1. Section 01 11 00 - Summary of Work: Sequence of construction and Owner occupancy.
 - 2. Section 01 31 19 - Project Meetings.
 - 3. Section 01 62 00 - Product Options.
 - 4. Section 01 73 29 - Cutting and Patching.
 - 5. Section 01 77 00 - Closeout Procedures: Closeout submittals.

1.2 DESCRIPTION

- A. Coordinate scheduling, submittals and work of the various sections of specifications to ensure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items to be installed later.
- B. Coordinate sequence of work to accommodate Owner occupancy as specified in SECTION 01 11 00 - SUMMARY OF WORK.

1.3 MEETINGS

- A. In addition to progress meetings specified in SECTION 01 31 19 - PROJECT MEETINGS, hold coordination meetings and pre-installation conferences with personnel and subcontractors to ensure coordination of work.

1.4 COORDINATION OF SUBMITTALS

- A. Schedule and coordinate submittals specified in SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
- B. Coordinate work of various sections having interdependent responsibilities for equipment, such as installing, connecting to and placing in service.
- C. Coordinate requests for substitutions to ensure compatibility of space, of operating elements and effect on work of other sections.

1.5 COORDINATION OF SPACE

- A. Coordinate use of project space and sequence of installation of mechanical and electrical work which is indicated diagrammatically on drawings. Follow routings shown for pipes, ducts and conduits as closely as practicable, with due allowance for available physical space; make runs parallel with lines of building. Utilize space efficiently to maximize accessibility for other installations, for maintenance and for repairs.
- B. In finished areas, except as otherwise shown, conceal pipes, ducts and wiring in the construction. Coordinate locations of fixtures and outlets with finish elements.

1.6 COORDINATION OF CONTRACT CLOSEOUT

- A. Coordinate completion and cleanup of work of separate sections in preparation for substantial completion of portions of work designated for Owner partial occupancy.
- B. After Owner occupancy of premises, coordinate access to site by various sections for correction of defective work and work not in accordance with contract documents, to minimize disruption of Owner's activities.

Controlled Entry at 15 Campuses
Birdville ISD
North Richland Hills, Haltom City, Hurst and Watauga, Texas

- C. Assemble and coordinate closeout submittals specified in SECTION 01 77 00 - CLOSEOUT PROCEDURES.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01 31 19

PROJECT MEETINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Scheduling and administration of progress meetings.
 - 2. Pre-installation conferences.
- B. Related Requirements:
 - 1. Section 01 31 00 - Project Management and Coordination.
 - 2. Section 01 31 19.13 - Preconstruction Meetings: Owner's preconstruction conference and pre-mobilization conference.
 - 3. Section 01 32 16 - Construction Progress Schedules.
 - 4. Section 01 33 23 - Shop Drawings, Product Data and Samples.
 - 5. Section 01 45 00 - Quality Control.
 - 6. Section 01 78 23 - Operation and Maintenance Data.
 - 7. Section 01 78 39 - Project Record Documents.

1.2 PROGRESS MEETINGS

- A. The Architect will schedule and administer monthly construction progress meetings, throughout progress of work. He will prepare agenda and distribute notice of each meeting to participants
- B. Contractor shall make physical arrangements.
- C. Architect will preside at meetings.
- D. Location of Meetings: Contractor's field office.
- E. Attendance: Contractor, job superintendent, and Architect. Owner and professional consultants will attend as appropriate. Subcontractors and suppliers shall attend as Architect sees necessary to agenda.
- F. Anticipated Agenda:
 - 1. Review of Contractor's updated Construction Schedule.
 - 2. Review of work in-progress.
 - 3. Field observations, problems and decisions.
 - 4. Identification of problems which impede planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of off-site fabrication and delivery schedules.
 - 7. Maintenance of progress schedule.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress during succeeding work period.
 - 10. Coordination of projected progress.
 - 11. Maintenance of quality and work standards.
 - 12. Effect of proposed changes on progress schedule and coordination.
 - 13. Other business relating to work.

1.3 PRE-INSTALLATION CONFERENCES

- A. When required in individual specification section, convene a pre-installation conference at work site prior to commencing work of the section.
- B. Require attendance of entities directly affecting, or affected by, work of the section.
- C. Notify Architect four days in advance of meeting date.
- D. Prepare agenda, preside at conference, record minutes and distribute copies within two days after conference to participants, with two copies to Architect.

Controlled Entry at 15 Campuses
Birdville ISD
North Richland Hills, Haltom City, Hurst and Watauga, Texas

E. Review conditions of installation, preparation and installation procedures and coordination with related work.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01 31 19.13

PRECONSTRUCTION MEETINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Contractor participation in preconstruction meetings.
- B. Related Requirements:
 - 1. Section 01 11 00 - Summary of Work: Administrative provisions.
 - 2. Section 01 31 00 - Project Management and Coordination.
 - 3. Section 01 31 19 - Project Meetings.

1.2 PRECONSTRUCTION MEETING

- A. Architect will schedule meeting within 15 days after notice of award.
- B. Attendance: Owner, Architect, General Contractor and representatives of major subcontractors.
- C. Agenda
 - 1. Submittal of executed bonds and insurance certificates.
 - 2. Execution of Owner-Contractor Agreement.
 - 3. Distribution of Contract Documents.
 - 4. Submittal of list of subcontractors, list of products, schedule of values and progress schedule.
 - 5. Designation of responsible personnel.
 - 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal requests, change orders, allowances and Contract closeout procedures.
 - 7. Scheduling.
 - 8. Use of premises by Owner and Contractor.
 - 9. Owner's requirements and occupancy.
 - 10. Temporary facilities.
 - 11. Survey and building layout.
 - 12. Security and housekeeping procedures.
 - 13. Procedures for testing.
 - 14. Procedures for maintaining record documents.
 - 15. Requirements for startup of equipment.
 - 16. Accessibility Issues.
 - 17. Inspection and acceptance of equipment put into service during construction period.
 - 18. Notice to proceed.
 - 19. Color samples.
 - 20. Procedures for site meetings.
 - 21. Site access and security.
 - 22. Procedures and processing of TEA "Certification of Project Compliance" form.
 - 23. Substantial and final project completion procedures.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

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SECTION 01 32 16

CONSTRUCTION PROGRESS SCHEDULES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Procedures for preparation and submittal of digital construction progress schedules and periodical updating.
- B. Related Requirements:
 - 1. Section 01 11 00 - Summary of Work: Work sequence.
 - 2. Section 01 21 00 - Allowances.
 - 3. Section 01 29 00 - Payment Procedures: Schedule of Values.
 - 4. Section 01 33 23 - Shop Drawings, Product Data and Samples.

1.2 SUBMITTALS

- A. Within 21 days of the contract date, Contractor shall prepare and submit a digital Critical Path construction schedule for the work. After review, resubmit required revised data within 5 days.
- B. Submit revised digital Critical Path Construction Schedule monthly with each Application for Payment.
- C. Submit under transmittal letter specified in SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

1.3 WORK SCHEDULE FORMAT

- A. The schedule shall not exceed time limits current under the Contract Documents and shall be subject to the approval of the Architect. The Contractor shall prosecute the work vigorously and make every effort to start and complete each phase of the work on or before the dates stated.
- B. Should actual construction of project vary from the Critical Path schedule, Contractor shall take whatever actions are necessary to improve progress as quickly as possible in order to meet pre-determined milestones. Revise and re-submit schedule not less than every 30 calendar days. Presentation of the existing or updated Critical Path schedule, in three copies, along with the Certificate of Payment Request shall be a prerequisite to the monthly review of the payment request by the Architect's representative.
- C. Sequence of Listings: The chronological order of the start of each item of work.
- D. Scale and Spacing: To provide space for notations and revisions.
- E. Sheet Size: Minimum 11" x 17".

1.4 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by major specification section number.
- C. Identify work of separate stages and other logically grouped activities.
- D. Provide sub-schedules for each stage of work identified in SECTION 01 11 00 - SUMMARY OF WORK.
- E. Provide sub-schedules to define critical portions of entire schedule.
- F. Show accumulated percentage of completion of each item, and total percentage of work completed, as of the first day of each month.

- G. Provide separate schedule of submittal dates for shop drawings, product data and samples, including Owner furnished products and products specified under Allowances, and dates reviewed submittals will be required from Architect. Show decision dates for selection of finishes.
- H. Show delivery dates for Owner furnished products and products specified under Allowances.
- I. Coordinate content with SECTION 01 29 00 - PAYMENT PROCEDURES, Schedule of Values.

1.5 REVISIONS TO SCHEDULES

- A. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
- B. Identify activities modified since previous submittal, major changes in scope and other identifiable changes.
- C. Provide narrative report to define problem areas, anticipated delays and impact on Schedule. Report corrective action taken, or proposed and its effect.

1.6 DISTRIBUTION

- A. Distribute copies of reviewed schedules to job site file, subcontractors, suppliers and other concerned entities.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01 33 23

SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Digital submission of shop drawings.
- B. Related Requirements:
 - 1. General Conditions of the Contract for Construction: Definitions and basic responsibilities of entities.
 - 2. Section 01 31 00 - Project Management and Coordination: Coordination of submittals.
 - 3. Section 01 32 16 - Construction Progress Schedules: Schedules for submittals.
 - 4. Section 01 45 00 - Quality Control: Mockups and samples for testing.
 - 5. Section 01 50 00 - Temporary Facilities and Controls: Project management software.
 - 6. Section 01 62 00 - Product Options.
 - 7. Section 01 78 23 - Operation and Maintenance Data.
 - 8. Section 01 78 39 - Project Record Documents.

1.2 GENERAL

- A. Refer to General Conditions, Paragraph 3.12 (Shop Drawings, Product Data and Samples).
- B. Digital Submittals: Submit to the Architect, or applicable consultant, shop drawings, product data, and samples required by specification sections. Do not submit illegible fax copies nor carbon copies of shop drawings and product data.
 - 1. Submit using the Architect's web-based project management program (Projectmates). Prepare submittals as .pdf files, with a single file for each submittal, and upload to the Architect's project management program (Projectmates). Enter required data in program to fully identify submittal in accordance with the required submittal numbering format.
- C. Within 30 of the contract date Contractor shall prepare and submit with the Schedule of Values a comprehensive schedule of shop drawings, product data and samples. This schedule shall include products which are proposed for substitution. Also include the estimated date of each submittal and anticipated date of submittal return. Allow the Architect reasonable time to review submittals.
 - 1. The schedule shall be compiled and submitted using the "Submittal" feature in the Architect's project management program (Projectmates).
- D. Prepare schedule on basis of each specification section.
- E. For products specified under reference standards, include with listing of each product:
 - 1. Name and address of manufacturer.
 - 2. Trade name.
 - 3. Model or catalog designation.
 - 4. Manufacturer's data, including performance and test data, reference standards.

1.3 SHOP DRAWINGS

- A. Prepared by a qualified detailer. Prepare project-specific information, drawn accurately to scale. Do not base shop drawings on reproductions of the contract documents or standard printed data. Include supplier's / detailer's / manufacturer's title block.
- B. Identify details by reference to sheet and detail numbers shown on Contract Documents.
- C. Present in a clear and thorough manner original drawings which illustrate the portion of the work showing fabrication, layout, setting, or erection details, prepared by a qualified detailer. Title each drawing with Project and Contract name and number; identify each element of drawings by reference to sheet number and detail, schedule, or room number of Contract Documents.

1.4 PRODUCT DATA

- A. Manufacturer's standard schematic drawings and diagrams:
 - 1. Modify drawings to delete information which is not applicable to the work.
 - 2. Supplement standard information to provide additional information specifically applicable to the work.
- B. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data:
 - 1. Clearly mark each copy to identify pertinent materials, products or models.
 - 2. Show dimensions and clearances required.
 - 3. Show performance characteristics and capacities.
 - 4. Show wiring or piping diagrams and controls.
- C. Submit only pages which are pertinent; mark each copy of standard printed data to identify pertinent products, referenced to specification section and Article number. Show reference standards, performance characteristics and capacities; wiring and piping diagrams and controls; component parts; finishes; dimensions; and required clearances.
- D. Modify manufacturer's standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the work. Delete information not applicable.

1.5 SAMPLES

- A. Office samples shall be of sufficient size and quantity to clearly illustrate:
 - 1. Functional characteristics of product or material, with integrally related parts and attachment devices.
 - 2. Full range of color samples.
- B. Color Selections & Samples: Provide two (2) samples for the Architect's review and record. Provide cut sheet when applicable.
 - 1. Samples for Initial Selection: Submit one (1) full set 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. In addition to the physical samples required above, submit a .pdf file of photographs of the actual color samples and identifying labels.
 - 2. Samples for Verification: Submit two (2) full-size units or Sample 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. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection. In addition to the physical samples required above, submit a .pdf file of photographs of the actual color samples and identifying labels. Architect will retain physical samples.
 - a. After Color Board has been delivered to the project site, submit one (1) sample for verification in lieu of two (2). One will be retained by Contractor for mounting on Color Board after approval by Architect.
- C. Field Samples and Mock-ups:
 - 1. Erect at project site at location acceptable to Architect.
 - 2. Construct each sample or mock-up complete, including work of all trades required in finish work.
 - 3. Install each sample complete and finished. Acceptable finishes in place may be retained in completed work.
- D. Digital Samples: In addition to the physical Office Samples and Field Samples/Mock-ups, submit a .pdf file of photographs of the actual samples/mock-ups.
- E. Submit full range of manufacturer's standard finishes except when more restrictive requirements are specified, indicating colors, textures and patterns, for Architect selection.
- F. Submit samples to illustrate functional characteristics of products, including parts and attachments.
- G. Approved samples which may be used in the work are indicated in the specification section.
- H. Label each sample with identification required for transmittal letter.

1.6 CONTRACTOR REVIEW

- A. Review submittals prior to transmittal; determine and verify field measurements, field construction criteria, quantities and details, manufacturer's catalog numbers and conformance of submittal with requirements of Contract Documents.
- B. Coordinate submittals with requirements of work and of Contract Documents.
- C. Sign or initial in a rubber-stamped review block format, each sheet of shop drawings and product data and each sample label to certify compliance with requirements of Contract Documents. Notify Architect in writing at time of submittal, of any deviations from requirements of Contract Documents.
- D. Do not fabricate products or begin work which requires submittals until return of submittal with Architect acceptance.
- E. Contractor's responsibility for errors and omissions in submittals is not relieved by Architect's review of submittals.
- F. Contractor's responsibility for deviations in submittals from requirements of contract documents is not relieved by Architect's review of submittals, unless Architect gives specific written acceptance of deviations. Architect will review submittals for general conformance to design intent only.

1.7 SUBMISSION REQUIREMENTS

- A. Submit Shop Drawings and Product Data as soon as practicable after award of contract but not later than 30 calendar days before dates reviewed submittals will be needed.
- 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 10 working 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. Resubmittal Review: Allow 10 working days for review of each resubmittal.
- C. Submit all office samples as soon as practicable but not later than **60 or 20** days after award of contract in order to facilitate color selections and coordination of the various materials. Final color selections and release of shop drawings contingent upon color selection will not be made until all office samples have been submitted, coordinated and approved.
 - 1. Color Board shall be delivered to the project site after 60 days. Contractor is responsible for updating color board with samples submitted by Contractor and approved by Architect after 60 days.
- D. Digital Submittals: Submit to the Architect, or applicable consultant, shop drawings, product data, and samples required by specification sections. Do not submit illegible fax copies nor carbon copies of shop drawings and product data.
 - 1. The submittals shall be logged in by the General Contractor and tracked using the "Submittal" feature in the Architect's project management program (Projectmates). All submittals shall be submitted in .pdf format.
 - a. Submittals 8-1/2" x 11" and/or 11" x 17" and greater than 50 pages: Provide digital copy for the Architect's records.
 - b. Large Format Drawings (larger than 11 x 17): Provide digital copy for the Architect's records.
 - 2. Architect will indicate, via markup on each digital submittal, the appropriate action, then return submittal via the Architect's project management program (Projectmates).
 - 3. Submittals to be reviewed by consultants shall be submitted directly to the applicable consultant via ProjectMates with a copy simultaneously sent to the Architect. Submittals will be reviewed by the consultant and then delivered/transmitted to the Architect for his review prior to transmitting them to the contractor. Submittals to be reviewed by the testing lab shall be handled in the same manner.
 - 4. Color Selections & Samples: Reference "Samples" Article within this specification section.
 - 5. Submittals to be reviewed by consultants shall be submitted directly to the applicable consultant with a copy of only the digital transmittal simultaneously copied to the Architect. Submittals will be reviewed by the consultant and then delivered/transmitted to the Architect for his review prior to transmitting them to the contractor. Submittals to be reviewed by the testing lab shall be handled in the same manner.

- E. Contractor is responsible for the costs associated with the digital delivery of all submittals, and hard copy where required, to the Architect and the Architect's consultants and retrieval of all submittals from the Architect, when necessary.
- F. Accompany submittals with transmittal letter containing:
 - 1. Date.
 - 2. Project title and number.
 - 3. Contractor's name and address.
 - 4. Identification of specification section and submittal numbers.
 - 5. The number of each shop drawing, product data and sample submitted.
 - 6. Notification of deviations from contract documents.
 - 7. Other pertinent data.
- G. Submittals shall include:
 - 1. Date and revision dates.
 - 2. Project title and number.
 - 3. Names of Architect, Contractor, subcontractor, supplier and manufacturer.
 - 4. Identification of product or material and specification section number.
 - 5. Relation to adjacent structure, materials or other critical features.
 - 6. Field dimensions, clearly identified as such.
 - 7. Applicable reference standards.
 - 8. A blank space 3" x 4" for Architect's stamp.
 - 9. Identification of deviations from contract documents.
 - 10. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of field measurements, compliance with contract documents and coordination with requirements of the work.
Note: Absence of the Contractor's stamp shall constitute grounds for rejection of the submittal until such time as the submittal has been processed in accordance with this requirement.
 - 11. Other pertinent data required by specifications.

1.8 RE-SUBMISSION REQUIREMENTS

- A. Re-submission: For shop drawings and product data not approved by Architect, make corrections and changes in submittals required by Architect and re-submit until approved.
 - 1. The digital re-submission shall be logged in using the "Resubmit" feature in the Architect's project management program (Projectmates).
- B. Shop Drawings:
 - 1. Revise initial drawings and re-submit as specified for initial submittal.
 - 2. Indicate on drawings any changes which have been made, other than those requested by Architect.
- C. Product Data and Samples: Submit new data and samples as specified for initial submittal

1.9 DISTRIBUTION OF SUBMITTALS AFTER REVIEW

- A. Distribute reviewed submittal of shop drawings and product data which carry Architect's stamp as follows: Contractor's file, project site file, record documents file, other prime contractors.
- B. Keep and maintain a full set of submittals throughout the construction phase to be submitted to the Architect with other Close-out documents for delivery to the Owner for his permanent record. Set of submittals shall be delivered to the Architect in cardboard file boxes with string and button type closures. Organize submittals by CSI divisions, utilizing neatly labeled pressboard dividers to separate the sections. Neatly label short end of box with project name, contents and duration of construction.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01 35 00

ALTERATION PROJECT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. General: The procedures and administrative requirements of this section apply to all of the sections of the specification which are involved in alterations to the existing building.
2. Extent Notes: Cut into or partially remove portions of the existing buildings as necessary to make way for new construction. Include such work as:
 - a. Cutting, moving, or removal of items shown to be cut, moved, or removed.
 - b. Cutting, moving, or removal of items not shown to be cut, moved, or removed, but which must be cut, moved, or removed to allow the new work to proceed. Work or items which are to remain in the finished work shall be patched or reinstalled after their cutting, moving, or removal, and their joints and finishes made to match adjacent or similar work.
 - c. Removal of existing surface finishes as needed to install new work or finishes.
 - d. Removal of abandoned items and removal of items serving no useful purpose, such as abandoned piping.
 - e. Repair or removal of dangerous or unsanitary conditions resulting from alterations work.

B. Related Requirements:

1. Section 01 11 00 - Summary of Work; Sequence of construction and instructions concerning asbestos.
2. Section 01 50 00 - Temporary Facilities and Controls.
3. Section 01 73 29 - Cutting and Patching.
4. Section 01 74 13 - Progress Cleaning.
5. Section 02 41 19 - Selective Structure Demolition.

1.2 SCHEDULING AND ACCESS

- A. Maintenance of Access and Operations: During period of construction, do not obstruct in any manner existing exit ways of Owner-occupied areas. Prior to removal of existing exit ways (stairs, corridors, doors) as part of new work, provide and maintain new exit ways so as to maintain same number of exit ways. Maintain existing fire doors in an operable condition.
- B. Maintenance of Existing Services:
1. Maintain environmental control in existing buildings, especially temperature, humidity and dust control.
 2. Provide temporary lines and connections as required to maintain existing mechanical and electrical services in buildings.
 3. Notify Owner a minimum of seven days prior to each required interruption of mechanical or electrical services in buildings. Such interruptions shall be only at such times and for lengths of time as approved by the Owner. In no event shall interruption occur without prior approval of the Owner.

PART 2 - PRODUCTS

2.1 PRODUCTS FOR PATCHING EXTENDING WORK

- A. New Materials: As specified in individual sections.
- B. Match existing products and work for patching and extending work.
- C. Determine type and quality of existing products by inspection and any necessary testing, and workmanship by use of existing as a standard. Presence of a product, finish, or type of work, requires that patching, extending, or matching shall be performed as necessary to make work complete and consistent with existing quality or specifications if more stringent.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Verify that demolition is complete, and areas are ready for installation of new work.

- B. Beginning of restoration work means acceptance of existing conditions.

3.2 PREPARATION

- A. Cut, move, or remove items as necessary for access to alterations and renovations work; replace and restore at completion.
- B. Remove unsuitable material not marked for salvage, such as rotted wood, rusted materials, and deteriorated masonry and concrete; replace materials as specified for finished work.
- C. Remove debris and abandoned items from area and from concealed spaces.
- D. Prepare surfaces and remove surface finishes to provide for proper installation of new work and new finishes.
- E. Close openings in exterior surfaces to protect existing work and salvage items from weather and extremes of temperature and humidity. Insulate ductwork and piping to prevent condensation in exposed areas.

3.3 INSTALLATION

- A. Coordinate work of alterations and renovations to expedite completion.
- B. Project shall be complete.
- C. Remove, cut, and patch work in a manner to minimize damage and to provide means of restoring products and finishes to specified condition.
- D. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent new finishes.
- E. Install products as specified in individual sections.

3.4 ALTERATIONS, CUTTING, AND PROTECTION

- A. Extent:
 - 1. Cutting and removal work shall be performed so as not to cut or remove more than is necessary and so as not to damage adjacent work.
 - 2. Conduct work in such a manner as to minimize noise and to minimize accumulation and spread of dirt and dust.
 - 3. Perform cutting for ductwork and other rectangular openings with carborundum saw with approved dust arrestor.
 - 4. Drill holes for conduit and piping using core drills.
- B. Shoring, Bracing, and Capping: Provide shores, needling and bracing as needed to keep buildings structurally secure and free of deflection in all its parts, and as needed for installation of new structural members.
- C. Responsibility and Assignment to Trades:
 - 1. Contractor shall assign the work of moving, removal, cutting, patching and repair to trades under his supervision so as to cause the least damage to each type of work encountered, and so as to return the buildings as much as possible to the appearance of new work.
 - 2. Patching of finish materials shall be assigned to mechanics skilled in the work of the finish trade involved.
- D. Protection:
 - 1. Protect remaining finishes, equipment, and adjacent work from damage caused by cutting, moving, removal and patching operations. Protect surfaces which will remain a part of the finished work.
 - 2. Protect existing facilities and features, within designated construction limits and along corridor access route to construction area.

3. Cover existing wall and floor finishes in work areas, in adjacent areas, and along corridor access route to prevent damage from product delivery and construction operations. Use reinforced sheeting, listed by Underwriters' Laboratories, Inc., as having a flame spread rating of less than 25 and smoke developed rating of less than 50. Apply double thickness of sheeting, fastened to one side with no-tear fasteners. Tape joints continuously.
 4. During demolition, cutting and construction, provide positive dust control by wetting dust debris and by completely sealing openings to Owner-occupied areas with temporary partitions, so as to prevent spread of dust and dirt to adjacent areas.
 5. After materials, equipment and machinery are installed, properly protect work until final acceptance.
 6. Damage resulting from construction operations shall be repaired by the Contractor without cost to the Owner.
 7. During non-working hours, provide continuous security at openings cut into existing exterior walls and roofs.
- E. Debris:
1. Remove debris promptly from the site each day. Removed material, except that listed or marked by the Architect for retention, becomes property of the Contractor. Load removed material directly on trucks for removal from site. Do not allow debris to enter sewers.
 2. Do not let piled material endanger structure.
 3. During cutting and coring operations, use metal lined wood box secured tight against surface, to catch falling debris and water.

3.5 PATCHING, EXTENDING, AND MATCHING

- A. Skill: Patch and extend existing work using skilled mechanics who are capable of matching the existing quality of workmanship. The quality of patched or extended work shall not be less than that specified in the sections of the product and execution specifications which follow these general requirements.
- B. Patching:
1. In areas where any portion of an existing finishing surface is damaged, lifted, stained, or otherwise made or found to be imperfect, patch or replace the imperfect portion of the surface with matching material.
 2. Provide adequate support or substrate for patching of finishes.
 3. If the imperfect surface was a painted or coated one, re-paint or re-coat the patched portion in such a way that uniform color and texture over the entire surface results.
 4. If the surrounding surface cannot be matched, re-paint or re-coat the entire surface.
- C. Quality:
1. In the sections of the product and execution of specifications which follow these general requirements, no concerted attempt has been made to describe each of the various existing products that must be used to patch, match, extend or replace existing work. Obtain such products in time to complete the work on schedule. Such products shall be provided in quality which is in no way inferior to the existing products.
 2. The quality of the products that exist in the buildings, as apparent during pre-bid site visits, shall serve as the specification requirement for strength, appearance, and other characteristics.
- D. Transitions:
1. Where new work abuts or finishes flush with existing work, make the transition as smooth and workmanlike as possible. Patched work shall match existing adjacent work in texture and appearance so as to make the patch or transition invisible to the eye.
 2. Where masonry, or other finished surface is cut in such a way that a smooth transition with new work is not possible, terminate the existing surface in a neat fashion along a straight line at a natural line of division and provide trim appropriate to the finished surface.
 3. Where two or more spaces are indicated to become one space, rework floors and ceilings so that horizontal planes, without breaks, steps or bulkheads result.
 4. In cases of extreme change of level (3" or more), obtain instructions from Architect as to method of making transition. Either stepping, bulkheading, encasement, ramping, sloping or change of transition line shall be employed, or a combination of these, as directed in each case by the Architect.
- E. Matching:
1. Restore existing work that is damaged during construction to a condition equal to its condition at the time of the start of the work.
 2. At locations in existing areas where partitions are removed, patch the floors, walls, and ceilings with finish materials to match adjacent finishes.

3. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

3.6 REPAIR

- A. Replace work damaged in the course of alterations, except at areas approved by the Architect for repair.
- B. Where full removal of extensive amounts of almost-suitable work would be needed to replace damaged portions, then filling, spackling, straightening, and similar repair techniques, followed by full painting or other finishing, will be permitted.
- C. If the repaired work is not brought up to the standard for new work, the Architect will direct that it be cut out and replaced with new work.

3.7 FIRESTOPPING

- A. Where existing partitions or walls are penetrated by new work, seal around penetrating conduit or sleeve with approved and listed safig.

3.8 CLEANING

- A. In addition to cleaning specified in SECTION 01 74 13 - PROGRESS CLEANING, clean Owner-occupied areas of work daily.

END OF SECTION

SECTION 01 41 00

REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.1 CODES

- A. Where references are made on drawings or specifications to codes, they shall be considered an integral part of the contract documents as minimum standards. Nothing contained in the contract documents shall be so construed as to be in conflict with any law, bylaw or regulation of the municipal, state, federal or other authorities having jurisdiction.
- B. Perform work in compliance with all City of North Richland Hills, Haltom City, Hurst and Watauga ordinances and requirements.

1.2 GOVERNING LAWS

- A. Additional information with legal implications regarding applicable governing laws and jurisdictions can be found in the conditions of the contract.

1.3 PERMITTING

- A. Contractor shall, without additional expense to Owner, obtain necessary licenses and permits, and be responsible for complying with any federal, state, county and municipal laws, codes and regulations applicable to the performance of the work, including, but not limited to, any laws or regulations requiring the use of licensed contractors to perform parts of the work.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

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SECTION 01 42 00

REFERENCES

PART 1 - GENERAL

1.1 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.
- B. Publication Dates: Comply with standards in effect as of date of the contract documents.
- C. Copies of Standards: Each entity engaged in construction on project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the contract documents.
1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

- D. Abbreviations and Acronyms for 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 in the following list. Names, telephone numbers, and web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the contract documents.

ADAAG	Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities Available from Access Board www.access-board.gov	800.872.2253 202.272.0080
CRD	Handbook for Concrete and Cement Available from Army Corps of Engineers Waterway Experiment Station http://www.erdc.usace.army.mil/	601.634.2355
DOD	Department of Defense Military Specifications and Standards Available from Department of Defense Single Stock Point www.dodssp.daps.dla.mil	215.697.6257
FED-STD	Federal Standard (See FS)	
FS	Federal Specification Available from Department of Defense Single Stock Point www.dodssp.daps.dla.mil	215.697.6257
	Available from General Services Administration www.gsa.gov	202.501.1021
	Available from National Institute of Building Sciences www.nibs.org	202.289.7800
ICC-ES	ICC Evaluation Services, Inc. www.icc-es.org	800.423.6587 562.699.0543
MIL	See MILSPEC	
MIL-STD	See MILSPEC	
MILSPEC	Military Specification and Standards Available from Department of Defense Single Stock Point www.dodssp.daps.dla.mil	215.697.6257

REFERENCES

TAS	Texas Accessibility Standards P.O. Box 12157 Austin, TX 78711 www.license.state.tx.us/ab/abtas.htm	512.463.3211
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1.2 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 entities in the following list. Names, telephone numbers, and web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the contract documents.

AA	Aluminum Association, Inc. (The) www.aluminum.org	703.358.2960
AAMA	American Architectural Manufacturers Association www.aamanet.org	847.303.5664
AASHTO	American Association of State Highway and Transportation Officials www.transportation.org	202.624.5800
ACI	ACI International (American Concrete Institute) www.aci-int.org (www.concrete.org)	248.848.3700
AGA	American Gas Association www.aga.org	202.824.7000
AISC	American Institute of Steel Construction www.aisc.org	800.644.2400 312.670.2400
AISI	American Iron and Steel Institute www.steel.org	202.452.7100
ANSI	American National Standards Institute www.ansi.org	202.293.8020
APA	APA-The Engineered Wood Association www.apawood.org	253.565.6600
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers www.ashrae.org	404.636.8400
ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	610.832.9585
AWI	Architectural Woodwork Institute www.awinet.org	571.323.3636
AWPA	American Wood Protection Association www.awpa.com	205.733.4077
AWS	American Welding Society www.aws.org	800.443.9353 305.443.9353
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	212.297.2122
BIA	Brick Industry Association (The) www.gobrick.com	703.620.0010

CISCA	Ceilings & Interior Systems Construction Association www.cisca.org	630.584.1919
CLFMI	Chain Link Fence Manufacturers Institute www.chainlinkinfo.org	301.596.2583
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	847.517.1200
DHI	Door and Hardware Institute www.dhi.org	703.222.2010
FM	Factory Mutual System (See FMG)	
FMG	FM Global (Formerly: FM - Factory Mutual System) www.fmglobal.com	401.275.3000
GA	Gypsum Association www.gypsum.org	301.277.8686
GANA	Glass Association of North America www.glasswebsite.com	785.271.0208
HMMA	Hollow Metal Manufacturers Association (See NAAMM)	
HPVA	Hardwood Plywood & Veneer Association www.hpva.org	703.435.2900
IGCC	Insulating Glass Certification Council www.igcc.org	315.646.2234
IGMA	Insulating Glass Manufacturers Alliance (The) www.igmaonline.org	613.233.1510
MBMA	Metal Building Manufacturers Association www.mbma.com	216.241.7333
MFMA	Maple Flooring Manufacturers Association, Inc. www.maplefloor.org	888.480.9138
MFMA	Metal Framing Manufacturers Association www.metalframingmfg.org	312.644.6610
MIA	Marble Institute of America www.marble-institute.com	440.250.9222
NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	630.942.6591
NCMA	National Concrete Masonry Association www.ncma.org	703.713.1900
NeLMA	Northeastern Lumber Manufacturers' Association www.nelma.org	207.829.6901
NEMA	National Electrical Manufacturers Association www.nema.org	703.841.3200

Controlled Entry at 15 Campuses
 Birdville ISD
 North Richland Hills, Haltom City, Hurst and Watauga, Texas

NFPA	NFPA (National Fire Protection Association) www.nfpa.org	800.344-3555 617.770-3000
NFRC	National Fenestration Rating Council www.nfrc.org	301.589.1776
NHLA	National Hardwood Lumber Association www.nhla.com	800.933.0318 901.377.1818
NLGA	National Lumber Grades Authority www.nlga.org	604.524.2393
NOFMA	National Oak Flooring Manufacturers Association (The Wood Flooring Manufacturers Association) www.nofma.org	901.526.5016
NRCA	National Roofing Contractors Association www.nrca.net	800.323.9545 847.299.9070
NTMA	National Terrazzo & Mosaic Association, Inc. www.ntma.com	800.323.9736 540.751.0930
NWWDA	National Wood Window and Door Association (See WDMA)	
PCI	Precast/Prestressed Concrete Institute www.pci.org	312.786.0300
PDCA	Painting and Decorating Contractors of America www.pdca.org	800.332.7322 314.514.7322
SDI	Steel Deck Institute www.sdi.org	847.458.4647
SDI	Steel Door Institute www.steeldoor.org	440.899.0010
SEFA	Scientific Equipment and Furniture Association www.sefalabs.com	516.294.5424
SGCC	Safety Glazing Certification Council www.sgcc.org	315.646.2234
SIGMA	Sealed Insulating Glass Manufacturers Association (See IGMA)	
SJI	Steel Joist Institute www.steeljoist.org	843.626.1995
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	703.803.2980
SPIB	Southern Pine Inspection Bureau (The) www.spib.org	850.434.2611
TCNA	Tile Council of America, Inc. www.tileusa.com	864.646.8453
TPI	Truss Plate Institute, Inc. www.tpinst.org	703.683.1010

UL	Underwriters Laboratories Inc. www.ul.com	800.285.4476 847.272.8800
USGBC	U.S. Green Building Council www.usgbc.org	800.795.1747 202.828.7422
WCLIB	West Coast Lumber Inspection Bureau www.wclib.org	800.283.1486 503.639.0651
WDMA	Window & Door Manufacturers Association (Formerly: NWWA - National Wood Window and Door Association) www.wdma.com	800.223.2301 312.321.6802
WI	Woodwork Institute www.woodworkinstitute.com	916.372.9943
WWPA	Western Wood Products Association www.wwpa.org	503.224.3930

B. Code Agencies: Where abbreviations and acronyms are used in specifications or other contract documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the contract documents.

BOCA	BOCA International, Inc. (See ICC)	
CABO	Council of American Building Officials (See ICC)	
IAPMO	International Association of Plumbing and Mechanical Officials www.iapmo.org	909.472.4100
ICBO	International Conference of Building Officials (See ICC)	
ICC	International Code Council (Formerly: CABO - Council of American Building Officials) www.iccsafe.org	888.422.7233 703.931.4533
SBCCI	Southern Building Code Congress International, Inc. (See ICC)	

C. Federal Government Agencies: Where abbreviations and acronyms are used in specifications or other contract documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the contract documents.

CE	Army Corps of Engineers www.usace.army.mil	
CPSC	Consumer Product Safety Commission www.cpsc.gov	800.638.2772 301.504.6816
EPA	Environmental Protection Agency www.epa.gov	202.272.0167
OSHA	Occupational Safety & Health Administration www.osha.gov	800.321.6742 202.693.1999

Controlled Entry at 15 Campuses
Birdville ISD
North Richland Hills, Haltom City, Hurst and Watauga, Texas

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01 42 16

DEFINITIONS

PART 1 - GENERAL

1.1 DEFINITIONS

- A. "Furnish": Supply and deliver to project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- B. "Install": Operations at project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- C. "Product": Materials, systems and equipment.
- D. "Project Manual": Volume assembled for the Work which may include the bidding requirements, sample forms, conditions of the contract, and specifications.
- E. "Provide": Furnish and install, complete and ready for the intended use.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

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SECTION 01 45 00
QUALITY CONTROL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Quality control of products and workmanship.
 - 2. Manufacturer's instructions.
 - 3. Manufacturer's certificates and field services.
 - 4. Mockups.

- B. Related Requirements:
 - 1. Section 01 33 23 - Shop Drawings, Product Data, and Samples: Field samples. Submittal of manufacturer's instructions.
 - 2. Section 01 42 00 - References.
 - 3. Section 01 45 23 - Testing and Inspection Services.
 - 4. Section 01 62 00 - Product Options.
 - 5. Individual Specifications Sections: Mockups required.

1.2 DESCRIPTION

- A. Maintain quality control over supervision, subcontractors, suppliers, manufacturers, products, services, workmanship, and site conditions, to produce work in accordance with contract documents.

1.3 WORKMANSHIP

- A. Comply with industry standards of the region except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
- B. Provide suitably qualified personnel to produce work of specified quality.
- C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.
- D. Provide finishes to match approved samples.

1.4 MANUFACTURER'S INSTRUCTIONS

- A. Require compliance with instructions in full detail, including each step in sequence.
- B. Should instruction conflict with contract documents, request clarification from Architect/Engineer before proceeding.

1.5 MANUFACTURER'S CERTIFICATES

- A. When required in individual Specifications section, submit manufacturer's certificate, in duplicate, certifying that products meet or exceed specified requirements, executed by responsible officer.

1.6 MANUFACTURER'S FIELD SERVICES

- A. When required in individual Specifications section, have manufacturer or his authorized representative provide qualified representative to observe field conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment test, adjust, and balance of equipment as applicable, and to make written report of observations and recommendations to Architect.
- B. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- C. Submit report in duplicate within 30 days of observation to Architect/Engineer for review.

1.7 MOCKUPS

- A. Tests will be performed under provisions of SECTION 01 45 23 - TESTING AND INSPECTION SERVICES.
- B. Assemble and erect complete, with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Acceptable mockups in place may be retained in completed work.

1.8 FIELD SAMPLES

- A. Install field samples at the site as required by individual specification sections for review.
- B. Acceptable samples represent a quality level for the work.
- C. Where field sample is specified in individual sections to be removed, clear area after field sample has been accepted by Architect/Engineer.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 GENERAL

- A. Provide temporary facilities and controls needed for the work including, but not limited to those described in the Articles below.
- B. Maintain temporary facilities and controls as long as needed for safe and proper completion of the work.

1.2 ACCESS

- A. Provide adequate access to and temporary roads to the site of the building if required for the prosecution of the work.
- B. Provide and maintain access to fire hydrants, free of obstructions.

1.3 TELEPHONES AND ELECTRONIC COMMUNICATION SERVICE

- A. Electronic Communication Service: Provide a computer, printer, high-speed data connection, and internet service as required for the Contractor to maintain internet access and e-mail correspondence.
 - 1. The Architect's project management system is Projectmates by Systemates, which can be accessed by logging in at the following website: www.vlkprojects.com. Contractor shall utilize this system for all formal and informal correspondence with the Architect and Architect's Consultants, including E-Mails, Requests for Information, Proposals, Submittals, Submittal Transmittals, Meeting Minutes (for regularly scheduled meetings), and Warranty Responses (if warranty items are submitted in the system). In addition, Subcontractor Lists, Project Schedules, Schedule of Values and other documents requiring submission shall be uploaded in pdf, Word, or Excel format by the Contractor to the appropriate location in Projectmates. At the Contractor's option, Pay Applications, Project Schedules, and Transmittals, may be created or imported into the system, as well.
 - 2. While the project management system is very user friendly and easy to learn, Architect will provide informal training for the Contractor as necessary to expedite the Contractor's familiarity with the program.
 - 3. Contractor shall pay for installation, maintenance, and removal of high-speed data connection and for all use charges.

1.4 TEMPORARY ELECTRICAL SERVICE

- A. At all locations, the Contractor may utilize building electrical power to the extent existing power may be suitable for construction operations. The contractor shall make all tie-ins and shall maintain utility service in all occupied areas. Damage, if any, caused by the Contractor use or tie-ins shall be immediately corrected by the Contractor to as-new conditions. Owner shall pay only the energy charges.
 - 1. Provide GFCI adapters since existing circuits may not be protected.
- B. The Contractor shall provide and maintain electrical power to points in the building convenient for and available to all trades, including mechanical and other subcontractors, so that power may be secured anywhere in the building with no more than a 100 ft. extension cord. Energy charges for power taken from existing building electrical system shall be paid by the Owner.

1.5 TEMPORARY LIGHTING

- A. Provide and maintain temporary lighting inside the building for safe and adequate working conditions throughout all areas where work of any kind is being performed. Provide at least 1/2 watt of incandescent lighting for each square foot of space. Where practical, place temporary lights in the locations where the permanent lighting fixtures are to be installed.

1.6 TEMPORARY VENTILATION

- A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

TEMPORARY FACILITIES AND CONTROLS

- B. Utilize existing ventilation equipment. Extend and supplement equipment with temporary fan units as required to maintain clean air for construction operations.

1.7 TEMPORARY WATER SERVICE

- A. Provide and maintain a temporary water supply during the course of construction and pay meter installation or "tap" fee, if any. Include necessary piping and hose connections. Take precautions to avoid spattering and spilling water in the building. Monthly water usage will be paid by the Owner.

1.8 TEMPORARY SANITARY FACILITIES

- A. Contractor/vendor shall only use restrooms designated for contractors/workers. Student restrooms are prohibited from use. The following are the only facilities for use:
 - 1. Inside Birdville ISD buildings, "faculty only" facilities, if necessary, with preference for contractors to use contractor furnished "portable" facilities;
 - 2. Outside Birdville ISD property, contractor/vendor furnished "portable" facilities.
- B. Provide and maintain adequate sanitary toilet facilities on the project site. The toilet facilities shall meet the requirements of the public authorities having jurisdiction and their use strictly enforced. Sanitary sewer "tap" fee and monthly use fees, if any, shall be paid by Contractor if temporary facilities are connected to city sanitary sewer.

1.9 REFUSE

- A. The Contractor shall provide refuse removal service at all times.

1.10 PROTECTIVE FACILITIES

- A. Provide and maintain temporary guardrails, handrails and covers for floor, roof and wall openings, vertical shafts and stairways. If movement of the protective facilities is required by a subcontractor to perform his work, it will be the responsibility of that subcontractor to give prior notification to the Contractor and to replace the protective facilities in a satisfactory manner.
- B. Provide and maintain, as per City of North Richland Hills, Haltom City, Hurst and Watauga requirements, fire lane(s) and other required fire protection at the appropriate time and sequence of construction.

1.11 BARRICADES

- A. Provide and maintain lighted barricades and fences for the public protection in accordance with requirements of the local city ordinances.

1.12 TEMPORARY FIRE PROTECTION

- A. Contractor shall provide adequate fire extinguishers on the premises during the course of construction, of the type and size recommended to control fires, which may result from the particular work being performed in accordance with the local fire marshal and fire codes.
- B. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of ignition for possible fires.
 - 1. Keep work area free of combustible material.
 - 2. A fire watch consisting of at least one man furnished by Contractor with a fire extinguisher in hand and with no other assigned duties, shall be posted to stand by and observe for potential hazards while welding or cutting is being done. Equip fire watch with suitable personal eye protection and fire extinguishers.
 - 3. At completion of work operations, immediately inspect work and adjacent area for hazards. Re-inspect work for hazards at 1/2 hour and at one hour after completion of welding and cutting operations.
- C. No smoking shall be allowed within the building or on the site.

1.13 ENCLOSURES

- A. Provide temporary partitions and ceilings as required to separate work areas from Owner occupied areas, to prevent penetration of dust and moisture into Owner occupied areas, to prevent damage to existing areas and equipment. Construction: Framing and sheet materials with closed joints and sealed edges at intersections with existing surfaces; STC rating 35 in accordance with ASTM E 90; flame spread rating of 25 in accordance with ASTM E 84; paint surfaces exposed to view in Owner occupied areas.

1.14 WATER CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide and operate pumping equipment.
- B. Protect site from puddling or running water.

1.15 CLEANING DURING CONSTRUCTION

- A. Control accumulation of waste materials and rubbish; periodically dispose of off site.
- B. Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.
- C. Refer to SECTION 01 74 13 - PROGRESS CLEANING for additional cleaning requirements.

1.16 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary materials, equipment, services, and construction prior to substantial completion inspection.
- B. Clean and repair damage caused by installation or use of temporary facilities. Remove underground installations to a depth of 2'; grade site as indicated. Restore existing facilities used during construction to specified, or to original, condition.

1.17 PROJECT IDENTIFICATION SIGNS

- A. Furnish and erect a project sign, approximately 4' high by 8' long of 3/4" thick exterior grade plywood, in conformance with sign detail supplied by the Architect. Support on posts of framing of treated wood or steel.
- B. Erect sign within 30 days of start of construction and maintain in good condition until completion of project. Sign shall be located as directed by the Architect.
- C. No other signs or advertising of any kind, except precautionary warning signs, will be permitted.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

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SECTION 01 62 00

PRODUCT OPTIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Administrative and procedural requirements for product options and substitutions.
- B. Related Requirements:
 - 1. Section 01 31 00 - Project Management and Coordination: Coordination of construction.
 - 2. Section 01 33 23 - Shop Drawings, Product Data, and Samples: Product data submittals.
 - 3. Section 01 42 00 - References: Applicability of specified reference standards.
 - 4. Section 01 78 23 - Operation and Maintenance Data.
 - 5. Section 01 78 39 - Project Record Documents.

1.2 PRODUCT LIST

- A. Within 30 days after date of contract, submit to the Architect a list of products and materials which are proposed for substitution per SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

1.3 CONTRACTOR'S OPTIONS

- A. For products specified only by reference standards, select any product meeting standards, by any manufacturer.
- B. For products specified by naming several products or manufacturers, followed by the words "NO SUBSTITUTIONS", select one of the products/manufacturers named.
- C. For products specified by naming only one product and manufacturer, there is no option unless a substitution is approved as specified below.
- D. For products specified by naming only one product and manufacturer, followed by the words "NO SUBSTITUTIONS", there is no option.

1.4 SUBSTITUTIONS

- A. Requests for substitution to material, products, or equipment instead of those specified will be considered if received at least 10 days prior to the bid date. Substitution request received within 10 days of the bid date will be returned without review. Refer to Substitution Request (During the Bidding Phase) form attached to this section.
- B. Within 30 days after Notice to Proceed, Architect will consider additional formal requests from the Contractor for substitutions of products in place of those specified. Refer to Substitution Request (After the Bidding Phase) form attached to this section.
- C. Submit a separate request for each substitution on a copy of the "SUBSTITUTION REQUEST" form, attached to this section. Include in request:
 - 1. Complete data substantiating compliance of proposed substitution with contract documents.
 - 2. For products:
 - a. Product identification, including manufacturer's name and address.
 - b. Manufacturer's literature, including product description, performance and test data and reference standards.
 - c. Samples, if applicable.
 - d. Name and address of similar projects on which product was used and date of installation.
 - 3. For construction methods:
 - a. Detailed written descriptions of proposed method.
 - b. Complete drawings illustrating methods or revisions.
 - 4. Itemized Comparison of qualities of proposed substitution with product or method specified.
 - 5. Changes required in other elements of work because of substitution.
 - 6. Effect on construction schedule.

- D. Request for substitution constitutes a representation that General Contractor or Construction Manager:
 - 1. Has personally investigated proposed product or method and determined that it is equal to or superior in all respects to that specified.
 - 2. Will provide same warranties for substitution as for product or method specified.
 - 3. Will coordinate installation of accepted substitution into the work, making such changes as may be required for the work to be complete in all respects.
 - 4. Waives all claims for additional cost, under his responsibility and related to substitution, which subsequently become apparent.
- E. Substitutions will not be considered if:
 - 1. They are indicated or implied on shop drawings or product data submittals without formal request submitted in accordance with this section.
 - 2. Acceptance will require substantial revision of contract documents.
- F. If substitution is not approved or accepted, Contractor shall furnish specified product or method at no additional cost to the Owner.
- G. Acceptance of a proposed substitution prior to the bid date will be in the form of an addendum.

1.5 SUBMITTAL PROCEDURES

- A. Submit request for substitution.
- B. Architect will review Contractor's requests for substitutions with reasonable promptness.
- C. For accepted products, submit shop drawings, product data, and samples under provisions of SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SUBSTITUTION REQUEST
 (During the Bidding Phase)
 (Submittal must be received 10 days prior to bid/proposal date)

Project: _____ Substitution Request Number: _____

From: _____
To: _____ Date: _____

A/E Project Number: _____
Re: _____ Contract For: _____

Specification Title: _____ Description: _____
Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____
Manufacturer: _____ Address: _____ Phone: _____
Trade Name: _____ Model No.: _____

Attached data includes product description, specifications, drawings, custom color/pre-selected color availability, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E/ design, detailing, and construction costs caused by the substitution.

Submitted by: _____
Signed by: _____
Firm: _____
Address: _____

Telephone: _____

A/E REVIEW AND ACTION

- Substitution approved - Submit bid/proposal based on accepted substitution.
- Substitution approved as noted - Submit bid/proposal based on accepted substitution - as noted.
- Substitution rejected - Submit bid/proposal for specified materials.
- Substitution Request received too late - Submit bid/proposal for specified materials.

Signed by: _____ Date: _____

Supporting Data Attached: Drawings Product Data Samples Tests Reports _____

SUBSTITUTION REQUEST
(After the Bidding Phase)
(Submittal must be received not later than 30 days after Notice to Proceed)

Project: _____ Substitution Request Number: _____
_____ From: _____
To: _____ Date: _____
_____ A/E Project Number: _____
Re: _____ Contract For: _____

Specification Title: _____ Description: _____
Section No.: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____
Manufacturer: _____ Address: _____ Phone: _____
Trade Name: _____ Model No.: _____

History: New product 2-5 years old 5-10 years old More than 10 years old

Differences between proposed substitution and specified product: _____

For finish materials and pre-finished equipment, list the colors available for the specified item and the colors available for the proposed substitution.

Point-by-point comparative data attached - REQUIRED BY A/E

Reason for not providing specified item: _____

Similar Installation:

Project: _____ Architect: _____
Address: _____ Owner: _____
_____ Date Installed: _____

Proposed substitution affects other parts of Work: No Yes; explain _____

Savings to Owner for accepting substitution: _____ (\$ _____).

Proposed substitution changes Contract Time: No Yes [Add] [Deduct] _____ days.

Supporting Data Attached: Drawings Product Data Samples Tests Reports _____

SUBSTITUTION REQUEST - Continued

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

Telephone: _____

Attachments: _____

A/E REVIEW AND ACTION

- Substitution approved - Make submittals in accordance with Section 01 33 23.
- Substitution approved as noted - Make submittals in accordance with Section 01 33 23.
- Substitution rejected - Use specified materials.
- Substitution Request received too late - Use specified materials.

Signed by: _____ Date _____

Additional Comments: Contractor Subcontractor Supplier Manufacturer A/E _____

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SECTION 01 65 00

PRODUCT DELIVERY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Requirements Included:
 - 1. Packaging, Transportation.
 - 2. Delivery and Receiving.
 - 3. Product Handling.

- B. Related Requirements:
 - 1. Section 01 32 16 - Construction Progress Schedules.
 - 2. Section 01 33 23 - Shop Drawings, Product Data and Samples: Manufacturers' Instructions.
 - 3. Section 01 66 00 - Product Storage and Handling Requirements.
 - 4. Individual Sections: Specific requirements for packaging, shipping and handling.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 PACKAGING, TRANSPORTATION

- A. Require supplier to package products in boxes or crates for protection during shipment, handling and storage. Protect sensitive products against exposure to elements and moisture.

- B. Protect sensitive equipment and finishes against impact, abrasion and other damage.

3.2 DELIVERY AND RECEIVING

- A. Arrange deliveries of products in accordance with construction progress schedules. Allow time for inspection prior to installation.

- B. Coordinate deliveries to avoid conflict with work and conditions at site; limitations on storage space; availability of personnel and handling equipment; and Owner's use of premises.

- C. Deliver products in undamaged, dry condition, in original unopened containers or packaging with identifying labels intact and legible.

- D. Clearly mark partial deliveries of component parts of equipment to identify equipment and contents to permit easy accumulation of parts and to facilitate assembly.

- E. Immediately on delivery, inspect shipment to assure
 - 1. Product complies with requirements of contract documents and reviewed submittals.
 - 2. Quantities are correct.
 - 3. Accessories, and installation hardware are correct.
 - 4. Containers and packages are intact and labels legible.
 - 5. Products are protected and undamaged.

3.3 PRODUCT HANDLING

- A. Provide equipment and personnel to handle products by methods to prevent soiling and damage.

- B. Provide additional protection during handling to prevent marring and otherwise damaging products, packaging and surrounding surfaces.

Controlled Entry at 15 Campuses
Birdville ISD
North Richland Hills, Haltom City, Hurst and Watauga, Texas

- C. Handle product by methods to avoid bending or over-stressing. Lift large and heavy components only at designated lift points.

END OF SECTION

SECTION 01 66 00

PRODUCT STORAGE AND HANDLING REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Requirements Included:
 - 1. Storage, General.
 - 2. Enclosed Storage.
 - 3. Exterior Storage.
 - 4. Maintenance of Storage.

- B. Related Requirements:
 - 1. Section 01 11 00 - Summary of Work.
 - 2. Section 01 50 00 - Construction Facilities and Temporary Controls: Storage facilities. Protection of installed work.
 - 3. Section 01 65 00 - Product Delivery Requirements.
 - 4. Section 01 78 39 - Project Record Documents.

PART 2 - PRODUCTS - Not used.

PART 3 - EXECUTION

3.1 STORAGE, GENERAL

- A. Store products, immediately on delivery, in accordance with manufacturer's instructions, with seals and labels intact. Protect until installed.

- B. Arrange storage in a manner to provide access for maintenance of stored items and for inspection.

3.2 ENCLOSED STORAGE

- A. Store products, subject to damage by the elements, in substantial weathertight enclosures.

- B. Maintain temperature and humidity within ranges stated in manufacturer's instructions.

- C. Provide humidity control and ventilation for sensitive products as required by manufacturer's instructions.

- D. Store unpacked and loose products on shelves, in bins, or in neat groups of like items.

3.3 EXTERIOR STORAGE

- A. Provide substantial platforms, blocking, or skids, to support fabricated products above ground; slope to provide drainage. Protect products from soiling and staining.

- B. For products subject to discoloration or deterioration from exposure to the elements, cover with impervious sheet material. Provide ventilation to avoid condensation.

- C. Store loose granular materials on clean, solid surfaces such as pavement, or on rigid sheet materials, to prevent mixing with foreign matter.

- D. Provide surface drainage to prevent erosion and ponding of water.

- E. Prevent mixing of refuse or chemically injurious materials or liquids.

3.4 MAINTENANCE OF STORAGE

- A. Periodically inspect stored products on a scheduled basis.

- B. Verify that storage facilities comply with manufacturer's product storage requirements.
- C. Verify that manufacturer required environmental conditions are maintained continually.
- D. Verify that surfaces of products exposed to the elements are not adversely affected; that any weathering of finishes is acceptable under requirements of contract documents.

3.5 MAINTENANCE OF EQUIPMENT STORAGE

- A. For mechanical and electrical equipment in long-term storage, provide manufacturer's service instructions to accompany each item, with notice of enclosed instructions shown on exterior of package.
- B. Service equipment on a regularly scheduled basis, maintaining a log of services; submit as a record document.

END OF SECTION

SECTION 01 73 29

CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements and limitations for cutting and patching of work.
- B. Related Requirements:
 - 1. Section 01 11 00 - Summary of Work: Work by Owner or by separate contractors.
 - 2. Section 01 62 00 - Product Options.
 - 3. Individual Specifications Sections:
 - a. Cutting and patching incidental to work of the section.
 - b. Advance notification to other Sections of openings required in work of those sections.
 - c. Limitations on cutting structural members.

1.2 SUBMITTALS

- A. General: Submit in accordance with SECTION 01 33 23 – SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Submit written request in advance of cutting or alteration which affects
 - 1. Structural integrity of any element of the project.
 - 2. Integrity of weather-exposed or moisture-resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight-exposed elements.
 - 5. Work of Owner or separate contractor.
- C. Include in request
 - 1. Identification of project.
 - 2. Location and description of affected work.
 - 3. Necessity for cutting or alteration.
 - 4. Description of proposed work and products to be used.
 - 5. Alternatives to cutting and patching.
 - 6. Effect on work of Owner or separate contractor.
 - 7. Written permission of affected separate contractor.
 - 8. Date and time work will be executed.

1.3 PAYMENT FOR COSTS

- A. Costs resulting from ill-timed or defective work, or work not conforming to contract documents, including costs for additional services of Architect or other consultants, shall be borne by the Contractor.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Products: Those required for original installation.
- B. For any change in materials, submit request for substitution under provisions of SECTION 01 62 00 - PRODUCT OPTIONS.

PART 3 - EXECUTION

3.1 GENERAL

- A. Execute cutting, fitting and patching including excavation and fill, to complete work, and to
 - 1. Fit the several parts together, to integrate with other work.
 - 2. Uncover work to install ill-timed work.
 - 3. Remove and replace defective and non-conforming work.

4. Remove samples of installed work for testing.
5. Provide openings in elements of work for penetrations of mechanical and electrical work.

3.2 INSPECTION

- A. Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- B. After uncovering, inspect conditions affecting performance of work.
- C. Beginning of cutting or patching means acceptance of existing conditions.

3.3 PREPARATION

- A. Provide temporary supports to assure structural integrity of surroundings; devices and methods to protect other portions of project from damage.
- B. Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.
- C. Maintain excavations free of water.

3.4 PERFORMANCE

- A. Execute work by methods to avoid damage to other work, and which will provide proper surfaces to receive patching and finishing.
- B. Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- C. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- D. Restore work with new products in accordance with requirements of contract documents.
- E. Fit work tight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.
- F. At penetrations of fire-rated wall, ceiling, or floor construction, completely seal voids with fire-rated packing material, full thickness of the construction element.
- G. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.

END OF SECTION

SECTION 01 74 13

CLEANING

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Included: Throughout the construction period, maintain the buildings and sites in a standard of cleanliness as described in this section.
- B. Related Requirements: In addition to standards described in this section, comply with requirements for cleaning as described in other pertinent sections of these specifications.

1.2 QUALITY ASSURANCE

- A. Conduct a daily inspection, and more often if necessary, to verify that requirements for cleanliness are being met.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS AND EQUIPMENT

- A. Provide required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

2.2 COMPATIBILITY

- A. Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

PART 3 - EXECUTION

3.1 PROGRESS CLEANING

- A. General:
 - 1. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.
 - 2. Do not allow accumulation of scrap, debris waste material, and other items not required for construction of the work.
 - 3. At least twice each month, and more often if necessary, completely remove all scrap, debris, and waste material from the project sites.
 - 4. Provide adequate storage for all items awaiting removal from the project sites, observing requirements for fire protection and protection of the ecology.
- B. Site: (at Green Valley Elementary School)
 - 1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
 - 2. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site. Restack, tidy, or otherwise service arrangements to meet the requirements of this section.
 - 3. Maintain the site in a neat and orderly condition at all times.
- C. Structures:
 - 1. Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
 - 2. Weekly, and more often if necessary, sweep interior spaces clean.
 - a. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and a hand-held broom.
 - 3. As required preparatory to installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using equipment and materials required to achieve the necessary cleanliness.

4. Following the installation of finish floor materials, clean the finish floor daily (and more often if necessary) at all times while work is being performed in the space in which finish materials are installed.
- D. "Clean", for the purpose of this subparagraph shall be interpreted as meaning free from foreign material which, in the opinion of the Architect, may be injurious to the finish floor material.

3.2 FINAL CLEANING

- A. "Clean", for the purpose of this Article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provide by skilled cleaners using commercial quality building maintenance equipment and materials.
- B. Prior to completion of the work, remove from the project sites all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described in this section.
- C. Site (at Green Valley Elementary School):
 1. Unless otherwise specifically directed by Architect, broom clean paved areas on the site and public paved areas adjacent to the site.
 2. Completely remove resultant debris.
- D. Structures:
 1. Exterior:
 - a. Visually inspect exterior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
 - b. Remove all traces of splashed materials from adjacent surfaces.
 - c. If necessary to achieve a uniform degree of cleanliness, hose down the exterior of the structures.
 - d. In event of stubborn stains not removable with water, Architect may require light sandblasting or other cleaning at no additional cost to the Owner.
 2. Interior:
 - a. Visually inspect interior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
 - b. Remove all traces of splashed material from adjacent surfaces.
 - c. Remove paint droppings, spots, stains, and dirt from finished surfaces.
 3. Glass: Clean inside and outside.
 4. Polished Surfaces: To surfaces requiring routine application of buffed polish, apply the polish recommended by the manufacturer of the material being polished. This does not apply to resilient flooring surfaces. Reference SECTION 09 65 00 - RESILIENT FLOORING for cleaning of resilient flooring.
- E. Special floor/base final cleaning requirements:
 1. Contractor shall coordinate with the Owner's housekeeping department for preparing the surfaces for final cleaning by the Contractor and protective coatings installed by the Owner.
 2. Protection after final treatment until date of Substantial Completion shall be the responsibility of the Contractor.
 3. All repairs or re-application required as a result of damage caused by the Work shall be the responsibility of the Contractor as directed by the Owner.
- F. Schedule final cleaning, as approved by the Architect, to enable the Owner to accept a completely clean work.

3.3 CLEANING DURING OWNER'S OCCUPANCY

- A. Should the Owner occupy the work, or any portion thereof, prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning shall be as determined by the Architect in accordance with the General Conditions of the Contract for Construction.

END OF SECTION

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Administrative and procedural requirements for project closeout, including but not limited to:
 - 1. Inspection procedures.
 - 2. Project record document submittal.
 - 3. Operating and maintenance data submittal, including training sessions for equipment and systems.
 - 4. Submittal of warranties.
 - 5. Submittal of spare parts and maintenance materials.
- B. Related Requirements:
 - 1. Section 01 11 00 - Summary of Work: record drawings.
 - 2. Section 01 33 23 - Shop Drawings, Product Data and Samples.
 - 3. Section 01 74 13 - Progress Cleaning: final cleaning.
 - 4. Section 08 71 00 - Door Hardware: keys and keying schedule.

1.2 SUBSTANTIAL COMPLETION

- A. General: Substantial Completion is defined in Paragraph 9.8.1 of the General Conditions.
- B. Preliminary Procedures: Before requesting inspection for certification of substantial completion, complete the following. List exceptions in the request.
 - 1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100% completion for the portion of the work claimed as substantially complete. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
 - a. If 100% completion cannot be shown, include a list of incomplete items, the value of incomplete construction and reasons the work is not complete.
 - 2. Advise Owner of pending insurance change-over requirements.
 - 3. Submit specific warranties, maintenance agreements, final certifications and similar documents.
 - 4. Obtain and submit releases enabling the Owner unrestricted use of the work and access to services and utilities; include occupancy permits, operating certificates and similar releases.
 - 5. Submit record drawings, maintenance manuals and similar final record information.
 - 6. Deliver tools, spare parts, extra stock and similar items.
 - 7. Make final change-over of permanent locks and transmit keys and keying schedule to the Owner. Advise the Owner's personnel of change-over in security provisions.
 - 8. Complete start-up testing of systems, and training sessions for Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups and similar elements.
 - 9. Complete final clean-up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.
- C. Inspection Procedures: On receipt of a request for inspection, the Architect will either proceed with inspection or advise the Contractor of unfulfilled requirements. The Architect will prepare the Certificate of Substantial Completion following inspection, or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
 - 1. Architect will repeat the inspection when requested and assured that the work has been substantially completed.
- D. Results of the completed inspection will form the basis of requirements for final acceptance.

1.3 FINAL ACCEPTANCE

- A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, submit the following. List exceptions in the request.
 - 1. Final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.

2. Updated final statement, accounting for final additional changes to the contract sum.
 3. Certified copy of the Architect's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by the Architect.
 4. Consent of surety to final payment.
 5. Final Liquidated Damages settlement statement.
 6. Evidence of final, continuing insurance coverage complying with insurance requirements.
 7. Evidence of Compliance with Requirements of Governing Authorities
 - a. Certificate of Occupancy.
 - b. Certificates of Inspection required for mechanical and electrical systems.
 8. Operation and Maintenance Data: Under provisions of SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA.
 9. Warranties and Bonds: Under provisions of SECTION 01 78 30 - WARRANTIES AND BONDS.
 10. Project Record Documents: Under provisions of SECTION 01 78 39 - PROJECT RECORD DOCUMENTS.
 11. Spare Parts and Maintenance Materials: Under provisions of SECTION 01 78 40 - SPARE PARTS, OVERAGES AND MAINTENANCE MATERIALS.
 12. Keys and Keying Schedule: Under provisions of SECTION 08 71 00 - DOOR HARDWARE.
 13. Evidence of Payment and Release of Liens: In accordance with General Conditions of the Contract for Construction.
 14. Evidence of Payment of Debts and Claims: In accordance with General Conditions of the Contract for Construction.
 15. Certificate of Project Compliance: Required under provisions of Texas Administrative Code (TAC), Chapter 61, 1036(c)(3)(F). Form developed by the Texas Education Agency (TEA). See form attached to the end of this Section.
 16. Certification of Asbestos and Lead Free Project: The Contractor shall submit to the Architect a letter addressed to the Owner certifying that no materials used in the construction of this project contain lead nor asbestos materials in excess of amounts allowed by local/state standards, laws, codes, rules and regulations, Federal Environmental Protection Agency (EPA) standards and the Federal Occupational Safety and Health Administration (OSHA) standards, whichever are most restrictive. Certification shall further state that should lead or asbestos fibers be found in this project in concentrations greater than the allowed amounts, that the Contractor shall be responsible for determining which materials contain the lead or asbestos fibers and shall take corrective action to remove those materials from the project at no additional cost to the Owner. Final payment shall not be made until this letter of certification has been received.
- B. Re-inspection Procedures: Architect will re-inspect the work upon receipt of notice that the work, including inspection list items from earlier inspections, has been complete, except items whose completion has been delayed because of circumstances acceptable to the Architect.
1. Upon completion of re-inspection, the Architect will advise the Contractor of work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
 2. If necessary, re-inspection will be repeated.
- C. Re-inspection Fees: Should status of completion of work require re-inspection by Architect due to failure of work to comply with Contractor's claims on initial inspection, Owner will deduct the amount of Architect and appropriate consultants compensation for re-inspection services from final payment to Contractor. The reimbursement transaction shall be executed by change order to the contract.

1.4 CLOSEOUT PROCEDURES

- A. Maintenance Manuals: Organize operating and maintenance data into suitable sets of manageable size. Bind properly indexed data in three individual heavy-duty 3-1/2", three-ring vinyl-covered binders, with identification on front and spine of each binder. Include the following types of information:
1. Emergency instructions.
 2. Spare parts list.
 3. Copies of warranties.
 4. Wiring diagrams.
 5. Recommended "turn around" cycles.
 6. Inspection procedures.
 7. Shop drawings.
 8. Fixture lamping schedule.

- B. Shop Drawings: Keep and maintain a full set of submittals throughout the construction phase to be submitted to the Architect with other close-out documents for delivery to the Owner for his permanent record. Set of submittals shall be delivered to the Architect in cardboard file boxes with string and button type closures. Organize submittals by CSI divisions, utilizing neatly labeled pressboard dividers to separate the sections. Neatly label short end of box with project name, contents and duration of construction.
- C. Operating and Maintenance Training Sessions: Prepare a written agenda of items to be covered at each training session. Attendance by Owner's operating and maintenance personnel is mandatory. Notify Owner not less than 48 hours prior to scheduled training sessions.
1. Arrange for each installer of equipment and systems that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. If installers are not experienced in procedures, provide instruction by manufacturer's representatives. Include a detailed review of the following items:
 - a. Maintenance manuals.
 - b. Record documents.
 - c. Spare parts and materials.
 - d. Tools.
 - e. Lubricants.
 - f. Fuels.
 - g. Identification systems.
 - h. Control sequences.
 - i. Hazards.
 - j. Cleaning.
 - k. Warranties and bonds.
 - l. Maintenance agreements and similar continuing commitments.
 2. Training sessions shall consist of not less than five days of not less than four hours each day. A copy of maintenance manuals for equipment or system being demonstrated shall be on hand during training session. As part of instruction for operating equipment, demonstrate the following procedures:
 - a. Start-up.
 - b. Shutdown.
 - c. Emergency operations.
 - d. Noise and vibration adjustments.
 - e. Safety procedures.
 - f. Economy and efficiency adjustments.
 - g. Effective energy utilization.
 3. Training sessions shall be conducted for:
 - a. HVAC systems.
 - b. Energy management controls.
 - c. Public address system.
 - d. Fire alarm and smoke detection systems.
 4. Demonstration and Training DVDs
 - a. General: Engage a qualified commercial photographer to record demonstration and training DVDs. Record each training session separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids.
 - b. Digital Format: Provide high-quality DVD color recording.
 - c. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of demonstration and training. Display continuous running time.
 - d. Narration: Describe scenes by audio narration by microphone while being recorded. Include description of items being viewed. Describe vantage point, indicating location, direction (by compass point), and elevation or story of construction.
 - e. Transcript: Provide a typewritten transcript of the narration. Display images and running time captured from recording opposite the corresponding narration segment.

Controlled Entry at 15 Campuses
Birdville ISD
North Richland Hills, Haltom City, Hurst and Watauga, Texas

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

**CERTIFICATION
OF PROJECT
COMPLIANCE**

Distribution to:
District _____ Architect/Engineer _____
Contractor _____ Texas Education Agency _____
Other _____ Building Department _____

1. PROJECT INFORMATION:
(name, address)

ARCHITECT/ENGINEER:

CONTRACTOR/CM:

PROJECT NUMBER:

CONTRACT DATE:

<p>DISTRICT:</p> <p>DATE DISTRICT AUTHORIZES PROJECT:</p>
--

BRIEF DESCRIPTION OF PROJECT:

2. CERTIFICATION OF DESIGN AND CONSTRUCTION

The intent of this document is to assure that the school district has provided to the architect/engineer the required information and the architect/engineer has reviewed the School Facilities Standards as required by the State of Texas, and used his/her reasonable professional judgment and care in the architectural/engineering design and that the contractor has constructed the project in a quality manner in general conformance with the design requirements and that the school district certifies to project completion.

3. The District certifies that the enrollment projections, educational specifications and objectives of this facility along with the identified building code to be used have been provided to the architect/engineer.

DISTRICT: BY:

DATE:

4. The Architect/Engineer certifies the above information was received from the school district, and that the building(s) were designed in accordance with the applicable building codes. Further, the facility has been designed to meet or exceed the design criteria relating to space (minimum square footage), educational adequacy, and construction quality as contained in the School Facilities Standards as adopted by the State Board of Education, July 1992, and as provided by the district.

ARCHITECT/ENGINEER: BY:

DATE:

5. The Contractor/CM certifies that this project has been constructed in general conformance with the construction documents as prepared by the architect/engineer listed above.

CONTRACTOR/CM: BY:

DATE:

6. The District certifies completion of the project (as defined by the architect/engineer and contractor).

DISTRICT: BY:

DATE:

INSTRUCTIONS FOR COMPLETION OF “CERTIFICATION OF PROJECT COMPLIANCE” FORM

Section 1. Identify the following:

- name and address of the school facility
- the Architect/Engineer and Contractor
- the school district’s project number (if applicable)
- the date of execution of the construction contract
- name, address, and telephone number of the school district
- the date that the school district authorized the superintendent to hire an architect/engineer
- scope of the project.

Section 2. This section outlines the intent of the document. No action required.

Section 3. This section is to be executed by the school district upon transmittal of the information (as listed) to the architect/engineer and is to remain in the custody of the school district throughout the entire project.

Section 4. This section is to be executed by the architect/engineer upon completion of the plans and specifications and in conjunction with the completion of the plan review for code compliance (ref. 19 TAC §61.104, School Facilities Standards) and returned to the school district’s files.

Section 5. This section is to be executed by the contractor upon substantial completion of the project and retained in the school district’s files.

Section 6. This section is to be executed by the school district upon acceptance and occupancy of the project.

NOTE: DO NOT SUBMIT THIS DOCUMENT TO THE TEXAS EDUCATION AGENCY. The school district will retain this document in their files indefinitely until review and/or submittal is required by representatives of the Texas Education Agency.

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Format and content of manuals.
 - 2. Instruction of Owner's personnel.
 - 3. Schedule of submittals.

- B. Related Requirements:
 - 1. Section 01 33 23 - Shop Drawings, Product Data, and Samples.
 - 2. Section 01 45 00 - Quality Control: Manufacturer's instructions.
 - 3. Section 01 77 00 - Closeout Procedures.
 - 4. Section 01 78 30 - Warranties and Bonds.
 - 5. Section 01 78 39 - Project Record Documents.
 - 6. Individual Specifications Sections: Specific requirements for operation and maintenance data.

1.2 QUALITY ASSURANCE

- A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

1.3 FORMAT

- A. Prepare data in the form of an instructional manual.

- B. Binders: Bind in three individual heavy-duty 8-1/2" x 11" black, three-ring binders with hardback, cleanable, plastic covers; 3" maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

- C. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; list title of project identify subject matter of contents.

- D. Arrange content by systems, under section numbers and sequence of table of contents of this project manual.

- E. Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

- F. Text: Manufacturer's printed data, or typewritten data on 20-pound paper.

- G. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

1.4 CONTENTS, EACH VOLUME

- A. Table of Contents: Provide title of project; names, addresses, and telephone numbers of Architect/Engineer and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

- B. For Each Product or System: List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

- C. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.

- D. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use project record documents as maintenance drawings.

- E. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in SECTION 01 45 00 - QUALITY CONTROL.
- F. Warranties and Bonds: Bind in copy of each.

1.5 MANUAL FOR MATERIALS AND FINISHES

- A. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Provide information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture-protection and Weather-exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D. Additional Requirements: As specified in individual specifications sections.
- E. Provide a listing in table of contents for design data, with tabbed fly sheet and space for insertion of data.

1.6 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Give function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications.
- C. Include as-installed color coded wiring diagrams.
- D. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- E. Maintenance Requirements: Include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- F. Provide servicing and lubrication schedule, and list of lubricants required.
- G. Include manufacturer's printed operation and maintenance instructions.
- H. Include sequence of operation by controls manufacturer.
- I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- J. Provide as-installed control diagrams by controls manufacturer.
- K. Provide Contractor's coordination drawings, with as-installed color coded piping diagrams.
- L. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- M. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- N. Additional Requirements: As specified in individual specifications sections.

O. Provide a listing in table of contents for design data, with tabbed fly sheet and space for insertion of data.

1.7 INSTRUCTION OF OWNER PERSONNEL

- A. Before final inspection, instruct Owner's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times. For equipment requiring seasonal operation, perform instructions for other seasons within six months.
- B. Use operation and maintenance manuals as basis of instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.
- C. Prepare and insert additional data in operation and maintenance manual when need for such data becomes apparent during instruction.

1.8 SUBMITTALS

- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of work. Architect/Engineer will review draft and return one copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within 10 days after acceptance.
- C. Submit one copy of completed volumes in final form 15 days prior to final inspection. Copy will be returned after final inspection, with Architect/Engineer comments. Revise content of documents as required prior to final submittal.
- D. Submit two copies of revised volumes of data in final form within 10 days after final inspection.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

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SECTION 01 78 30

WARRANTIES AND BONDS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Preparation and submittal of warranties and bonds.
 - 2. Schedule of submittals.
- B. Related Requirements:
 - 1. Document 00 21 16 - Instructions to Proposers: Proposer bonds.
 - 2. General Conditions of the Contract for Construction: Performance Bond and Labor and Material Payment Bonds, Warranty, and Correction of Work.
 - 3. Section 01 77 00 - Closeout Procedures.
 - 4. Section 01 78 23 - Operation and Maintenance Data.
 - 5. Section 01 78 39 - Project Record Documents.
 - 6. Individual Specifications Sections: Warranties and bonds required for specific products or work.

1.2 FORM OF SUBMITTALS

- A. Bind in three individual heavy-duty 8-1/2" x 11" black, three-ring binders, with hardback, cleanable, plastic covers.
- B. Label cover of each binder with typed or printed title WARRANTIES AND BONDS, with title of project; name, address and telephone number of Contractor; and name of responsible principal.
- C. Table of Contents: Neatly typed, in the sequence of the table of contents of the project manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
- D. Separate each warranty or bond with index tab sheets keyed to the table of contents listing. Provide full information, using separate typed sheets as necessary. List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

1.3 PREPARATION OF SUBMITTALS

- A. Obtain warranties and bonds, executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the date of substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.

1.4 TIME OF SUBMITTALS

- A. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
- B. Make other submittals within 10 days after date of substantial completion, prior to final application for payment.
- C. For items of work when acceptance is delayed beyond date of substantial completion, submit within ten days after acceptance, listing the date of acceptance as the beginning of the warranty period.

Controlled Entry at 15 Campuses
Birdville ISD
North Richland Hills, Haltom City, Hurst and Watauga, Texas

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Maintenance and submittal of record documents and samples.
- B. Related Requirements:
 - 1. General Conditions of the Contract for Construction: Documents at the site.
 - 2. Section 01 33 23 - Shop Drawings, Product Data, and Samples.
 - 3. Section 01 77 00 - Closeout Procedures.
 - 4. Section 01 78 23 - Operation and Maintenance Data.
 - 5. Individual Specifications Sections: Manufacturer's certificates and certificates of inspection.

1.2 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. In addition to requirements in General Conditions, maintain at the site for Owner one record copy of:
 - 1. Contract drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change orders and other modifications to the contract.
 - 5. Reviewed shop drawings, product data, and samples.
 - 6. Field test records.
 - 7. Inspection certificates.
 - 8. Manufacturer's certificates.
- B. Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage for record documents and samples.
- C. Label and file record documents and samples in accordance with section number listings in table of contents of this project manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- D. Maintain record documents in a clean, dry and legible condition. Do not use record documents for construction purposes.
- E. Keep record documents and samples available for inspection by Architect.

1.3 RECORDING

- A. Record information on a set of opaque drawings, and in a copy of a project manual. All changes made in these drawings in connection with the final construction and installation shall be neatly made in red ink on the prints.
- B. Provide felt tip marking pens, maintaining separate colors for each major system, for recording information.
- C. Contractor shall include with the record documents, all changes and modifications made by addenda, change orders, supplementary instructions, or other forms of documentation, written or verbal, which alter the documents.
- D. Record information concurrently with construction progress. Do not conceal any work until required information is recorded.
- E. Contract drawings and shop drawings: Legibly mark each item on the drawings to record actual construction, including:
 - 1. Measured depths of elements of foundation in relation to finish first floor datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of construction.

4. Field changes of dimension and detail.
 5. Changes made by addenda and modifications.
 6. Details not on original contract drawings.
 7. References to related shop drawings and modifications.
- F. Specifications: Legibly mark each item in the specifications to record actual construction, including:
1. Manufacturer, trade name, and catalog number of each product actually installed, particularly optional items and substitute items.
 2. Changes made by addenda and modifications.
- G. Other Documents: Maintain manufacturer's certifications, inspection certifications, field test records, and other documents required by individual specifications sections.
- H. Maintain these documents to reflect the current conditions of the work. Changes shall be reviewed on a monthly basis with the Architect's representative. The Contractor's updating of the "installed condition drawings" shall be a prerequisite to the monthly review of the Contractor's payment request by the Architect's representative.

1.4 SUBMITTALS

- A. At contract closeout, deliver record documents and samples under provisions of SECTION 01 77 00 - CLOSEOUT PROCEDURES.
- B. Transmit with cover letter in duplicate, listing:
1. Date.
 2. Project title and number.
 3. Contractor's name, address, and telephone number.
 4. Number and title of each record document.
 5. Signature of Contractor or authorized representative.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01 78 40

SPARE PARTS, OVERAGES AND MAINTENANCE MATERIALS

PART 1 - GENERAL

1.1 SUMMARY

- A. Requirements Includes:
 - 1. Products required.
 - 2. Storage and delivery of products.
- B. Related Requirements:
 - 1. Section 01 66 00 - Product Storage and Handling Requirements.
 - 2. Section 01 77 00 - Closeout Procedures.
 - 3. Section 01 78 23 - Operation and Maintenance Data.
 - 4. Individual Specifications Sections: Specific spare parts and materials required.

1.2 PRODUCTS REQUIRED

- A. Provide quantities of products, spare parts, maintenance tools, and maintenance materials specified in individual sections to be provided to Owner, in addition to that required for completion of work.
- B. Products: Identical to those installed in the work. Include quantities in original purchase from manufacturer to avoid variations in manufacture.

1.3 STORAGE, MAINTENANCE

- A. Store products with products to be installed in the work, under provisions of SECTION 01 66 00 - PRODUCT STORAGE AND HANDLING REQUIREMENTS.
- B. When adequate, secure storage facilities are available at site, capable of maintaining conditions required for storage and not required for contract work or storage, or for Owner's needs, spare products may be stored in available space.
- C. Maintain spare products in original containers with labels intact and legible, until delivery to Owner.

1.4 DELIVERY

- A. Coordinate with Owner: Deliver and unload spare products to Owner at Owner's Maintenance Facility and obtain receipt prior to final payment.
- B. For portions of project accepted and occupied by Owner prior to substantial completion, deliver a proportional part of spare products to Owner; obtain receipt.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

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SECTION 02 41 19

SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Taking down, cutting away, breaking out and removing portions of the existing buildings to accommodate new construction.
2. Disconnecting, capping and removing identified utilities.
3. Offsite disposal and/or salvaging for reinstallation, indicated components.

B. Related Requirements:

1. Section 01 11 00 - Summary of Work: Instructions concerning hazardous materials.
2. Section 01 35 00 - Alteration Project Procedures: Re-installation of removed materials.
3. Section 01 50 00 - Temporary Facilities and Controls: Barricades; Dust control.
4. Section 01 78 39 - Project Record Documents.

1.2 SUBMITTALS

A. Submit demolition and removal procedures and schedule under provisions of SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

B. Submit record documents under provisions of SECTION 01 78 39 - PROJECT RECORD DOCUMENTS. Accurately record actual locations of capped utilities and subsurface obstructions.

1.3 PROJECT CONDITIONS

A. Occupancy: Owner will be continuously occupying portions of the building immediately adjacent to areas of selective demolition. Conduct selective demolition work in manner that will minimize need for disruption of Owner's operations.

B. Existing Conditions: Owner assumes no responsibility for actual condition of items or structures to be demolished. Contractor shall visit the buildings and verify the nature and extent of demolition required. Conditions existing at time of commencement of contract will be maintained by Owner insofar as practicable. However, variations within structures may occur by Owner's removal and salvage operations prior to start of selective demolition.

C. Property Protection: Contractor shall be responsible for the protection of adjoining property, including all parts of the building outside the limits of demolition and site improvements outside the limits of the new construction.

1.4 EXISTING CONDITIONS

A. Conduct demolition to minimize interference with adjacent portion of structures to remain.

B. Conduct operations with minimum interference with Owner's usage of buildings. Maintain protected egress and access at all times and maintain protected egress at fire exits as required by the Fire Marshall.

1.5 PROTECTION

A. It is essential that there be minimal interruptions of existing mechanical and electrical systems in addition to the normal operation of Owner's facilities.

B. Take care to ensure that there will be no damage to elements or portions thereof which are not required to be removed. Erect and maintain temporary shoring, bracing, and other means to safeguard the structural integrity of the existing portions of building and its parts to remain.

- C. Erect and maintain temporary bracing, shoring, lights, barricades, signs and other means to protect workers and other persons, and finishes and improvements to remain from damage; all in accordance with applicable regulatory requirements.
- D. Erect and maintain temporary barriers to confine dust and debris.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Materials designated for demolition shall become the Contractor's property; remove and dispose of such materials unless otherwise indicated or specified. Sales of salvage materials are not allowed on site.
- B. Furnishings and equipment items to remain the Owner's property will be removed by him prior to the start of demolition (or will be designated on the drawings herein or to be removed and stored by Contractor). Items not so designated shall be considered debris and shall be removed and disposed of accordingly.
- C. Carefully disconnect, remove and protect items directed by the Owner to be salvaged.
- D. Transport salvaged items to on-site storage areas designated by the Owner.

PART 3 - EXECUTION

3.1 INSPECTIONS

- A. Prior to starting demolition, make inspection and report observable defects and structural weaknesses of construction designated for demolition, of adjacent structures, and of improvements to remain. If unsatisfactory conditions exist, do not commence demolition until appropriate determinations have been made.
- B. Following demolition, make inspection and report defects and structural weaknesses of items partially demolished, cut, or removed, of adjacent structures; and of improvements remaining.

3.2 PREPARATION

- A. Cover and protect furniture, equipment and fixtures to remain from soiling or damage when demolition work is performed in rooms or areas from which such items have not been removed.
- B. Prevent movement or settlement of adjacent structures. Provide bracing, shoring and underpinning as required.
- C. Protect existing appurtenances, structures and landscaping which are not to be demolished.
- D. Locate, disconnect, remove and cap designated utility lines within demolition areas.
- E. Mark location of disconnected utilities. Identify utilities and indicate capping locations on project record documents.
- F. Provide weatherproof closures for exterior openings resulting from demolition work.

3.3 PERFORMANCE

- A. Demolition: Carry out the work carefully and in an orderly manner to minimize interference with the daily operations in the building and to avoid damage to permanent parts of the building and the equipment therein. Hold noise, dust and vibration to a minimum. Remove all items and parts so shown and noted on the drawings and as otherwise may be required to be removed to carry out the work.
- B. Shoring: Provide temporary shoring for walls and framing wherever present supports are removed or weakened. Any settling or cracking of the existing construction due to the removal of supports and faulty or insufficient shoring shall be the responsibility of the contractor and shall be repaired at no additional expense to the Owner.

- C. Material and Equipment Disposal:
 - 1. The materials and items of equipment which are noted and shown to be salvaged and re-used in new locations or re-used for patching shall be carefully removed and safely stored until ready for reinstallation.
 - 2. Other items and all debris shall become the property of the Contractor and shall be removed from the premises entirely. Under no circumstances shall debris be allowed to accumulate.
- D. Damage: Any existing construction to be left in place which is damaged by the demolition operations shall be refinished or replaced at no additional expense to the Owner. The repair of such damage shall leave the parts in a condition at least equal to that found at the start of the work.
- E. Perform demolition in accordance with ANSI A10 - Construction and Demolition Standards, ANSI A10.6 – Safety and Health Program Requirements for Demolition Operations, and applicable regulatory requirements.
- F. Remove items designated for demolition within the limits of work indicated and as required to perform the work. Do not remove anything beyond the limits of demolition indicated without the prior written approval of Architect. If in doubt whether to remove an item, obtain written approval prior to proceeding.
- G. If in the event hazardous materials (asbestos, PCB's etc.) are encountered during the course of the demolition work, or if it is even suspected that such materials will or have been encountered cease work immediately in the affected area and promptly notify the Owner and Architect.

3.4 CUTTING

- A. Make new openings neat, as close as possible to profiles indicated and only to extent necessary for new work.
- B. Do not cut or alter structural members unless specifically indicated or approved, and do not damage reinforcing or structural steel to remain.
- C. At concrete, masonry, paving and other materials where edges of cuts and holes will remain exposed in the completed work, make cuts using power-sawing and -coring equipment. Do not over-cut at corners of cut openings.
- D. Upon completion of cutting and coring, clean remaining surfaces of loose particles and dust.

3.5 PIPES, DUCTS AND CONDUITS

- A. Remove deactivated mechanical, plumbing and sprinkler piping, ducts and electrical conduit, including fastenings, connections and other related appurtenances and accessories which would otherwise be exposed in the completed work or interfere with construction operations.
- B. These facilities above ceilings may remain in place if their presence does not result in interference with new work, in which case they shall be removed to extent necessary.
- C. Cap deactivated piping systems at points of cutoff.

3.6 RECONDITIONING EXISTING SUBSTRATES

- A. Clean surfaces on which new materials will be applied, removing adhesives, bitumen and other adhering materials, as necessary to furnish acceptable substrates for new materials.
- B. Perform sandblasting, chipping, grinding, acid washing, etching and other work as required by conditions encountered and new materials involved.
- C. Use of acids or other cleaning agents shall include neutralizing, washing, rinsing and drying, as applicable.
- D. Determine substrate requirements for reconditioned surfaces in cooperation with the manufacturer's representative and installer of each new material involved.

3.7 CLEAN UP

- A. Upon completion of demolition work, remove tools, equipment and demolished materials from site. Remove protections and leave interior areas broom clean.

END OF SECTION

SECTION 03 11 00

CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Formwork with accessories for the cast-in-place concrete and permanent shoring.
- B. Related Sections:
 - 1. Section 31 10 00 - Site Cleaning.
 - 2. Section 32 13 13 - Concrete Paving.

1.2 QUALITY ASSURANCE

- A. Standard: Formwork shall meet the requirements of ACI 347.
- B. Surface Tolerances: Allowable tolerances for formed concrete surfaces shall be $\frac{3}{8}$ " maximum in 20 feet for vertical surfaces out of plumb and $\frac{1}{4}$ " maximum in 20 feet for horizontal surfaces out of plane.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

- A. Lumber: S2S&CM or S2S&SL No. 3 Boards or better Southern Pine not less than a nominal 1" thick.
- B. Plywood: EXT-APA grade-trademarked B-B Plyform, Class I, or High Density Overlaid Plyform, Class I. B-B Plyform shall be sanded but not mill oiled. Plywood shall be new.
- C. Expansion Joint Filler:
 - 1. Concealed: ASTM D 1751, asphalt saturated cane fiberboard.
 - 2. Exposed: ASTM D 1752, Type I, premolded, non-bituminous, closed cell sponge rubber. Color to be stone gray.

2.2 ACCESSORIES

- A. Form Ties: Form ties for exposed concrete surfaces shall be manufactured to allow a positive breakback of at least 1" inside the concrete surface. Ties shall be equipped with a plastic cone or washer not less than 1" in diameter and 1" long which will cover the hole and prevent leakage of mortar. Form ties for unexposed surfaces shall be bolt rods or patented devices having a minimum tensile strength of 3000 pounds when fully assembled. Ties shall be adjustable in length and free of lugs, cones, washers or other features which would leave a hole larger than $\frac{7}{8}$ " in diameter, or depressions back of the exposed surface of the concrete. Ties shall be of such construction that, when the forms are removed, there will be no metal remaining within 1" of the finished surface of the concrete.
- B. Form Release Agent: Colorless material which will not stain concrete, absorb moisture or affect bond of subsequent surface finish manufactured by Nox-Crete, Symons, or approved equivalent.
- C. Chamfer Strips: Extruded plastic triangular chamfer with $\frac{3}{4}$ " face; Burke "CSF- $\frac{3}{4}$ ", Greenstreak Cat. No. 612.

PART 3 - EXECUTION

3.1 FORMWORK

- A. General: Construct forms in compliance with referenced standard. All forms, shores, falsework, bracing and other temporary supports shall be engineered by the Contractor to support all loads imposed during construction, including weight of construction equipment, allowance for live loads and lateral forces due to wind and temporary imbalance of discontinuity of building components.

- B. Construction: Construct forms to the dimensions and shapes of the concrete members as detailed and scheduled; and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Set, assemble and brace forms to withstand wet concrete construction loads without deflection, movement, or leakage. Provide access for placing and adjusting reinforcement and cleaning forms.
 - 1. Exposed Surfaces: Form with plywood the non-wearing concrete surfaces exposed to view. On these surfaces locate the form ties in uniform patterns. The joints shall be tight and flush. Plywood may be re-used only with the specific approval of the Architect. Chamfer exposed outside corners.
 - 2. Concealed Surfaces: Form with wood or metal forms the concealed vertical surfaces.
 - 3. Recesses and Chases: Form for and provide in their proper locations all slots, chases and recesses indicated or implied by the drawings and not formed by sleeves, frames, and other equipment furnished under other sections. The trades requiring such recesses and openings in concrete shall furnish the necessary information for their correct location and placement.
- C. Inserts and Fasteners: Provide for the installation of inserts, conduits, sleeves, drains, hangers, nosings, metal reglets, nailing strips, and like items required for the attachment of other work and furnished by other trades. Properly locate in cooperation with other trades and secure in position before concrete is placed.
- D. Provide bracing to ensure stability of formwork. Strengthen formwork liable to be overstressed by construction loads.

3.2 EARTH FORMS

- A. Earth forms are not permitted.

3.3 REMOVAL OF FORMS

- A. Remove forms with sufficient care to avoid scarring exposed surfaces. Prying against face of concrete will not be permitted. Remove forms completely so that no wood form material is left in contact with concrete.
 - 1. General: Formwork for parts not supporting the weight of the concrete may be removed as soon as the concrete has hardened sufficiently to resist damage from removal operations, but in no event before concrete is 24 hours old. Formwork for parts that support the weight of concrete shall remain in place until the concrete has reached its specified 28-day strength unless otherwise permitted. When shores and other vertical supports are so arranged that the form facing material may be removed without loosening or disturbing the shores and supports, the facing material only may be removed at an age of 24 hours. Whenever the formwork is removed during the curing period, the exposed concrete shall be cured.
 - 2. Re-shoring: When re-shoring is permitted or required, the operations shall be planned in advance and shall be subject to review. Re-shoring for the purpose of early form removal shall be performed so that at no time will large areas of new construction be required to support their own weight. While re-shoring is under way, no live loads shall be permitted on the new construction. Re-shores shall be tightened to carry their required loads, but they shall not be over-tightened so that the new construction is over-stressed. Re-shores shall remain in place until the concrete has reached its specified 28-day strength and while weights or loads in excess of design live loads are imposed.
 - 3. Permanent shoring shall not be removed.

3.4 FIELD QUALITY CONTROL

- A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.
- B. Do not reuse wood formwork more than three times for concrete surfaces to be exposed to view. Do not patch formwork.

3.5 FORMWORK TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI 301.

END OF SECTION

SECTION 03 20 00

CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Reinforcement with accessories for the cast-in-place concrete.
 - 2. Reinforcing steel bars and welded steel wire fabric for cast-in-place concrete.
 - 3. Support chairs, bolsters, and spacers, for supporting reinforcement.
- B. Related Sections:
 - 1. Section 03 11 00 - Concrete Forming and Accessories.
 - 2. Section 03 30 00 - Cast-in-Place Concrete.
 - 3. Section 32 13 13 - Concrete Paving.

1.2 SUBMITTALS

- A. Shop Drawings: Submit in accordance with SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES. Drawings shall show the size, length, form and position of bar reinforcing and accessories.
- B. Certification: Submit a letter certifying that reinforcing bars comply with specified standard for grade.

1.3 QUALITY ASSURANCE

- A. Standard: Reinforcement shall meet the requirements of ACI 318 Building Code Requirements for Structural Concrete.

1.4 DELIVERY AND STORAGE

- A. Stack reinforcing steel in tiers and mark so that each length, size, shape and location can be readily determined. Exercise care to maintain reinforcement free of dirt, mud, paint or rust.
- B. Store materials and accessories on dunnage and under protective sheeting.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60 deformed billet steel.
- B. Reinforcing Fabric: ASTM A 185, welded steel wire fabric in flat sheets.
- C. Tie Wire: 16 gage annealed steel wire.
- D. Accessories: Anchors, dowels, spacers, chairs, bolsters and other devices for supporting and fastening reinforcement and normally considered as accessories to the concrete work.

2.2 FABRICATION

- A. Fabricate reinforcing bars to conform to the required shapes and dimensions, with fabrication tolerances complying with the CRSI Manual.
- B. In case of fabricating errors, do not straighten or re-bend reinforcement in a manner that will weaken or injure the material.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Placing Steel:

1. Place reinforcement in accordance with CRSI "Placing Reinforcing Bars" and ACI 318, with provisions of ACI 318 governing.
2. Assemble reinforcing steel in the forms, wired and fastened securely. Bending shall be done cold. Bars with kinks or bends not detailed shall be rejected.
3. Clean reinforcing steel of loose rust, mill scale, grease, dirt and other coatings which will reduce or destroy bond with the concrete. A thin film of tight rust will not be objectionable.
4. Position, support, and secure reinforcement to resist displacement by formwork, construction, and concrete placing operations.
5. Locate and support reinforcement by metal chairs, runners, bolsters, spacers, and hangers.
6. Place reinforcement to obtain minimum coverages for concrete protection.
7. Arrange, space, and securely tie bars and bar supports together with the specified tie wire.
8. Set wire ties so twisted ends are directed away from exposed concrete surfaces.
9. Support reinforcement and fasten together to prevent displacement by construction loads of placing concrete. Use No. 16 gauge black annealed wire at all joints and crosses to accurately position reinforcement in place.
10. Over formwork, use metal or plastic bar chairs and spacers to support reinforcement.
11. Where concrete surface will be exposed to weather in finished structure, use non-corrosive or corrosion protected accessories within 1/2" of concrete surface.
12. Where successive mats of reinforcing fabric are continuous, overlap welded wire fabric so that overlap measured between outermost cross wires of each fabric sheet is not less than spacing of cross wires plus 2".
13. Bars having splices not shown on shop drawings will be subject to rejections.
14. Do not bend reinforcement after being embedded in hardened concrete.
15. Do not allow bars to be in contact with dissimilar materials.

3.2 FIELD QUALITY CONTROL

- A. Inspection and Evaluation: The testing and inspection laboratory shall inspect placement of all reinforcing steel to confirm compliance with the contract documents.
- B. Concrete shall not be poured without inspection approval as noted above.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Cast-in-place concrete, including mixing, placing, and finishing.
- B. Related Sections:
 - 1. Section 01 45 23 - Testing and Inspection Services.
 - 2. Section 03 10 00 - Concrete Forming and Accessories.
 - 3. Section 03 20 00 - Concrete Reinforcing.
 - 4. Section 32 13 13 - Concrete Paving.

1.2 SUBMITTALS

- A. General: Submit in accordance with SECTION 01 33 23 – SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Product Data: Submit product data for admixture, bonding compound, curing compound, grout, and sealer.
- C. Design Mixes:
 - 1. At the beginning of the work, Contractor shall submit proposed concrete mix designs for review by the Architect, structural engineering consultant, and testing laboratory per SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
 - a. Include the sieve analysis of fine and coarse aggregate ASTM C 136, dry rodded weight of coarse aggregate - ASTM C 29, and the specific gravity (bulk saturated surface dry), of fine and coarse aggregates ASTM C 127 and C 128.
 - b. State admixture used and project conditions required for specific admixtures.
 - c. Proposed concrete mix design shall also include the results of compressive tests.
 - 2. Contractor shall not mix concrete for placing in the work until confirmation laboratory reports are supplied to reflect that each proposed mix will develop the strength and slump required. Successful past history in accordance with ACI 318 will be satisfactory.

1.3 QUALITY ASSURANCE

- A. Standard: Concrete shall meet the requirements of ASTM C 94.
- B. Perform work in accordance with ACI 301, 304, 305, 306, and 309.
- C. Obtain materials from same source throughout the work.
- D. Batch plant shall be able to show a minimum of five-years' experience in batching concrete. If required, they shall furnish a list of similar sized jobs or special condition jobs performed during the last two-years.
- E. Surface Tolerances: For all finished concrete wearing surfaces, the variation from level or from elevations indicated shall not exceed ¼" in 16'. If variations exceed those as set forth then the wearing surface shall be filled or ground down as required to meet the stated tolerances.

1.4 PROJECT CONDITIONS

- A. Environmental Requirements:
 - 1. Cold Weather Placing: Do not place concrete when the temperature is below 40°F. or is expected to fall below 40°F. within 24 hours after placing concrete; unless either favorable weather is forecast or adequate arrangements for protection and heating have been made in accordance with ACI 306.
 - 2. Hot Weather Placing: Do not place concrete when hot weather conditions exist that would impair the quality and strength of concrete, i.e. any combination of high air temperature, low relative humidity, and wind velocity, unless adequate arrangements for protection have been made in accordance with ACI 305.

- B. Coordination: Notify other trades and contractors well in advance of placing concrete to allow them sufficient time in which to install work which is to be built-in or cast into the concrete.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

- A. Portland Cements: ASTM C 150, Type I, domestic manufacture.
- B. Fine Aggregate: ASTM C 33, washed sand with a fineness modulus of between 2.50 and 3.00.
- C. Coarse Aggregate: ASTM C 33, clean crushed stone or washed gravel. The nominal maximum particle size shall not exceed 1/5 of the narrowest dimension between forms or 3/4 of the minimum clear spacing between reinforcing bars.
- D. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will 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.
- E. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures, equal to Master Builders "Micro Air", a BASF Chemical Company.
- F. Fly Ash - ASTM C 618, Type C or Type F, limit use of fly ash to not-to-exceed 20% of cement content by weight.
- G. Water: Clean and potable.

2.2 CONCRETE TREATMENT PRODUCTS

- A. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements. Product/manufacturer; one of the following:
 - Sikadur 32, Hi-Mod; Sika Chemical
 - Sealtight Rezi-Weld 1000; W.R. Meadows, Inc.
 - EpoXeal™ GS Structural; MBT Products, a BASF Chemical Company
- B. Curing Compound: ASTM C 309, Type 1, Class B, 18 to 25 percent solids, clear, acrylic copolymer based liquid for curing and sealing concrete. Product/manufacturer; one of the following:
 - Safe-Cure Clear; ChemMasters ClearDR
 - Diamond Clear VOX; Euclid Chemical Co.
 - Cure & Seal 1315 LVOC; Symons Corp., a Dayton Superior Co.
 - Vocomp-20; W.R. Meadows, Inc.
- C. Non-metallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, non-metallic aggregate grout, non-corrosive, non-staining, mixed with water to consistency suitable for application and 30-minute working time. Product/manufacturer; one of the following:
 - NS Grout; Euclid Chemical Co.
 - Sealtight 588 Precision Grout; W.R. Meadows, Inc.
 - SonogROUT® 10K; Master Builders, a BASF Chemical Company

2.3 SELECTING PROPORTIONS FOR CONCRETE

- A. Strength: Select proportions for a mix designed to produce concrete with a minimum 28-day compressive strength of 3000 psi, unless noted otherwise.
 - 1. Reference SECTION 32 13 13 - CONCRETE PAVING for compressive strength needed for paving.
- B. Admixture:
 - 1. Use admixture in all concrete. Select the type (normal, retarder, or high early) best suited for the temperature conditions at the time the concrete is placed and finished.

2. Use water reducing admixture only with the permission of the Engineer. Do not use water reducing admixture and air entrainment together with any slabs to receive a hard trowelled finish. Use air entrainment in all concrete to be pumped (5%).
- C. Use air-entraining admixture in all exterior concrete, including pavement and flatwork. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content by volume with a tolerance of plus or minus 1½ percent within the following limits:
 1. 3 to 6 percent, 1½" max. aggregate.
 2. 3.5 to 6.5 percent, 1" max. aggregate.
 3. 4 to 8 percent, ¾" max. aggregate.
 4. 5 to 9 percent, ½" max. aggregate.
- D. Calcium chloride shall not be used.
- E. Slump: Select proportions to produce concrete with the following maximum allowable slumps. The slump limits given shall apply after inclusion of the admixture.

Pavement, flatwork	4"
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2.4 MIXING AND DELIVERY

- A. Measurement of concrete materials, mixing, and delivery of fresh concrete to the project shall meet the requirements of ASTM C 94. Transit-mixed concrete supplier shall have a plant with sufficient capacity and transportation facilities to assure continuous delivery at the rate required.
- B. Mix concrete in accordance with ASTM C 94, Alternative No. 2, or ACI 304.
- C. Deliver concrete in accordance with ASTM C 94.
- D. Select proportions for normal weight concrete in accordance with ACI 301 Method 1. Mix not less than one minute after materials are in mixer.
- E. Do not transport or use concrete after 90 minutes has expired from time of initial mixing.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before any concrete is placed, the forms and reinforcement shall be inspected by the Contractor and the Owner's testing laboratory. Notify the Owner's testing laboratory not less than one working day before concrete is scheduled to be placed. Bucks, sleeves, anchors and other fixtures to be embedded in concrete shall be properly positioned and anchored. Wash down form surfaces to remove foreign substances. Provide elevated runways clearing steel and other embedded work.
- B. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Apply bonding agent in accordance with manufacturer's instructions.
- C. At locations where new concrete is doweled to existing work, drill over-sized holes in existing concrete, insert steel dowels, and pack solid with non-shrink grout.

3.2 CONVEYING CONCRETE

- A. Convey concrete to the place of final deposit by methods which will prevent the separation or loss of the ingredients. Equipment for chuting, pumping, and pneumatically conveying concrete shall be such as to assure a continuous flow of concrete at the delivery end without separation. The use of aluminum chutes or pipes for transporting concrete will not be permitted.

3.3 PLACING CONCRETE

- A. Notify Architect and testing laboratory a minimum of 24 hours prior to commencement of concreting operations.

- B. General: Place concrete in continuous horizontal lifts no deeper than 24". Avoid inclined lifts and inclined construction joints and do not cause or allow concrete to flow horizontally in the forms. Keep conveying equipment clean and free of hardened concrete. Use tremies or suitable chutes for placing concrete in high narrow walls so that concrete will not have a free vertical fall in excess of 3'.
- C. Place concrete in accordance with ACI 301 and as specified below:
 - 1. Unless protection is provided, do not place concrete in rain, sleet, or snow.
 - 2. Regulate rate of placement so concrete remains plastic and flows into position.
 - 3. Deposit concrete continuously until panel or section is completed. Place as near as possible to its final location; do not rehandle.
 - 4. Do not place concrete, under any circumstances, except in presence of testing laboratory.
 - 5. When placing concrete in masonry, exercise extreme care to prevent concrete from staining face of masonry.
 - 6. Consolidation
 - a. Comply with requirements of ACI 309.
 - b. Use mechanical vibrating equipment for consolidation.
 - c. Do not use vibrators to transport concrete in forms.
 - d. Use vibrators with sufficient speed and amplitude to consolidate effectively.
 - e. Keep a spare vibrator on site during all concrete pours.
 - f. Thoroughly consolidate concrete and work around reinforcement, embedded items and into corners of forms. Thoroughly consolidate layers of concrete with previous layers.
 - 7. Expansion Joint Fillers: Place pre-molded expansion joint fillers at locations as detailed and whenever required to separate site paving from building slabs. Refer to Drawings for required joint dimensions. Reference SECTION 03 10 00 - CONCRETE FORMING AND ACCESSORIES for joint filler products.
 - 8. Bonding: Before depositing any new concrete on or against previously deposited concrete which has partially or entirely set, thoroughly roughen and clean the surfaces of the latter of all foreign matter, scum, and laitance. Re-tighten forms and re-coat the surface of the previously deposited concrete with specified bonding agent per manufacturer's directions.
- D. Ensure reinforcement, inserts, embedded parts, and formed joints are not disturbed during concrete placement.
- E. Place concrete continuously between predetermined construction and control joints. Do not break or interrupt successive pours such that cold joints occur.
- F. Saw cut control joints at an optimum time after finishing. Use 3/16" thick blade, cutting 1/3 into depth of slab thickness.
- G. Separate exterior slabs on fill from vertical surfaces with joint filler. Extend joint filler from bottom of slab to within 1/4" of finished slab surface.
- H. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Architect/Engineer upon discovery.
- I. Maintain record of concrete placement. Record date, location, quantity, air temperature and test samples taken.
- J. Slabs: Place each slab in one continuous operation without joints within the area established for a continuous pour. Start placing at the far end of the area and place each load of concrete against previously placed concrete, not away from it.
- K. Drains: Check the setting of floor drains so that they will finish flush with floor surfaces without varying the intended elevations and slopes. Slope surfaces down to drains at least 1/8" per foot or as shown.
- L. Compaction: Compact concrete with ramming and spading tools during placing to work the coarse aggregate away from the forms and to produce a dense mass without air pockets. Work concrete through and around reinforcing steel. Do not disturb any embedded work.
- M. Consolidation: Use high frequency mechanical vibrators to consolidate concrete and eliminate lift lines in walls exposed to view. Vibrators shall be operated by skilled mechanics under close supervision. Insert and withdraw the vibrator heads at points from 18" to 30" apart for short periods. Do not allow heads to touch the forms.

- N. Leveling: Level and grade the top surface of slabs with straight edges over gauge strips. Level the top of foundations for the reception of subsequent work. Level and line steps in like manner over strips or forms. Remove wood spreaders, block, and screeds as the concrete is placed and before it sets.
- O. Loading: Do not shake or move the forms and reinforcement nor place any strain on projecting metal after the concrete has taken its initial set. Do not permit loading or traffic of any kind on the construction until the concrete has fully hardened.
- P. Hot Weather Placement: Take special care to prevent high temperatures in the fresh concrete during hot weather. Use a set-retarding type admixture to assure that concrete remains workable and lift lines will not be visible. For flatwork use a spray-on evaporation retardant as needed during finishing operations.

3.4 CORRECTING DEFECTIVE CONCRETE

- A. Examine concrete for defects as the forms are removed. Concrete out of alignment or with defective surfaces shall be considered as not conforming to the intent of these specifications. Such concrete shall be removed from the project site unless the Architect grants permission to patch the defective area.
- B. Concrete that does not attain the specified 28-day strength shall be removed from the project site at the contractor's expense.
- C. Formed surfaces exposed to view shall not have fins, offsets, voids, and bulges. Minor grain marks will not be objectionable, but the texture shall be uniform. Leave corners and other details sharply defined and surfaces straight and true.
- D. Repair honeycomb, pour joints, stone pockets, and like imperfections by wetting and pointing with mortar to match adjacent concrete. Where unacceptable surface blemishes occur on concrete exposed to view, rub the entire surface to produce a uniform appearance throughout.

3.5 CONCRETE FLOOR, SLAB, AND TOPPING FINISHES

- A. Brush: Provide a texture finish for exterior concrete except where scheduled otherwise. After floating and an initial troweling, go over the surfaces with a soft bristle brush or broom to produce a fine textured non-slip finish. Exposed vertical surfaces and corners shall be tooled and troweled smooth.

3.6 CURING

- A. Cure all concrete at least 7 days. All curing procedures shall prevent evaporation of moisture from the concrete for the full curing period. Protect surfaces from traffic damage until the curing is complete.
- B. Keep exposed vertical surfaces and the tops of beams and walls moist by spraying with water or covering with saturated burlap, starting as soon as the surfaces will resist erosion.
- C. Coat other concrete wearing surfaces with the curing and sealing compound, using at least 1 gallon per 300 sq. ft. Areas damaged by traffic or subsequent construction operations shall be re-coated.

3.7 FIELD QUALITY CONTROL

- A. Acceptance Tests:
 - 1. Samples for strength tests of concrete shall be taken from each 75 cu. yds., or fraction thereof, of each mix design of concrete placed in any one day.
 - 2. Sampling procedures shall meet the requirements of ASTM C 172. If concrete is being pumped, take concrete samples for testing at the point of placement and not at the mixer discharge.
 - 3. Make and record a slump test on each sample. The method of test shall meet the requirements of ASTM C 143.
 - 4. Make 4 cylinders from each sample for strength tests, 1 for 7-day, 2 for 28-day test, and 1 in reserve. The cylinders shall be made on the project site by an Independent Testing Laboratory and shall be cured and tested in conformance with the requirements of ASTM C 31 and C 39.
 - 5. Samples for 3-day strength tests may be taken at the Contractor's discretion and at the Contractor's expense.
 - 6. Samples for temperature and slump tests of concrete shall be taken from each truck, of each mix design of concrete placed in any one day.
 - 7. Testing lab representative shall be on site at all times during concrete pours.

8. No water shall be added to concrete mix on project site without approval from Owner's Testing Laboratory.
 9. Concrete delivery tickets for all trucks shall be given to General Contractor for later submission to Owner. Delivery tickets shall record time truck left plant, time truck arrived at site and mix design number being delivered. A maximum of 90 minutes will be allowed from mixing of concrete to delivery.
- B. Evaluation of Test Results:
1. Each strength test result shall be the average of 2 cylinders from the same sample tested at 28 days.
 2. Strength of each concrete mixture will be satisfactory if the average of any 3 consecutive compressive-strength tests equals or exceeds the specified compressive strength and no individual strength test value falls below specified compressive strength by more than 500 psi.
 3. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that compressive strengths or other requirements have not been met. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work.
- C. The cost of testing service shall be per SECTION 01 45 23 - TESTING AND INSPECTION SERVICES.

3.8 PATCHING

- A. Patch and repair existing concrete to restore smooth, uniform surfaces.
- B. Prepare the surfaces by removing loose and faulty material down to firm concrete. Edges of concrete exposed to view shall be saw-cut straight and square. Brush the surfaces free of dirt and debris and flush down with clean water. After the surfaces are dry, coat them with bonding compound used in conformance with the manufacturer's instructions.
- C. Major patching and deep fills shall be done with a mixture of 1 part Portland cement, 1½ parts sand, and 1½ parts pea gravel. Work and tamp the fill into place, screed the surface and float and trowel to a smooth finish. Cure as specified above.
- D. Minor patching and re-surfacing of concrete to be covered with tile and carpet shall be done using a suitable re-surfacing material such as Ardex K-15 or Super Flo-Top, which can be carried to a feather edge. Mix and apply in conformance with the manufacturer's instructions and finish to a smooth surface.

3.9 PROTECTION AND CLEAN UP

- A. Protection: All concrete which will be exposed to view in the completed area shall be protected from pedestrian and vehicle traffic.
- B. Clean Up: Excess concrete and wash water from concrete truck drums shall not be dumped anywhere on the site or on adjoining streets, but shall be disposed of away from the premises.

END OF SECTION

SECTION 04 01 20

UNIT MASONRY RESTORATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Restoration of unit masonry consisting of brick and concrete masonry restoration and cleaning as follows:
 1. Repairing unit masonry, including replacing units.
 2. Painting steel uncovered during the work.
 3. Re-anchoring veneers.
 4. Repointing joints.
 5. Cleaning exposed unit masonry surfaces if required by Architect after new brick and concrete masonry is installed.

1.2 SUBMITTALS

- A. General: Submit in accordance with SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.
- C. Qualification Data: For restoration specialists, including field supervisors and restoration workers.
- D. Cleaning program.

1.3 QUALITY ASSURANCE

- A. Specialist Qualifications: Engage an experienced masonry firm to perform work of this section. Firm shall have completed work similar in material, design, and extent to that indicated for this project with a record of successful in-service performance.
- B. Source Limitations: Obtain each type of material for masonry restoration (face brick, cement, sand, etc.) from one source with resources to provide materials of consistent quality in appearance and physical properties.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver masonry units to project site strapped together in suitable packs or pallets or in heavy-duty cartons.
- B. Deliver other materials to project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.
- 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 hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.
- E. Store sand where grading and other required characteristics can be maintained and contamination avoided.

1.5 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit masonry restoration and cleaning work to be performed according to manufacturers' written instructions and specified requirements.
- B. Repair masonry units and repoint mortar joints only when air temperature is between 40°F. and 90°F. and is predicted to remain so for at least 7 days after completion of the Work unless otherwise indicated.

UNIT MASONRY RESTORATION

- C. Cold-Weather Requirements: Comply with the following procedures for masonry repair and mortar-joint pointing unless otherwise indicated:
 - 1. When air temperature is below 40°F., heat mortar ingredients, masonry repair materials, and existing masonry walls to produce temperatures between 40°F. and 120°F.
 - 2. When mean daily air temperature is below 40°F., provide enclosure and heat to maintain temperatures above 32°F. within the enclosure for 7 days after repair and pointing.
- D. Hot-Weather Requirements: Protect masonry repair and mortar-joint pointing when temperature and humidity conditions produce excessive evaporation of water from mortar and repair materials. Provide artificial shade and wind breaks and use cooled materials as required to minimize evaporation. Do not apply mortar to substrates with temperatures of 90°F. and above unless otherwise indicated.
- E. Clean masonry surfaces only when air temperature is 40°F. and above and is predicted to remain so for at least 7 days after completion of cleaning.

PART 2 - PRODUCTS

2.1 MASONRY MATERIALS

- A. Face Brick: Provide face brick, including specially molded, ground, cut, or sawed shapes where required to complete face brick masonry restoration work. Provide units with colors, color variation within units, surface texture, size, and shape to match existing brickwork.
- B. Concrete Masonry: Provide new units to match adjoining units in size, shape and texture.

2.2 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150, Type I or Type II, white or gray or both where required for color matching of exposed mortar.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Mortar Sand: ASTM C 144 unless otherwise indicated.
 - 1. Color: Provide natural sand of color necessary to produce required mortar color.
 - 2. For pointing mortar, provide sand with rounded edges.
 - 3. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.
- D. Mortar Pigments: Natural and synthetic iron oxides, compounded for mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortars.
- E. Water: Potable.

2.3 CLEANING MATERIALS

- A. Water: Potable.
- B. Hot Water: Water heated to a temperature of 140°F. to 160°F.
- C. Two-Part Chemical Cleaner: When required by Architect after new brick and concrete unit masonry is installed. Provide manufacturer's standard system consisting of potassium or sodium hydroxide based, alkaline prewash cleaner and acidic afterwash cleaner that does not contain hydrofluoric acid. Product/manufacture; one of the following:
 - ABR Products, Inc.; 500 Limestone Prewash Cleaner followed by 500 Limestone Afterwash.
 - Diedrich Technologies Inc.; Diedrich 808 Limestone Pre-Wash followed by 707N Limestone Neutralizer After-Rinse.
 - PROSOCO; Enviro Klean BioKlean followed by Sure Klean Limestone & Masonry Afterwash.

2.4 ACCESSORY MATERIALS

- A. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film-forming, strippable masking material for protecting glass, metal, and polished stone surfaces from damaging effects of acidic and alkaline masonry cleaners. Product/manufacture; one of the following:
 - ABR Products, Inc.; Rubber Mask.
 - Price Research, Ltd.; Price Mask.
 - PROSOCO; Sure Klean Strippable Masking.
- B. Masking Tape: Nonstaining, nonabsorbent material, compatible with pointing mortar, joint primers, sealants, and surfaces adjacent to joints; that will easily come off entirely, including adhesive.
- C. Antirust Coating: Fast-curing, lead- and chromate-free, self-curing, universal modified-alkyd primer complying with SSPC-Paint 20 or SSPC-Paint 29 zinc-rich coating.
- D. Miscellaneous Products: Select materials and methods of use based on the following, subject to approval of a mockup:
 - 1. Previous effectiveness in performing the work involved.
 - 2. Little possibility of damaging exposed surfaces.
 - 3. Consistency of each application.
 - 4. Uniformity of the resulting overall appearance.
 - 5. Do not use products or tools that could do the following:
 - a. Remove, alter, or in any way harm the present condition or future preservation of existing surfaces, including surrounding surfaces not in contract.
 - b. Leave a residue on surfaces.

2.5 MORTAR MIXES

- A. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.
 - 1. Mixing Pointing Mortar: Thoroughly mix cementitious materials and sand together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30 minutes. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within one hour of final mixing; do not retemper or use partially hardened material.
- B. Colored Mortar: Produce mortar of color required by using specified ingredients. Do not alter specified proportions without Architect's approval.
 - 1. Mortar Pigments: Where mortar pigments are indicated, do not exceed a pigment-to-cement ratio of 1:10 by weight.
- C. Do not use admixtures in mortar unless otherwise indicated.
- D. Mortar Proportions: Mix mortar materials in the following proportions: 1 part Portland cement, 2 parts lime, and 6 parts sand. Add mortar pigments to produce mortar colors required.

PART 3 - EXECUTION

3.1 PROTECTION

- A. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from masonry restoration work. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of restoration and cleaning work.
- B. Comply with chemical-cleaner manufacturer's written instructions for protecting building and other surfaces against damage from exposure to its products. Prevent chemical-cleaning solutions from coming into contact with people, motor vehicles, landscaping, buildings, and other surfaces that could be harmed by such contact.

1. Cover adjacent surfaces with materials that are proven to resist chemical cleaners used unless chemical cleaners being used will not damage adjacent surfaces. Use materials that contain only waterproof, UV-resistant adhesives. Apply masking agents to comply with manufacturer's written instructions. Do not apply liquid masking agent to painted or porous surfaces. When no longer needed, promptly remove masking to prevent adhesive staining.
 2. Keep wall wet below area being cleaned to prevent streaking from runoff.
 3. Do not clean masonry during winds of sufficient force to spread cleaning solutions to unprotected surfaces.
 4. Dispose of runoff from cleaning operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.
- C. Prevent mortar from staining face of surrounding masonry and other surfaces.
1. Cover sills, ledges, and projections to protect from mortar droppings.
 2. Keep wall area wet below rebuilding and pointing work to discourage mortar from adhering.
 3. Immediately remove mortar in contact with exposed masonry and other surfaces.
 4. Clean mortar splatters from scaffolding at end of each day.

3.2 UNIT MASONRY REMOVAL AND REPLACEMENT

- A. At locations indicated, remove brick or concrete masonry that are damaged, spalled, or deteriorated. Carefully demolish or remove entire units from joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units. When removing single units, remove material from center of unit and work toward outside edges.
- B. Support and protect remaining masonry that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.
- C. Notify Architect of unforeseen detrimental conditions including voids, cracks, bulges, and loose units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items.
- D. Remove in an undamaged condition as many whole units as possible.
1. Remove mortar, loose particles, and soil from units by cleaning with hand chisels, brushes, and water.
 2. Remove sealants by cutting close to units with utility knife and cleaning with solvents.
 3. Store units for reuse. Store off ground, on skids, and protected from weather.
 4. Deliver cleaned units not required for reuse to Owner unless otherwise indicated.
- E. Clean units surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement.
- F. Replace removed damaged units with other removed units in good quality, where possible, or with new unit matching existing units, including size. Do not use broken units unless they can be cut to usable size.
- G. Install replacement units into bonding and coursing pattern of existing units. If cutting is required, use a motor-driven saw designed to cut masonry with clean, sharp, unchipped edges. Maintain joint width for replacement units to match existing joints.
- H. Lay replacement units 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 units 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.
1. Tool exposed mortar joints in repaired areas to match joints of surrounding existing work.
 2. Rake out mortar used for laying units before mortar sets and point new mortar joints in repaired area to comply with requirements for repointing existing masonry, and at same time as repointing of surrounding area.
 3. When mortar is sufficiently hard to support units, remove shims and other devices interfering with pointing of joints.

3.3 PAINTING STEEL UNCOVERED DURING THE WORK

- A. Inspect steel exposed during masonry removal. Where Architect determines that it is structural, or for other reasons cannot be totally removed, prepare and paint it as follows:
 - 1. Remove paint, rust, and other contaminants according to SSPC-SP 2, "Hand Tool Cleaning", as applicable to meet paint manufacturer's recommended preparation.
 - 2. Immediately paint exposed steel with two coats of antirust coating, following coating manufacturer's written instructions and without exceeding manufacturer's recommended rate of application (dry film thickness per coat).
- B. If on inspection and rust removal, the cross section of a steel member is found to be reduced from rust by more than 1/16 inch, notify Architect before proceeding.

3.4 CLEANING MASONRY, GENERAL

- A. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other. Ensure that dirty residues and rinse water will not wash over cleaned, dry surfaces.
- B. Use only those cleaning methods indicated for each masonry material and location.
 - 1. Do not use wire brushes or brushes that are not resistant to chemical cleaner being used. Do not use plastic-bristle brushes if natural-fiber brushes will resist chemical cleaner being used.
 - 2. Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip. Adjust pressure and volume to ensure that cleaning methods do not damage masonry. Equip units with pressure gages.
 - 3. For chemical-cleaner spray application, use low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with cone-shaped spray tip.
- C. Chemical-Cleaner Application Methods: Apply chemical cleaners to masonry surfaces to comply with chemical-cleaner manufacturer's written instructions; use brush or spray application. Do not spray apply at pressures exceeding 50 psi. Do not allow chemicals to remain on surface for periods longer than those indicated or recommended by manufacturer.
- D. After cleaning is complete, remove protection no longer required. Remove tape and adhesive marks.

3.5 REPOINTING MASONRY

- A. Rake out and repoint joints to the following extent:
 - 1. All joints in areas indicated.
 - 2. Joints where mortar is missing or where they contain holes.
 - 3. Cracked joints where cracks can be penetrated at least 1/4 inch by a knife blade 0.027 inch thick.
 - 4. Cracked joints where cracks are 1/16 inch or more in width and of any depth.
 - 5. Joints where they sound hollow when tapped by metal object.
 - 6. Joints where they are worn back 1/4 inch or more from surface.
 - 7. Joints where they are deteriorated to point that mortar can be easily removed by hand, without tools.
 - 8. Joints where they have been filled with substances other than mortar.
 - 9. Joints indicated as sealant-filled joints.
- B. Do not rake out and repoint joints where not required.
- C. Rake out joints as follows, according to procedures demonstrated in approved mockup:
 - 1. Remove mortar from joints to depth of joint width plus 1/8 inch, but not less than 1/2 inch or not less than that required to expose sound, unweathered mortar.
 - 2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
 - 3. Do not spall edges of masonry units or widen joints. Replace or patch damaged masonry units as directed by Architect.
 - a. Cut out mortar by hand with chisel and resilient mallet. Do not use power-operated grinders without Architect's written approval based on approved quality-control program.
 - b. Cut out center of mortar bed joints using angle grinders with diamond-impregnated metal blades. Remove remaining mortar by hand with chisel and resilient mallet. Strictly adhere to approved quality-control program.

- D. Notify Architect of unforeseen detrimental conditions including voids in mortar joints, cracks, loose masonry units, rotted wood, rusted metal, and other deteriorated items.
- E. Pointing with Mortar:
 - 1. Rinse joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen joint surfaces before pointing.
 - 2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch until a uniform depth is formed. Fully compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.
 - 3. After low areas have been filled to same depth as remaining joints, point all joints by placing mortar in layers not greater than 3/8 inch. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing masonry units have worn or rounded edges, slightly recess finished mortar surface below face of masonry to avoid widened joint faces. Take care not to spread mortar beyond joint edges onto exposed masonry surfaces or to featheredge the mortar.
 - 4. When mortar is thumbprint hard, tool joints to match original appearance of joints as demonstrated in approved mockup. Remove excess mortar from edge of joint by brushing.
 - 5. Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours including weekends and holidays.
 - a. Acceptable curing methods include covering with wet burlap and plastic sheeting, periodic hand misting, and periodic mist spraying using system of pipes, mist heads, and timers.
 - b. Adjust curing methods to ensure that pointing mortar is damp throughout its depth without eroding surface mortar.
 - 6. Hairline cracking within the mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repaint.

3.6 FINAL CLEANING

- A. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water, spray applied at low pressure.
 - 1. Do not use metal scrapers or brushes.
 - 2. Do not use acidic or alkaline cleaners.
- B. Wash adjacent non-masonry surfaces. Use detergent and soft brushes or cloths.
- C. Clean mortar and debris from roof; remove debris from gutters and downspouts. Rinse off roof and flush gutters and downspouts.
- D. Sweep and rake adjacent pavement and grounds to remove mortar and debris. Where necessary, pressure wash pavement surfaces to remove mortar, dust, dirt, and stains.

END OF SECTION

SECTION 05 50 00

METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Miscellaneous metal work and related items.

1.2 SUBMITTALS

- A. Shop Drawings: Submit in accordance with SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES. Include details of each metal fabrication, including setting drawings for anchor bolts and other required anchors.
- B. Submit structural calculations prepared by manufacturer for review by project engineer. Shop drawings and calculations shall be sealed by a professional engineer registered in the State of Texas.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel: ASTM A 36, shapes, plates and bars.
- B. Threaded Fasteners: ASTM A 307, Grade A, bolts and nuts.
- C. Stud Anchors: Provide headed stud anchors with a smooth shank of carbon steel with a minimum tensile strength of 60,000 psi, as manufactured by Nelson Stud Welding Div. or KSM Welding Systems Div.
- D. Expansion Bolts: Fed. Spec. FF-S-325, Group II, Type A, Class 1. Provide Hilti Kwik-bolt or Ramset Trubolt stud anchors.
- E. Galvanizing Repair Paint: Organic Zinc-Rich coating containing 95% metallic zinc, by weight in the dried film; recognized under the Component Program of Underwriter's Laboratories, Inc. as an equivalent to hot-dip galvanizing; conforming to Federal Specification DOD P-21035A for repair of hot-dip galvanizing; as manufactured by ZRC Worldwide, Marshfield, MA (phone 800.831.3275 web site: www.zrcworldwide.com). Provide Z.R.C. Cold Galvanizing Compound.

2.2 FABRICATION

- A. Fabricate and assemble metal work in the shop to the greatest extent possible.
1. Metal surfaces shall be clean and free of mill scale and rust pitting, well-formed to shape and size with sharp lines and angles. Shearing and punching shall leave clean true lines and surfaces. Exposed ends and edges shall be milled smooth with corners slightly rounded.
 2. Weld shop connections to the extent practical; finish exposed welds smooth. Weld joints shall be flush.
 3. Cut, drill or punch holes; do not make or enlarge by burning. Provide holes where required for connecting the work of other trades.
 4. Conceal fastenings where practical. Thickness of metal and method of assembly and support shall give ample strength and rigidity.
 5. Assemble parts so that joints are tight, members are in good alignment, and the finished work reproduces the drawing details as intended.
 6. Stud Anchors: Weld stud anchors to miscellaneous shapes using welding equipment and procedures recommended by the manufacturer of the stud anchors used.
- B. Shop Painting:
1. Carbon steel surfaces shall be cleaned, degreased, and shop coated with a straight alkyd, zinc chromate, rust inhibitive paint applied by brush or spray. Steel to be encased in concrete need not be painted.
 2. Aluminum surfaces to be in direct contact with concrete and masonry shall be shop coated with zinc chromate primer.

- C. Galvanizing: Provide a zinc coating for those items indicated or specified to be galvanized, as follows:
 - 1. ASTM A 153 for galvanizing iron and steel hardware.
 - 2. ASTM A 123 for galvanizing rolled, pressed and forged steel shapes, plates, bars and strip 1/8" thick and heavier, and for galvanizing assembled steel products.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Deliver, store and erect metal work in such manner that the parts are not damaged or deformed. Install the work true to line, plumb, level, in proper alignment with other work, and free of sags, buckles and other objectionable defects. Anchorage shall be adequate to safely resist all stresses to which the work will normally be subjected.
- B. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint and paint exposed areas with same material used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils. For galvanized surfaces, apply galvanizing repair paint.

3.2 MISCELLANEOUS METAL SCHEDULE

- A. General: The following is a general list of the metal work to be furnished under this section of the specifications. Other items of miscellaneous metal work shown and noted on the drawings and not mentioned elsewhere in the specifications shall be furnished as though specifically described herein.
- B. Loose Lintels: Lintels of steel shapes and plates where required at exterior brick veneer and as detailed.
 - 1. End bearing shall be at least 8".
 - 2. Where steel lintels are not specifically called out, furnish at least one steel angle for each 4" thickness of masonry in the wall.
 - 3. Wrap bearing ends of lintels with flashing to achieve a bond breaker between the lintel and the masonry.
 - 4. Galvanize steel lintels located in exterior walls.
- C. Storefront Bracing: Provide braces of steel angles, channels and plates to reinforce and stiffen the head of the aluminum storefront framing.
- D. Miscellaneous Steel Shapes: Channels, wide flange shapes, angles, plates, tubing, connections, and bolts where shown and detailed on Drawings. Hot-dip galvanize where exposed to weather or touching exterior masonry after fabrication. Set mechanical unit frames directly on joists, not on deck. Provide an angle frame supported by structure around all roof penetrations including hatches and ductwork.

END OF SECTION

SECTION 06 10 00

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Wood blocking, wood furring and grounds, and plywood backing panels.
- B. Related Sections:
 - 1. Section 06 40 00 - Architectural Woodwork.

1.2 SUBMITTALS

- A. General: Submit in accordance with SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
- B. Product Data:
 - 1. Include all data for rough carpentry products required for installation.
 - 2. Fire-retardant-treated wood product data, including certification by treating plant that treated materials comply with specified standard and other requirements as well as data relative to bending strength, stiffness, and fastener-holding capacities of treated materials.
- C. Warranty: Provide warranty of chemical treatment manufacturer for each type of treatment.

1.3 QUALITY ASSURANCE

- A. Lumber Grading: Lumber Grading Rules and Wood Species in accordance with Voluntary Product Standards. Grading rules of following associations apply to materials furnished.
 - 1. Southern Pine Inspection Bureau (SPIB).
 - 2. West Coast Lumber Inspection Bureau (WCLIBB).
 - 3. Western Wood Products Association (WWPA).
- B. Grade Marks: Identify lumber and plywood by official grade mark.
 - 1. Lumber: Include symbol of grading agency, mill name, grade, species, grading rules and condition of seasoning at time of manufacturer.
 - 2. Plywood: Include type, span rating or group number, exposure durability classification, and agency mark of APA.

1.4 QUALIFICATIONS

- A. Design structural site fabricated items under direct supervision of a professional structural engineer experienced in design of this work and licensed in the State of Texas.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, handle, and protect products in accordance with SECTION 01 65 00 - PRODUCT DELIVERY REQUIREMENTS and 01 66 00 - PRODUCT STORAGE AND HANDLING REQUIREMENTS.
- B. Store products above ground, on platforms or skids, and covered with waterproof coverings. Provide for adequate air circulation.
- C. Do not store seasoned materials in damp or wet locations.
- D. Support products in such a way as to prevent warping and distortion.

1.6 WARRANTY

- A. Provide a 20-year warranty for each type of chemical treatment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Wood: Lumber for framing and general carpentry work shall be sound, well manufactured, surfaced S4S material with a moisture content limit of 19%.
 - 1. Dimension: SPIB grade marked No.2 Dimension Southern Pine or WCLB grade marked No. 2 Dimension Douglas Fir.
 - 2. Boards: SPIB grade marked No. 2 Boards Southern Pine.
 - 3. Redwood: RIS grade marked Construction Heart California Redwood.
- B. Plywood: Plywood for general carpentry work shall be APA trademarked, 23/32" minimum thickness, Tongue & Groove.
 - 1. Interior: B - D, Group 2, Exposure 1, fire-retardant treated.
 - 2. Exterior: C - C plugged grade, Group 2, Exterior type, fire-retardant treated.
- C. Rough Hardware:
 - 1. Anchors, bolts, screws, and spikes shall be of proper types and sizes to support the work, to draw the members into place, and to hold them securely. Bolt heads and nuts bearing on wood shall have standard washers.
 - 2. Metal fasteners to secure wood grounds and blocking to masonry and concrete shall be of the type best suited to the conditions and spaced no more than 16" o.c. Wood plugs and nailing blocks are not acceptable.
 - 3. Nails shall be of the sizes and types intended for the particular use.
 - 4. Rough hardware exposed to the weather or embedded in exterior masonry and concrete walls or slabs shall be hot-dipped galvanized.
 - 5. Nails and bolts used with preservative treated lumber shall be hot-dipped galvanized.

2.2 WOOD TREATMENT

- A. Preservative Treatment:
 - 1. Comply with applicable requirements of AWPA U1; Category UC2 for interior construction not in contact with ground, Category UC3b for exterior construction not in contact with ground, and Category UC4a for items in contact with ground.
 - a. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
 - b. 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.
 - 2. Kiln-dry lumber and plywood after treatment to a maximum moisture content of 19% for lumber and 15% for plywood. Do not use material that is warped or that does not comply with requirements for untreated material
 - 3. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.
- B. Fire-Retardant Treatment:
 - 1. 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.
 - 2. Wood shall be fire-retardant chemically treated and pressure impregnated; with a flame spread index of 25 or less and a smoke development of 0-450 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.
 - 3. Treatment shall not promote corrosion of metal fasteners.
 - 4. 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.
 - 5. 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.
 - 6. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D 5664 and design value adjustment factors shall be calculated according to ASTM D 6841

7. Kiln-dry lumber and plywood after treatment to maximum moisture content of 19% for lumber and 15% for plywood.
 8. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.
- C. If cut after treatment, coat cut surfaces with heavy brush coat of same chemical used for treatment. Inspect each piece of lumber or plywood after drying; discard damaged or defective pieces.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General

1. Discard units of material with defects which might impair quality of work, and units which are too small to fabricate work with minimum joints or optimum joint arrangement.
2. Set carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted. Scribe and cope as required.
3. Securely attach carpentry work to substrates by anchoring and fastening as required by recognized standards and as required to draw members into place and securely hold same unless otherwise indicated. Use washers under all bolt heads.
4. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials.
5. Make tight connections between members to develop full strength of members.
6. Install fasteners without splitting of wood.
7. Pre-drill as necessary.
8. Comply with APA E30 requirements for plywood.
9. Install fasteners at spacings recommended by AFPA National Design Specifications for Stress Grade Lumber and Its Fastening - 1973 for lumber and APA Guide E30 for Plywood, unless more restrictive code requirements dictate tighter spacing or heavier fasteners.
10. Locate members as indicated on the drawings. Size, spacing or spans shall not be changed without specific approval of Architect. Take care to place proper grades and species of members where indicated in accordance with the lumber schedule herein.
11. Temporary brace framing at the end of each days' work until all framing is completed and securely anchored. Leave temporary bracing in place as long as required for safety. As work progresses, securely connect work to compensate for dead load, wind and erection stresses.

B. Shoring: Construct shoring for masonry where required. Brace and maintain it until the mortar has set sufficiently to permit removal.

C. Blocking: Install 2x6 wood blocking between studs to stiffen the structure and for the support of other work. Provide 2x6 blocking for installation of wall-mounted objects.

D. Bucks: Install wood bucks for frames as required. Members shall be at least 2 x 4 material. Spike securely together. In masonry, provide 16 ga. corrugated metal jamb anchors screwed to the back and spaced to work masonry bed joints, not more than 32" apart.

E. Plywood Backing Panels: Screw attach through gypsum board to supports.

3.2 PROTECTION

- A. Protect products from moisture absorption and subsequent warping or deterioration until subsequent construction can proceed.

END OF SECTION

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SECTION 06 40 00

ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Millwork.
- B. Related Sections:
 - 1. Section 06 10 00 - Rough Carpentry.
 - 2. Section 08 14 23 - Plastic-Laminate-Faced Wood Doors.
 - 3. Section 08 71 00 - Door Hardware: masterkey cabinet locks.

1.2 SUBMITTALS

- A. General: Submit following items in accordance with SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Product Data: Manufacturer's technical literature for factory fabricated items and components.
- C. Shop Drawings
 - 1. Indicate profiles, sections, and views of stock items as well as specially fabricated items for the work, at scale large enough to permit checking for design conformity.
 - 2. Indicate sizes, quantities, markings, materials, wood species, finishes and accessories.
 - 3. Include assembly and installation drawings to show methods of blocking, fastening, bracing, jointing, and connecting to work of other trades.
- D. Samples
 - 1. Two samples of each type and species of plywood, particle board, and finish lumber specified, complete with applied finish.
 - 2. Each type of hardware and fastening device required in the construction of the work specified herein.
- E. Certificate: Submit certification by testing plant stating chemicals and process used, conformance with referenced standards and governing ordinances, and non-bleeding quality of treatment.

1.3 QUALITY ASSURANCE

- A. AWI Quality Standard: Comply with grades of interior architectural woodwork, construction, finishes and other requirements of the "Architectural Woodwork Standards", 2nd Edition, 2014, adopted and published jointly by Architectural Woodwork Institute (AWI), Architectural Woodwork Manufacturers Association of Canada (AWMAC), and Woodwork Institute (WI), except as otherwise indicated.
 - 1. Use Premium Grade, except use Economy Grade for millwork in custodian closets and storage rooms. Items not given a specific quality grade shall be Premium Grade.
- B. Mock-up: Construct the mock-up cabinet as designated on the drawings using materials and hardware proposed for the project. The cabinet shall duplicate the typical construction and quality grade specified. Deliver the mock-up cabinet to the project site for approval by Architect. Notify the Architect in writing one week in advance of the mock-up's on-site arrival. Mock-up cabinet shall be made fully acceptable to the Architect through re-manufacture at the millwork shop or through acceptable field corrections prior to commencing construction of other cabinets. Mock-up cabinet shall be properly identified, and, if acceptable to Architect may be installed in the project. Once installed, do not alter or move the mock-up cabinet.
- C. Lumber and Plywood Material Grading: As defined in AWI Section 4 - Sheet Products, and as defined by the rules of the recognized associations of lumber and plywood manufacturers producing the materials specified.
- D. Fabrication Standards: Fabricate items in accordance with AWI standards listed below using Premium Grade except at millwork scheduled to be installed in Custodian's Closets and storage rooms, which shall be Economy Grade.
 - 1. Lumber grades: AWI Section 3 - Lumber.

2. Miscellaneous Work: AWI Section 6 - Interior & Exterior Millwork.
 3. Painted Millwork: AWI Section 10 - Casework.
 4. Countertops: AWI Section 11 - Countertops.
- E. Regulatory Requirements: Conform to applicable code for fire retardant requirements.
- F. Accessibility Standards: Meet Texas Accessibility Standards (TAS) special requirements for the following:
1. Countertop height with or without cabinet below
 2. Kneespace clearance to be minimum clearance
 3. 12 inch deep shelving, adjustable and fixed
 4. Wardrobe cabinets, furnished with rod/shelf adjustable to 48 inches above finished floor, with a maximum 21 inch shelf depth.
 5. Sink cabinet clearances
 6. Cabinet locks, latches, and other operating mechanisms, except locked bottom drawers at base cabinets.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver woodwork to the project site only when dry and product storage space is available at or in the building so that it can be kept dry and protected from injury.

1.5 PROJECT CONDITIONS

- A. Protection: Protect finish woodwork surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective covering. Woodwork damaged through neglect of the above requirements shall be repaired or replaced without additional cost to the Owner.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Install finish carpentry products only when temperature and humidity conditions have been stabilized and will be maintained.
- B. Maintain temperature and moisture conditions as recommended by woodwork fabricator from date of installation through remainder of construction period.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General:
1. Comply with quality and grading standards contained herein for each material.
 2. Sizes noted on drawings or indicated herein for lumber are nominal unless detailed by specific dimensions of actual size.
 3. Plywood and particleboard $\frac{3}{4}$ " thickness unless noted or detailed otherwise.
 4. Products surfaced four sides, unless noted otherwise.
- B. Softwood Lumber
1. Quality standard: PS 20.
 2. Grading Standard: AWI Premium grade.
 3. Maximum moisture content: 6% for interior work; 10% for exterior work.
 4. Species: Douglas fir.
 5. Grain: Plain sliced.
- C. Softwood Plywood
1. Quality standard: PS 1.
 2. Grading standard: AWI Premium grade.
 3. Core material: C-D Plugged INT-APA.
 4. Face quality: A-B INT-APA.
 5. Species: Douglas fir.
 6. Ply construction: 3 ply - 3/8-inch; 5 ply - 1/2-inch; 7 ply - 3/4-inch.
- D. Hardboard
1. Quality standard: PS 58.

2. Grade: Tempered.
3. Face: Both faces sanded.
4. Thickness: 1/4-inch.

2.2 ACCESSORIES AND TREATMENT

- A. Contact Adhesive: FS MMM-A-130B, of type recommended by millwork manufacturer to suit application.
- B. Wall Adhesive: Solvent release cartridge type, compatible with substrate, capable of achieving durable bond.
- C. Bolts, Nuts, Washers, Lags, Pins, Nails, and Screws: Size and type to suit application.
- D. Nails: Size and type to suit application, plain finish.

2.3 CABINETS AND COUNTERTOPS

- A. General: If practical, cabinets not dependent upon job conditions shall be shop assembled.
- B. Identification of Cabinet Parts by Surface Visibility:
 1. Exposed Surfaces: Surfaces visible when:
 - a. Drawers and opaque doors (if any) are closed.
 - b. Behind clear glass doors.
 - c. Bottoms of cabinets 42 inches or more above finish floor.
 - d. Tops of cabinets below 78 inches above finish floor.
 - e. Tops of cabinets or millwork are visible from an adjacent higher elevation.
 2. Semi-exposed Surfaces: Surfaces which become visible when:
 - a. Opaque doors are open or drawers are extended.
 - b. Bottoms of cabinets are more than 30 inches and less than 42 inches above finish floor.
 3. Concealed Surfaces: Surfaces considered concealed when:
 - a. Surfaces not visible after installation.
 - b. Bottoms of cabinets less than 30 inches above finish floor.
 - c. Tops of cabinets over 78 inches above finish floor and not visible from an upper level.
 - d. Stretchers, blocking, and components concealed by drawers.
- C. Millwork for Opaque Finish:
 1. AWI Custom Grade.
 2. Construction of Millwork: Flush overlay design.
 3. Exposed Solid Lumber Parts and Semi-exposed Parts: As governed by selected AWI quality grade unless shown otherwise.
- D. Laminate Clad Cabinets:
 1. Quality Standard: AWI Section 10 - Casework, Laminate Clad Cabinets, Premium Grade.
 2. AWI Type of Cabinet Construction: Flush overlay design.
 3. Laminate Grade for Exposed Surfaces:
 - a. Horizontal Surfaces other than Tops: GP-50 (0.050-inch nominal thickness).
 - b. Vertical Surfaces: GP-28 (0.028 inch nominal thickness).
 - c. Edges: GP-50 (0.050-inch nominal thickness).
 4. Semi-Exposed Surfaces: Provide high pressure laminate, GP-28, including backs of doors and drawers. Other interior surfaces of drawers may be sealed wood; reference SECTION 09 91 00 - PAINTING.
 5. Shop joints will be allowed only when the required lengths exceed the lengths of plastic regularly available. Field joints shall be shop prepared and pre-fitted with bolt-up type fasteners.
 6. PVC edging banding will not be acceptable.
 7. The use of LPDL (Melamine) will not be acceptable.
 8. Plastic Laminate: General purpose grade, high pressure decorative laminate meeting the physical requirements of NEMA LD 3. Colors shall be as selected by Architect from manufacturer's full color and pattern range. Architect reserves the right to select one color for the exposed surfaces of the basic components of cabinets and a different color for the following components of cabinets: door and drawer fronts (including edges of door and drawer fronts), backs of open shelving, and countertop and backsplash, unless shown otherwise. Product/manufacturer; one of the following:
 - Formica Brand Laminate; Formica Corp.
 - Pionite or Nevamar; Panolam Industries
 - Wilsonart; Wilsonart International; Div. of Premark International, Inc.

- E. Countertops:
 - 1. Quality Standard: AWI Section 11 - Countertops.
 - 2. Type of Top: High pressure decorative laminate complying with Premium Grade.
 - 3. Laminate Cladding for Horizontal Surfaces: High pressure decorative laminate, HGS (0.050-inch nominal thickness) Grade. Laminate shall be selected from one of the manufacturers listed above.
 - 4. Edge Treatment: Same as laminate cladding on horizontal surfaces. Plastic laminate edges shall return across open ends of cabinets.
 - 5. Countertops containing sinks and countertops over dishwashers shall be exterior-grade veneer core plywood or moisture resistant medium density fiberboard, no substitutions.
 - 6. Joints between tops and backsplash shall be square.
 - 7. Joint between backsplash and countertops containing sinks shall be sealed with sanitary, silicone sealant to ensure a tight seal.
 - 8. No joints shall be closer than 24 inches either side of sink cutout.
 - 9. No joints shall occur within kneespace.
 - 10. Seal substrate at sink cutouts with sanitary, silicone sealant.
 - 11. PVC edging will not be acceptable.
 - 12. The use of LPDL (Melamine) will not be acceptable.

2.4 SHOP FABRICATION

- A. Fabricate millwork to AWI Premium standards for flush overlay construction as detailed (or as indicated in AWI Section 6 Millwork if details are not present).
- B. Sanding/Filling
 - 1. Perform work according to AWI requirements.
 - 2. Sand work smooth and set exposed nails and screws.
 - 3. Apply wood filler in exposed nail and screw indentations and leave ready to receive applied finishes.
 - 4. On items to receive transparent finishes, use wood filler which matches surrounding surfaces and of types recommended for applied finishes.
- C. Prime seal concealed and semi-concealed surfaces. Brush apply only.
- D. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and other fixtures. Verify locations of cutouts from site dimensions. Seal edge surfaces of cutouts.
- E. Before proceeding with millwork required to be fitted to other construction, field-verify applicable measurements and include on shop drawing details.
- F. Fabricate millwork to dimensions, profiles, and details shown.
- G. Route and groove back of flat trim members, kerf backs of other wide flat members except plywood or veneered members.
- H. Assemble millwork in mill in as large of units as practicable to minimize field cutting and fitting.
- I. Miter trim joints, where required, by joining, splining, and gluing to complying with requirements for specified grade.
- J. Band exposed plywood and particleboard edges with hardwood trim, 3/8-inch x width of sheet unless otherwise noted or shown to be trimmed with plastic or aluminum.
- K. High Pressure Laminate Work:
 - 1. Apply laminate finish in full, uninterrupted sheets of maximum practical lengths. Apply backing sheets to reverse side of items receiving laminate surfacing. Use decorative vertical grade laminate for cabinet interiors.
 - 2. Form corners and butt joints with hairline joints.
 - 3. Do not locate joints within 2 feet' of sink cut-out.
 - 4. Cap exposed edges with laminate.
- L. Construction
 - 1. General
 - a. Unless otherwise indicated, construct millwork bodies, bottoms, dividers, sides, tops, shelves, doors, drawer fronts and countertops of 3/4-inch sheet material.
 - b. Use 1/2-inch thick solid lumber material for drawer sides, back and sub-front.

- c. Use 1/4-inch veneer core panel product for drawer bottoms and cabinet backs, unless noted otherwise.
2. Flush Overlay Reveals
 - a. Unless shown or noted otherwise, allow 1/8-inch between adjacent drawers and doors and 1/16-inch at vertical edges.
 - b. Allow 1/8-inch reveal at top and bottom of wall cabinets and at bottom of base cabinets.
3. Methods of Joinery
 - a. Provide face plates, paneled ends, and construction, glued under pressure.
 - b. Provide body web frames of stile plowed and stub tenoned construction.
 - c. Join case body members by dado or concealed dowel joints.
 - d. Do not use mechanical fasteners or metal clips for attachment of body members to other body members or to web frames.
4. Base cabinets
 - a. Use finished end panels unless condition will be fully concealed.
 - b. Provide unfinished toe space, prepared to receive base by others.
 - c. Construct drawers with Lock Shoulder rabbited (tongue-and-groove) construction.
5. Wall cabinets
 - a. Use finished end panels unless condition will be fully concealed.
 - b. Provide continuous 1x3 inch anchor cleat at top and bottom of cabinet interior full width of unit. Secure cleat in rabbit over back, then glue and spot pin.
6. Countertops
 - a. Provide with 1-1/2 inch deep face edge, faced with high pressure laminate unless noted or shown otherwise.
 - b. Provide loose 4 inch high pressure laminate covered splashes typically at countertops unless taller splashes shown or noted.
 - c. Regardless of drawing indications, provide a 1/2-inch thick wood strip on back side of splash to increase the splash top thickness for coping the splash to the wall.
 - d. Countertops containing sinks shall be medium density overlay plywood.

2.5 FINISH

- A. Sand work smooth and set exposed nails.
- B. Apply wood filler in exposed nail indentations.
- C. On items to receive transparent finishes, use wood filler which matches surrounding surfaces and of types recommended for applied finishes.
- D. Refer to SECTION 09 91 00 - PAINTING for field applied finish descriptions.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Verify location of wood blocking prior to installation of finish carpentry.

3.2 INSTALLATION

- A. Installation of Standing and Running Trim and Millwork: Comply with applicable AWI Section installation requirements.
- B. Workmanship: Exposed woodwork shall have a smooth finish, free from machine and tool marks, abrasions, and raised grain on exposed surfaces. Joints shall be tight and formed so as to conceal shrinkage.
- C. Interior Woodwork Installation:
 1. Accurately scribe and closely fit face plates, filler strips and trim strips to abutting walls and to irregularities of adjacent surfaces.
 2. Set wood finish straight, plumb, and level, in true alignment, and rigidly fastened in place. Nailing and fastening shall be concealed where possible. Set exposed nail heads for puttying.
 3. Anchor base and wall cabinets to walls with fully threaded oval head wood screws with finishing washers set at a minimum of 12 inches on center.

3.3 CABINET HARDWARE SCHEDULE

- A. In addition to the items of hardware specifically noted and shown on the drawing details, furnish and install the following hardware for cabinets. This schedule is intended to include hardware needed to completely equip cabinets specified in this Section. Verify cabinets shown and detailed on the drawings with cabinets listed in this schedule. In the event of omissions in the schedule, furnish hardware of the kind and quality scheduled for similar cabinets.
1. Each 3/4-inch overlay cabinet door more than 3 feet high:
 - 1-1/2 pair Interleaf design hinges HT1592-4 (Stanley).
 - 1 heavy duty 4" stainless steel wire pull.
 - 1 pair Magnetic Catches: 325 (Ives).
 2. Each 3/4-inch overlay cabinet door less than 3 feet high:
 - 1 pair Interleaf design hinges HT1592-4 (Stanley).
 - 1 heavy duty 4" stainless steel wire pull.
 - 1 pair Magnetic Catches: 325 (Ives).
 3. Each 1-1/2 inch overlay cabinet door more than 3 feet high:
 - 2-1/2 inch Interleaf design hinges HT1592-4 (Stanley).
 - 1 heavy duty 4" stainless steel wire pull.
 - 1 flap stay No. 499.050.02.0215 or 499.050.03.0215 (Mepla)
 - 1 pair Magnetic Catches: 327 (Ives).
 4. Each cabinet drawer:
 - KV #1300 Extension Drawer Slides.
 - KV #8400 Extension Drawer Slides at File Drawers.
 - 1 heavy duty 4" stainless steel wire pull
 5. Cabinets indicated to be locked:
 - a. Each cabinet door: C8055-14A x C2004 US26D (CompX National)
 - b. Each drawer: C8055-14A x C2004 US26D (CompX National)
 - c. Each pair of cabinet doors:
 - 1 cabinet lock C8053-14A x C2004 US26D (CompX National)
 - 1 elbow catch No. 2 (Ives)
 - d. Cabinet locks in each room shall be keyed alike.
 6. Grommets: Model No. LO-3 (Doug Mockett & Co., Inc.)
 7. Steel Support Brackets (for countertops): Provide one of the following:
 - a. Work Station Brackets formed of 1/8-inch steel with powder coat finish as manufactured by A & M Hardware, Inc. (phone 888.647.0200 web site: www.aandmhardware.com). Color as selected by Architect from manufacturer's full color line.
 - b. Rakks Counter Support Brackets fabricated of minimum 0.25-inch gauge 6063-T6 extruded aluminum as manufactured by Rangine Corp. (phone 800.826.6006 web site: www.rakks.com). Brackets shall be TIG welded along both 45° mitered sides and across the back. Sharp edges shall be ground and deburred. Color and finish shall be as selected by Architect.

END OF SECTION

SECTION 07 21 00

BUILDING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Acoustical and fire safing building insulations.
- B. Related Sections:
 - 1. Section 07 84 00 - Firestopping.

1.2 SUBMITTALS

- A. General: Submit following items under provisions of SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Product Data: Including performance specifications, composition and applicable standards.
- C. Samples: Submit 12" x 12" size samples of each type insulation proposed for use.
- D. Manufacturer's Instructions: Written installation instructions, including attachment recommendations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: (See Articles below for specific products)
 - Dow Chemical Company
 - Johns Manville, A Berkshire Hathaway Co., Denver, CO
 - Owens Corning, Toledo, OH
 - Certainteed Corp., Valley Forge, PA
 - Thermafiber, Inc.
 - U.S. Gypsum Co.

2.2 BATT ACOUSTICAL INSULATION

- A. Unfaced glass fiber composition, 3½" thick, minimum one lb./c.f. density, meeting following standards:
 - 1. ASTM E 84: FHC 25/50 maximum.
 - 2. ASTM C 518: R value of 3.2 per inch of thickness.
 - 3. ASTM C 665: Type I, Class A.
- B. Following products are acceptable
 - 1. Sonobatts by Owens Corning Fiberglas Corp.
 - 2. Sound Control Batts by Certainteed Corp.

2.3 FIRE SAFING INSULATION

- A. Mineral fiber composition, 4" thick, 4.0 pcf density, meeting following standards
 - 1. ASTM E 84: FHC 15/10 maximum.
 - 2. ASTM C 665: Type I, Class A
 - 3. ASTM E 119: Testing Procedures.
 - 4. FS HH-I-558B: Class 1 and 2.
- B. Following products are acceptable
 - 1. Thermafiber Safing Insulation by Owens Corning.
 - 2. Mineral Wool Safing Insulation by Johns Manville.

2.4 ACCESSORIES

- A. Joint Tape: Pressure sensitive type, recommended by insulation manufacturer.

- B. Insulation Adhesive: Type recommended by insulation manufacturer.
- C. Stick Clips
 1. Galvanized sheet metal with impaling pins and retainer washers.
 2. Size and type to suit application and insulation thickness.
 3. Approved by manufacturer of insulation for intended use.
- D. Stick Clip Adhesive
 1. High strength, resilient adhesive, having drying time of 0 to 30 minutes (rapid initial set), and 24 hours final set.
 2. Compatible with insulation adhesive, insulation and substrate.
 3. Non-corrosive to galvanized steel.
- E. Supportive Wire Mesh: Hexagonal design, woven mesh "chicken wire" style.
- F. Tie wire: Minimum 18 ga. annealed wire.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine areas to receive insulation for conditions that will adversely affect the execution and quality of the work. Do not start this work until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Fit insulation tight within stud spaces, above soffits, behind fascias, and tight to and behind mechanical and electric services within plane of insulation, leaving no gaps or voids. Butt insulation tightly. Cut and fit tightly around items penetrating insulation. Stagger and butt joints, or cavity of a cavity wall system.
- B. Install in conformance with the manufacturer's recommendations. Cut material to fit closely around obstructions and projections.
 1. Walls: Secure insulation by mechanical means to hold it in place without sagging or slumping. Install insulation with edges and joints butted tight to leave no gaps.
 2. Acoustical Insulation:
 - a. Install acoustical insulation between the studs in those gypsum drywall partitions so detailed and noted on the drawings. Staple blankets to the gypsum board or otherwise fasten in place as recommended by the manufacturer of the blankets. Fill all voids.
 - b. Where indicated at suspended gypsum board ceilings, lay sound attenuation blankets between wire hangers on back of gypsum board and over cross runners. Do not install on top of or within 3" of light fixtures.
- C. Safing Insulation: Compress and install insulation on wire hangers or clips in spaces between floor slabs and curtain walls. Also, in openings in floor slabs to seal around telephone cables, piping, ducts and other utilities per SECTION 07 84 00 - FIRESTOPPING.

3.3 SCHEDULES

- A. Provide acoustical insulation in thickness and locations as follows:
 1. Walls: 3½" (or as shown on drawings)
 2. Above Ceilings: 3½" (or as shown on drawings)

END OF SECTION

SECTION 07 84 00

FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Firestopping for all fire-rated construction complete, including, but not limited to:
 - 1. Firestopping in conjunction with gypsum board, masonry and plaster partitions.
 - 2. Firestopping shall include, but not be limited to the following applications:
 - a. Sealing gaps between tops of partitions and roof/floor decks.
 - b. Sealing gaps between structure and glass curtainwalls with fire safing insulation.
 - c. Other locations where "firestopping", "firestop", or "safing" is indicated.
 - d. Where required by codes.
 - e. Control joints and expansion joints in masonry or gypsum board fire-rated partitions.
 - f. Expansion joints in roof and floor assemblies.
- B. Related Sections:
 - 1. Section 07 21 00 - Building Insulation.
 - 2. Section 07 92 00 - Joint Sealants.
 - 3. Section 09 21 16 - Gypsum Board Assemblies.
 - 4. Divisions 23 and 26.

1.2 SUBMITTALS

- A. Refer to SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Product Data: Submit copies of manufacturer's literature. Include data substantiating that materials comply with specified tested system requirements.
- C. Samples: Submit duplicate samples of each type of firestopping material and accessories.
- D. For those firestop applications that exist for which no UL tested system is available through a manufacturer, an engineering judgement derived from similar UL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineer judgement drawings must follow requirements set forth by the International Firestop Council.

1.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Do not allow firestopping materials to become wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage and protection.

1.4 PROJECT CONDITIONS

- A. Do not install firestopping materials until building is completely enclosed and weathertight.
- B. Coordinate installation with the work of other trades. Reference SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION.

PART 2 - PRODUCTS

2.1 PRODUCT/MATERIAL PERFORMANCE REQUIREMENTS

- A. Except as otherwise indicated, firestop materials shall be classified in the Underwriters Laboratories (UL) Building Materials Directory, "Section XHEZ-Through-Penetration Firestop Systems", and/or "Section XHHW-Fill Void or Cavity Materials", and "Section XHBN - Joint Systems" for specific project conditions:
 - 1. Time rating ("F", Fire and "T", Temperature) (T-rating is only required for construction joint systems).
 - 2. Floor or wall assembly and material.
 - 3. Penetrating materials/items diameters, or void space.
 - 4. Through opening size.
 - 5. Annular space between penetration opening and penetrating item.

- B. Firestopping materials shall provide a fire-rating commensurate with the adjacent construction rating.
- C. Firestop materials shall comply with ASTM E 84: Surface Burning Characteristics.
- D. Firestop materials shall have been tested in accordance with ASTM E 814, UL 1479 or UL 2079.
- E. Firestop materials shall be free of asbestos.
- F. Firestop materials shall be paintable or capable of receiving finish materials in those areas which are exposed to view and which are scheduled to receive finishes.
- G. Obtain firestop products from a single manufacturer.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Installer must examine substrate and conditions under which firestopping work is to be performed, and notify Contractor in writing of any unsatisfactory conditions.

3.2 INSTALLATION

- A. Install firestopping materials including foaming, packing and accessory materials to fill openings around penetrations in floors and walls, to seal gaps between decks and partitions, gaps between structure and curtainwall, etc., to provide fire-stops with fire resistance ratings indicated for floor or wall assembly in which penetration occurs. Use silicone based materials for all wet or damp conditions.
- B. Install firestop materials and systems in accordance with manufacturer's printed instructions and applicable UL Building Materials Directory assemblies.
- C. Cut and friction fit fire safing type insulation firestopping to completely fill all gaps and voids. Provide stick-clips, sheet metal closures, and any other accessories to support insulation.
- D. Where floor openings are 4" or more in width and subject to traffic or loading, install firestopping materials capable of supporting same loading as floor.
- E. Remove damming materials after curing if made of other than fire resistant materials.
- F. Protect materials from damage on surfaces subject to traffic.

3.3 FIELD TESTING

- A. Firestop materials and installation may be tested by an independent testing laboratory. Refer to SECTION 01 45 23 - TESTING AND INSPECTION SERVICES.

3.4 CLEAN UP

- A. Clean up all debris caused by the work of this Section, keeping the premises clean and neat at all times.
- B. Clean adjacent surfaces soiled by the work of this section.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Sealing and caulking of joints.
- B. Related Sections:
 - 1. Section 03 30 00 - Cast-In-Place Concrete.
 - 2. Section 04 01 20 - Unit Masonry Restoration.
 - 3. Section 06 40 00 - Architectural Woodwork.
 - 4. Section 07 84 00 - Firestopping.
 - 5. Section 08 80 00 - Glazing.
 - 6. Section 09 21 16 - Gypsum Board Assemblies.

1.2 SUBMITTALS

- A. Submit under provisions of SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Submit product data indicating sealant chemical characteristics, performance criteria, limitations, color availability and application instructions.
- C. Submit two samples ¼" diameter x 4" in size illustrating color selections available.
- D. Submit manufacturer's certificate under provisions of SECTION 01 45 00 - QUALITY CONTROL that products meet or exceed specified requirements.

1.3 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum 3 years documented experience.
- B. Applicator: Company specializing in applying the work of this section with minimum 3 years documented experience and approved by sealant manufacturer.
- C. Conform to Sealant and Waterproofers Institute requirements for materials and installation.

1.4 FIELD SAMPLES

- A. Provide samples under provisions of SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Construct one field sample joint, 5 feet long, illustrating sealant type, color, and tooled surface.
- C. Locate where directed.
- D. Accepted sample may remain as part of the work.

1.5 PROJECT CONDITIONS

- A. Environmental Requirements: No caulking shall be done at temperatures below 40°F.

1.6 WARRANTY

- A. Furnish to the Owner a written warranty that the sealants shall remain watertight for a period of 2 years from the date of acceptance of the building. Joints which prove defective by leaking, cracking, melting or shrinking of the sealant shall be re-sealed without additional expense to the Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Reference "SEALANT SCHEDULE" at end of this specification section for locations of Sealant Types.
- B. Modified Polyurethane (Type 1 Sealant):
 - 1. Two or three-part conforming to ASTM C 920, Type M, Grade NS, Class 25.
 - 2. Color: Custom colors as selected by Architect.
 - 3. Acceptable products:
 - MasterSeal NP2, BASF the Chemical Company
 - Dymeric 240FC, Tremco.
- C. Pourable Urethane (Type 2 Sealant):
 - 1. Multicomponent conforming to ASTM C 920, Type M, Grade P (pourable), Class 25, Use T (traffic).
 - 2. Color: Custom color as selected by Architect.
 - 3. Acceptable products:
 - Urexpam NR-200, Pecora Corp.
 - MasterSeal SL 2 Sealant; BASF the Chemical Company
 - THC 900 (Self leveling) or 901 (low sag), Tremco.
- D. Pourable Urethane Sealant (Type 3 Sealant):
 - 1. Single-component conforming to ASTM C 920, Type S, Grade P (pourable), Class 25, Use T (traffic).
 - 2. Color: Gray or limestone as selected by Architect.
 - 3. Acceptable products:
 - Sikaflex - 1CSL; Sika Corporation, Inc.
 - MasterSeal SL 1; BASF the Chemical Company
 - Vulkem 45; Tremco
- E. Silicone, General Purpose (Type 4 Sealant)
 - 1. One-part rubber based silicone conforming to ASTM C 920, Type S, Grade NS, Class 100/50.
 - 2. Color: As selected by Architect.
 - 3. Acceptable products:
 - 790 Building Sealant, Dow Corning.
 - SCS2700 Silpruf LM, GE Silicones.
 - Spectrem 1, Tremco.
- F. Polyurethane Hybrid, Paintable (Type 5 Sealant):
 - 1. One-part, moisture-cure, polyurethane hybrid sealant for interior use, conforming to ASTM C 920, Type S, Grade NS, Class 35 and Fed. Spec TT-S-00230C, Class A, Type II.
 - 2. Acceptable product:
 - Dymonic FC, Tremco
- G. Acrylic Latex (Type 6 Sealant)
 - 1. One-part, non-sag acrylic latex, siliconized, conforming to ASTM C 834, Type P, Grade NF.
 - 2. Acceptable products:
 - AC-20+, Pecora Corp.
 - MasterSeal NP 520; BASF the Chemical Company
 - Tremflex 834; Tremco.
- H. Acoustical Sealant (Type 7 Sealant):
 - 1. Butyl rubber for concealed locations.
 - 2. Acceptable products:
 - AC-20 FTR Acoustical and Insulation Sealant, Pecora Corp.
 - Acoustical Sealant, Tremco
 - Sheetrock Acoustical Sealant; USG Co.

2.2 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

- C. Joint Backing: ASTM D 1056 and C 1330. In vertical joints use closed cell polyethylene foam rod; oversized 30 to 50 percent larger than joint width. In horizontal joints, use solid neoprene or butyl rubber, Shore A hardness of 70.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and joint openings are ready to receive work and field measurements are as shown on drawings and recommended by the manufacturer.
- B. Beginning of installation means installer accepts existing substrate.

3.2 PREPARATION

- A. Joint surfaces shall be clean and dry. Remove loose mortar and other material completely with compressed air or by brushing.
 - 1. Joints to be caulked shall be at least ¼" wide unless specifically specified smaller. At any point where the width of the joint is appreciably less, cut or grind out the joint to that width to assure an adequate volume of sealant along the length of the joint, except at concrete paving joints, those shall remain ⅛" wide as indicated.
 - 2. Pack with backing material the voids and recesses around metal frames which are deeper than the depth required for caulking. Leave the proper depth for the sealant.
 - 3. In open joints and where detailed, install rod stock as backing material. Roll the material into the joints to avoid stretching. The natural thickness of the rod stock shall be approximately twice the thickness of the joint in which it is installed.
 - 4. In raked masonry joints, apply a bondbreaker strip of polyethylene or masking tape along the bottom of the joints.
 - 5. Where sealant is to be applied against smooth metal surfaces, wipe these surfaces clean with a suitable ketone solvent immediately prior to caulking.
 - 6. Particular attention shall be paid to the preparation of horizontal joints in wear surfaces to be filled with sealant. Adjust joint depth to comply with sealant manufacturer's recommendations by malleting down the joint filler or filling in with rod stock as may be required. Joints in concrete paving shall be primed in accordance with manufacturer's recommendations.
 - 7. Perform preparation in accordance with ASTM C 1193 for solvent release sealants, C 1193 for latex base sealants, C 919 for acoustical applications, and C 1193 for elastomeric sealants.

3.3 APPLICATION

- A. Priming: Prime porous joint surfaces, particularly masonry and concrete. Test the primer to make sure it causes no staining of the material on which it is applied.
- B. Depth of sealant: Seal joints to a depth of approximately ½ the joint width, but never less than ¼" deep. Follow the sealant manufacturer's recommendations where possible.
- C. Apply the sealant in accordance with the manufacturer's instructions.
 - 1. Force the sealant into joints with enough pressure to expel all air and provide a solid filling. Correct any flowing or sagging before final inspection is made.
 - 2. Where adjacent surfaces permit, use masking tape to obtain straight, even lines. Remove tape immediately after the joints have been sealed.
 - 3. Fill joints flush with adjacent surfaces except where a recessed joint is specifically detailed. Tool beads with a sled runner or similar tool to insure full contact with joint faces.
 - 4. For caulking horizontal joints in wear surfaces, use a gun with a narrow nozzle. Apply the flow type sealant with the nozzle riding along the bottom so that the sealant is forced up to completely fill the slot without cavities. Provide and use a portable vacuum cleaner to remove loose dirt from the joints just ahead of the caulking gun.
- D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- E. Tool joints concave. Sealant shall achieve a firm skin before surface coating is applied.

3.4 CLEANING/REPAIRING

- A. Clean adjacent surfaces of soiling due to caulking operations. This applicator shall be responsible for and shall bear the cost of replacing any material damaged or discolored due to caulking operations.
- B. Repair or replace defaced or disfigured finishes caused by work of this section.

3.5 SEALANT SCHEDULE

- A. Locations specified below for sealants and caulking required under this section are general and shall not be considered as affecting the required use of sealing compounds specified under other sections of the specifications.

<u>SEALANT TYPE</u>	<u>APPLICATION</u>
1	<ul style="list-style-type: none">a. Vertical control and expansion joints in unpainted interior masonry surfaces.b. Vertical joints at perimeter of window, door, and storefront elements where adjacent to stone, masonry, or concrete surfaces.c. Unless noted otherwise, any other exterior vertical joints.
2	<ul style="list-style-type: none">a. Interior horizontal control and expansion joints in flooring, stone, masonry and tile flooring and at junctures between these materials and other adjacent materials.
3	<ul style="list-style-type: none">a. Exterior horizontal control and expansion joints in concrete paving.
4	<ul style="list-style-type: none">a. Sealing of joints between plumbing fixtures and substrates and between plastic laminate splashes and adjacent tops and walls.b. Threshold and windowsills set in full bed of sealant.
5	<ul style="list-style-type: none">a. General caulking as part of interior painting in joints subject to movement.
6	<ul style="list-style-type: none">a. General caulking as part of interior painting.
7	<ul style="list-style-type: none">a. Setting sill track, head track, and end studs to substrates on acoustically rated partitions. Refer to SECTION 09 21 16 - GYPSUM BOARD ASSEMBLIES for application requirements.

END OF SECTION

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SECTION 08 11 00

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Hollow metal doors and frames, sidelight frames, and borrowed light frames.

B. Related Sections:

1. Section 08 14 00 - Wood Doors.
2. Section 08 14 23 - Plastic-laminate-faced Wood Doors.
3. Section 08 71 00 - Door Hardware: hardware locations.
4. Section 08 80 00 - Glazing: glass for doors, sidelights, and borrowed lights.
5. Section 09 91 00 - Painting: finishing of hollow metal doors and frames.

1.2 SUBMITTALS

A. Shop Drawings: Submit in accordance with SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

1. Include door sizes, construction, frame types, wall anchors, and accessories required for installation.

1.3 REGULATORY REQUIREMENTS

A. Conform to applicable local building codes for fire rated requirements of metal door/metal frame and wood door/metal frame assemblies.

B. Fire Rated Door Construction: Conform to NFPA 252 or UL 10C.

1.4 QUALITY ASSURANCE

A. Standard: Provide steel doors and frames complying with the Steel Door Institute SDI-100 and as herein specified. Hollow metal provider that is not a member of the Steel Door Institute is not approved and must submit product data and samples for review.

B. Fire-Rated Door Assemblies: Provide door and frame assemblies which are identical in materials and construction to units tested in door and frame assemblies per NFPA 252 and which are labeled and listed for ratings indicated by UL. Metal UL classification markers shall be attached to these doors and frames.

1. Test Pressure (positive-pressure testing): After 5 minutes into the test, the neutral pressure level in furnace shall be established at 40 inches or less above the sill.

C. Conform to requirements of SDI-100.

D. Installed frame and door assembly to conform to UL 10C for fire-rated class indicated or scheduled.

E. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver metal doors and frames to the project site with no dents or open seams and store upright in a protected dry area. Provide packaging and wrapping to protect hollow metal items.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Provide steel doors and frames as manufactured by one of the following:
- Ceco Door Products; an ASSA ABLOY Group Co.
 - Curries Company; an ASSA ABLOY Group Co.
 - Deansteel Mfg., Inc.
 - Mesker Door, Inc.
 - Republic Builders Products Co.
 - Steelcraft; an Ingersoll-Rand Co.

2.2 MATERIALS

- A. Sheet and Strip: ASTM A 1008, commercial quality, leveled, cold-rolled steel free of scale and other surface defects.

2.3 FABRICATION

- A. Flush Steel Doors: SDI 100, Grade 2, heavy duty, full flush type of welded seamless construction with no visible seams or joints on faces or vertical edges.
1. Interior door face sheets of 18 gage and exterior door face sheets of 16 gage, steel reinforced, stiffened and sound-deadened by laminating to small cell impregnated kraft honeycomb core completely filling the door or by formed steel vertical stiffeners spaced 6" o.c. and attached to face sheets by spot welds and with the spaces between stiffeners filled with inorganic blanket insulation material.
 - a. At exterior doors, provide insulation value of R - 8.0 for foamed-in-place polyurethane.
 - b. At fire rated doors, provide mineral fiberboard core as scheduled and/or as required to meet applicable codes.
 - c. If door exceeds 36" width, interiors doors shall be 16 gage and exterior doors shall be 14 gage.
 2. Continuous vertical interlocking joints on lock and hinge edges with seams continuously welded, filled and dressed smooth. Bevel vertical edges.
 3. Top and bottom edges closed with continuous recessed steel channels spot welded to both faces. Top edge of exterior doors sealed flush with closing channel to exclude water.
 4. Fixed glass moldings welded to security side of door. Loose moldings of 20 gage steel fastened with countersunk flat head screws. Fabricate stops to receive vinyl gaskets.
 5. Overlapping steel astragals for pairs of labeled doors as required by manufacturer to meet codes.
- B. Steel Frames: Combination buck, frame and trim type of 16 gage steel for interior frames and 14 gage steel for exterior frames. Provide frames with face width, throat opening, backbend, and jamb depth as per dimensions shown.
1. Brake-form to profile free of warp, buckles, and fractures with corners square and sharp. Form stop integral with frame except where detailed otherwise. Dress sheared edges straight and smooth.
 2. Close corner joints tight with trim faces mitered and continuously welded. Dress exposed welds flush and smooth.
 3. Fabricate frames for large openings in knocked-down sections for field assembly with butt joints and internal reinforcing sleeves. Knocked-down frame assemblies shall be trial assembled in the shop.
 4. Loose glazing stops shall be 16 gage steel, mitered corners, fastened with countersunk flathead screws. Fabricate stops to receive vinyl gaskets.
 5. Weld 14 gage steel floor anchors inside each jamb with two holes each anchor for floor anchor bolts.
 6. Furnish frames with steel spreader temporarily fastened to the feet of both jambs for rigidity during shipping and handling.
 7. For each jamb in masonry construction provide 3 or more 16 gage adjustable jamb anchors of the T-strap type spaced not more than 30" apart. Furnish yoke type Underwriters anchors for labeled door openings only.
 8. For each jamb in steel stud construction provide 4 or more 18 gage drywall type jamb anchors. Weld anchors inside each jamb and wire or bolt to the studs.
- C. Shop Finish: After fabrication, doors and frames shall be degreased, phosphatized, and factory painted inside and out with a rust inhibitive synthetic primer. Apply mineral filler to eliminate weld scars and other blemishes.
- D. Fabricate frames and doors with hardware reinforcement plates welded in place. Provide mortar guard boxes.

- E. Reinforce frames wider than 48" with roll formed steel channels fitted tightly into frame head, flush with top.
- F. Prepare frame for silencers. Provide three single rubber silencers for single doors and mullions of double doors on strike side, and two single silencers on frame head at double doors without mullions.
- G. Attach fire-rated label to each frame and door unit.
- H. Close top edge of exterior door flush with inverted steel channel closure. Seal joints watertight.
- I. Fabricate frames for masonry wall coursing with 2" head member.

2.4 HARDWARE PREPARATION

- A. Prepare doors and door frames for hardware. Mortising, reinforcing, drilling, and tapping shall be done at the factory for mortised hardware. Reinforcement shall be provided for surface-applied hardware, and the drilling and tapping for this hardware shall be done in the field. Provide plaster guards for hinge and strike reinforcements and cutouts on frames.
- B. Reinforcement plates in doors and frames for hardware shall be 7 gage for hinges and 12 gage for all other hardware.
- C. Punch for and install rubber silencers on all interior hollow metal door frames. Furnish 3 silencers for each single door and 2 silencers for each pair of doors. Set out and adjust strikes to provide clearance for the silencers. Omit silencers on exterior door frames.

2.5 CLEARANCES

- A. Doors shall have pre-fit clearances of:
 - 1. At Head and Lock Stile: 1/8".
 - 2. At Hinge Stile: 1/16".
 - 3. At Door Sill:
 - a. Without Threshold: 1/8" from bottom of door to top of decorative floor finish or covering.
 - b. With Threshold: 1/8" from bottom of door to top of threshold.
 - 4. Between meeting edges of pair of doors: 1/8".
- B. Fitting Clearances for Fire-Rated Doors: Comply with NFPA 80. Bevel fire-rated doors 1/8" in 2" in lock edge.

2.6 ACCESSORIES

- A. Rubber Silencers: Resilient rubber.
- B. Anchors: Three per jamb, typically, of type to suit supportive construction.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify substrate conditions under provisions of SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify surfaces and conditions are ready to receive work of this section. Notify Architect of any existing conditions which will adversely affect execution. Beginning of execution will constitute acceptance of existing conditions.

3.2 INSTALLATION

- A. Install frames in accordance with SDI-105.
- B. Install doors in accordance with DHI.

- C. Install fire-rated frames and place fire-rated doors in accordance with NFPA 80.
- D. Coordinate with masonry and wallboard construction for anchor placement.
- E. Coordinate installation of glass and glazing.
- F. Install doors accurately in frames, maintaining specified clearances.
- G. Setting Frames:
 - 1. Check frames for rack, twist and out-of-square, and correct.
 - 2. Set frames accurately to maintain scheduled dimensions, hold head level and maintain jambs plumb and square.
 - 3. Anchor frames securely to adjacent construction. Anchor to floor at each jamb with two bolts to prevent twist.
 - 4. Leave spreader bars in place until frames have been permanently built into the walls.
 - 5. Install fire-rated frames in accordance with NFPA 80.
- H. Hanging Doors:
 - 1. Fit and hang the doors to maintain specified door clearances. Metal hinge shims are acceptable to maintain clearances.
 - 2. Doors shall be out of wind and shall operate smoothly and quietly after adjustment.
 - 3. Place fire-rated doors with clearances as specified in NFPA 80.

3.3 TOLERANCES

- A. Maximum Diagonal Distortion: 1/8" measured with straight edge, corner to corner.

END OF SECTION

SECTION 08 14 00

WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Solid core wood doors.
 - 2. Fire-rated wood doors.
 - 3. Factory finishing of wood doors with transparent finish.

- B. Related Sections:
 - 1. Section 06 40 00 - Architectural Woodwork.
 - 2. Section 08 11 00 - Hollow Metal Doors and Frames: hollow metal frames.
 - 3. Section 08 14 00 - Plastic-laminate-faced Wood Doors.
 - 4. Section 08 71 00 - Door Hardware: location of hardware.
 - 5. Section 08 80 00 - Glazing: glass for doors.
 - 6. Section 09 91 00 - Painting: finishing of metal glazing frames.

1.2 SUBMITTALS

- A. General: Submit in accordance with SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

- B. Shop Drawings: Indicate sizes, construction, face veneer species, core materials, edge banding dimensions and stop profile.

- C. Product Data: Indicate door core materials and construction; type and characteristics.

- D. Samples:
 - 1. Samples for Initial Selection: For factory-finished doors
 - 2. Submit a sample, 6" by 6", of each face veneer species finish and color selected. Include factory finishes applied to actual door face materials, for each material and finish.
 - 3. 12" x 12" sample of solid core door panel indicating construction, core, face and edge detail.
 - 4. Submit 8-1/2" x 11" paint color samples of door glazing frame paint.

- E. Certificates: Submit certification that doors comply with reference standards fabrication requirements, signed by authorized representative of door manufacturer.

1.3 QUALITY ASSURANCE

- A. Standard: Comply with the requirements of "Architectural Woodwork Quality Standards, Guide Specifications and Quality Certification Program" as published by Architectural Woodwork Institute.

- B. Fire-Rated Wood Doors: Provide wood doors which are identical in materials and construction to units tested in door and frame assemblies per NFPA 252 and which are labeled and listed for ratings indicated by UL or Warnock Hersey. Provide metal UL or Warnock Hersey classification markers attached to door.
 - 1. Test Pressure (positive-pressure testing): After 5 minutes into the test, the neutral pressure level in furnace shall be established at 40 inches or less above the sill.

1.4 REGULATORY REQUIREMENTS

- A. Fire Door Construction: Conform to NFPA 252.

- B. Installed Fire-Rated Door Assembly: Conform to NFPA 80 for fire-rated class as scheduled.

1.5 DELIVERY

- A. Deliver doors to the project site ready for installation and to receive hardware. Each unit shall be individually plastic wrapped at the factory for protection in transit and storage.

1.6 WARRANTY

- A. Special Warranty: Provide Life-of-Installation warranty on manufacturer's standard form, signed by manufacturer, installer, and contractor, in which manufacturer agrees to repair or replace doors that are defective in materials or workmanship or have warped (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section. Warranty shall specifically include installation of replacement doors required during term of the warranty.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Provide wood doors as manufactured by one of the following:
Eggers Industries, Architectural Door Div.
Marshfield-Algoma (Masonite Architectural)
Oregon Door
VT Industries, Inc.

2.2 MATERIALS AND FABRICATION

- A. Flush Solid Core Doors: Premium Grade as defined in Section 9 of AWI Quality Standards. Adhesive for faces and crossbands shall be Type I.
1. Core: AWI Type SLC-5 glued block.
 2. Stiles: Vertical edges at least 5/8" and bonded to core. Door stiles Red Oak for doors with stain grade faces, mill option for doors with paint grade faces.
 3. Rails: Top and bottom rail edges at least 1-1/8" wide and bonded to core. Species mill option.
 4. Crossbands: 1/16" selected hardwood bonded to core and to face veneer.
 5. Stain Grade Faces: I.S. "Premium Grade" plain sliced "book match" Red Oak for a transparent finish. Note: Half-round slicing will not be accepted.
 6. Stops: Provide shop primed metal glazing frames at all light openings. Fasten by through-bolted countersunk flathead screws. Field painted color as selected by Architect.
- B. Labeled Doors:
1. "B" Label Doors (90-minute and 60-minute): AWI Type FD 1-1/2 or 1 non-combustible solid mineral core with chemically treated hardwood edge banding and fire-retardant cross banding. Faces shall be same species and quality as specified for flush doors. Pairs of "B Label" doors shall be furnished with necessary metal edge and astragal trim if required by door manufacturer to meet code requirements.
 2. "C" Label Doors: AWI Type FD 3/4 non-combustible solid mineral core with chemically treated hardwood edge banding and fire-retardant cross banding.
 3. 20 Minute Doors: AWI Type FD 1/3 solid core with a 20-Minute Fire Label. Faces shall be same species and quality as specified for flush doors.
 4. Smoke Control Door Labeling: Smoke control doors shall show the letter "S" on the fire rating label of the door. The marking shall indicate that the door and frame assembly are in compliance when listed or labeled gasketing is also installed.
 5. Cut-outs for vision panels in fire-rated doors shall be factory cut. No field cutting shall be permitted.
 6. Stops: Provide listed shop primed metal glazing frames at all light openings. Fasten by through-bolted countersunk flathead screws. Field painted color as selected by Architect.
- C. Fitting:
1. Cutouts for mortise hardware shall be made to template at the factory.
 2. Top and bottom rail edges and core exposed by cutouts for hardware shall be factory sealed.
 3. Doors shall have pre-fit clearances of:
 - a. At Head and Lock Stile: 1/8"
 - b. At Hinge Stile: 1/16"
 - c. At Door Sill:
 - 1) Without Threshold: 1/8" from bottom of door to top of decorative floor finish or covering.
 - 2) With Threshold: 1/8" from bottom of door to top of threshold.
 - d. Between meeting edges of pair of doors: 1/8"
 4. Fitting Clearances for Fire-Rated Doors: Comply with NFPA 80. Bevel fire-rated doors 1/8" in 2" in lock edge.

2.3 ADHESIVE

- A. Facing Adhesive: Type I - waterproof.

2.4 FABRICATION

- A. Fabricate non-rated doors in accordance with AWI Quality Standards requirements.
- B. Fabricate fire-rated doors in accordance with AWI Quality Standards and to UL or Warnock-Hersey requirements. Attach fire-rating label to door.
- C. Provide lock blocks at lock edge and top of door for closer and hardware reinforcement.
- D. Fit door metal edge trim to edge of stiles after applying veneer facing.
- E. Bond edge banding to cores.
- F. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware. Provide solid blocking for through-bolted hardware.
- G. Factory pre-fit doors for frame opening dimensions identified on shop drawings.

2.5 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 - 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.
- B. Finish doors at factory.
- C. Transparent Finish:
 - 1. Grade: Premium.
 - 2. Finish: AWI Quality Standard Section 1500, Conversion Varnish Transparent
 - 3. Staining: Custom color stain as selected by Architect.
 - 4. Effect: Open grain finish.
 - 5. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify frame opening conditions under provisions of SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.2 PREPARATION

- A. Condition wood doors to the average prevailing humidity in the building prior to fitting and hanging.

3.3 INSTALLATION

- A. General: Installation of doors shall comply with the applicable requirements of Section 1700 Installation of Architectural Woodwork (Interior) of the AWI Quality Standards.
- B. Hang doors to maintain uniform clearances. Doors shall be out of wind and shall operate smoothly and quietly after adjustment. Replace doors damaged during installation.
- C. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80. Trim stiles and rails of fire-rated doors only to extent permitted by labeling agency.
- D. Pilot drill screw and bolt holes.

- E. Machine cut for hardware. Core for handsets and cylinders.
- F. Coordinate installation of doors with installation of frames specified in SECTION 08 11 00 - HOLLOW METAL DOORS AND FRAMES and hardware specified in SECTION 08 71 00 - DOOR HARDWARE.
- G. Factory Finished Doors: Restore finish before installation if fitting or machining is required at Project site.
- H. Coordinate installation of glass and glazing.

3.4 INSTALLATION TOLERANCES

- A. Conform to AWI requirements for fit and clearance tolerances.
- B. Maximum Diagonal Distortion (Warp): 1/8" measured with straight edge or taut string, corner to corner, over an imaginary 36" x 84" surface area.
- C. Maximum Vertical Distortion (Bow): 1/8" measured with straight edge or taut string, top to bottom, over an imaginary 36" x 84" surface area.
- D. Maximum Width Distortion (Cup): 1/8" measured with straight edge or taut string, edge to edge, over an imaginary 36" x 84" surface area.

3.5 ADJUSTING

- A. Adjust work under provisions of SECTION 01 77 00 - CLOSEOUT PROCEDURES.
- B. Adjust door for smooth and balanced door movement.
- C. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION

SECTION 08 14 23

PLASTIC-LAMINATE-FACED WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid core plastic-faced wood doors.
2. Fire-rated plastic-faced wood doors.

B. Related Sections:

1. Section 06 40 00 - Architectural Woodwork: laminate clad cabinets.
2. Section 08 11 00 - Hollow Metal Doors and Frames: hollow metal frames.
3. Section 08 71 00 - Door Hardware: location of hardware.
4. Section 08 80 00 - Glazing: glass for doors.

1.2 SUBMITTALS

A. General: Submit in accordance with SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Shop Drawings: Indicate sizes, construction, core materials, edge banding dimensions and stop profile.

C. Product Data: Indicate door core materials and construction; type and characteristics.

D. Samples:

1. Submit a sample, 6" by 6", of each plastic laminate finish and color selected.
2. Submit a 12" x 12" sample of solid core door panel indicating construction, core, face and edge detail.
3. Submit 8-1/2" x 11" paint color samples of door glazing frame paint.

E. Certificates: Submit certification that doors comply with reference standards fabrication requirements, signed by authorized representative of door manufacturer.

1.3 QUALITY ASSURANCE

A. Standard: Comply with the requirements of "Architectural Woodwork Quality Standards, Guide Specifications and Quality Certification Program" as published by Architectural Woodwork Institute.

B. Fire-Rated Wood Doors: Provide plastic faced wood doors which are identical in materials and construction to units tested in door and frame assemblies per NFPA 252 and which are labeled and listed for ratings indicated by UL or Warnock Hersey. Provide metal UL or Warnock Hersey classification markers attached to door.

1. Test Pressure (positive-pressure testing): After 5 minutes into the test, the neutral pressure level in furnace shall be established at 40 inches or less above the sill.

C. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.4 REGULATORY REQUIREMENTS

A. Fire Door Construction: Conform to NFPA 252.

B. Installed Fire-Rated Door Assembly: Conform to NFPA 80 for fire-rated class as scheduled.

1.5 DELIVERY

A. Deliver doors to the project site ready for installation and to receive hardware. Each unit shall be individually plastic wrapped at the factory for protection in transit and storage.

1.6 WARRANTY

- A. Special Warranty: Provide Life-of-Installation warranty on manufacturer's standard form, signed by manufacturer, installer, and contractor, in which manufacturer agrees to repair or replace doors that are defective in materials or workmanship or have warped (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section. Warranty shall specifically include installation of replacement doors required during term of the warranty.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Provide plastic laminate faced wood doors as manufactured by one of the following:
Eggers Industries, Architectural Door Div.
Marshfield-Algoma (Masonite Architectural)
Oregon Door
VT Industries, Inc.

2.2 MATERIALS AND FABRICATION

- A. Flush Doors: Premium Grade, PC-HPDL-3 (3-ply), as defined in Section 1300 of AWI Quality Standards.
1. Core: Particleboard meeting Type I, Density C, Class 1 of CS 236.
 2. Stiles: Vertical edges at least 1-1/8" and bonded to core. Species shall be closed grain hardwood with factory-painted finish to match faces. At doors with wood-look plastic laminate faces, stain vertical edges to match faces.
 3. Rails: Top and bottom rail edges at least 1-1/8" and bonded to core. Mill option.
 4. Faces: HGS (nominal 0.048") high pressure decorative laminated plastic conforming to NEMA LD 3. Laminate to be bonded to both faces. Fire-rated plastic laminate faced wood doors shall be surfaced with fire-rated (UL Stamped) laminated plastic sheet. Color shall be as selected by Architect from manufacturer's full color and pattern range. Product/manufacturer; one of the following:
Formica Brand Laminate; Formica Corp.
Nevamar; TexMar, Inc.
Pionite Decorative Laminate; Pioneer Plastics Corp.
Wilsonart; Ralph Wilson Plastics Co.
 5. Stops: Provide shop primed metal glazing frames at all light openings. Fasten by through-bolted countersunk flathead screws. Field painted color as selected by Architect.
- B. Labeled Doors:
1. "B" Label Doors (90-minute and 60-minute): AWI Type FD 1-1/2 or 1 non-combustible solid mineral core with chemically treated hardwood edge banding and fire-retardant cross banding. Pairs of "B Label" doors shall be furnished with necessary metal edge and astragal trim if required by door manufacturer to meet code requirements.
 2. "C" Label Doors: AWI Type FD 3/4 non-combustible solid mineral core with chemically treated hardwood edge banding and fire-retardant cross banding.
 3. 20-Minute Label Doors: AWI Type FD 1/3 solid particleboard core with a 20-Minute Fire Label.
 4. Smoke Control Door Labeling: Smoke control doors shall show the letter "S" on the fire rating label of the door. The marking shall indicate that the door and frame assembly are in compliance when listed or labeled gasketing is also installed.
 5. Cut-outs for vision panels in fire-rated doors shall be factory cut. No field cutting shall be permitted.
 6. Stops: Provide listed shop primed metal glazing frames at all light openings. Fasten by through-bolted countersunk flathead screws. Field painted color as selected by Architect.
- C. Fitting:
1. Cutouts for mortise hardware shall be made to template at the factory.
 2. Top and bottom rail edges and core exposed by cutouts for hardware shall be factory sealed.
 3. Doors shall have pre-fit clearances of:
 - a. At Head and Lock Stile: 1/8"
 - b. At Hinge Stile: 1/16"
 - c. At Door Sill:
 - 1) Without Threshold: 1/8" from bottom of door to top of decorative floor finish or covering.
 - 2) With Threshold: 1/8" from bottom of door to top of threshold.
 - d. Between meeting edges of pair of doors: 1/8"
 4. Fitting Clearances for Fire-Rated Doors: Comply with NFPA 80. Bevel fire-rated doors 1/8" in 2" in lock edge.

2.3 ADHESIVE

- A. Facing Adhesive: Type I - waterproof.

2.4 FABRICATION

- A. Fabricate non-rated doors in accordance with AWI Quality Standards requirements.
- B. Fabricate fire-rated doors in accordance with AWI Quality Standards and to UL or Warnock-Hersey requirements. Attach fire-rating label to door.
- C. Provide lock blocks at lock edge and top of door for closer for hardware reinforcement.
- D. Fit door metal edge trim to edge of stiles after applying veneer facing.
- E. Bond edge banding to cores.
- F. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware. Provide solid blocking for through-bolted hardware.
- G. Factory pre-fit doors for frame opening dimensions identified on shop drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify frame opening conditions under provisions of SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.2 PREPARATION

- A. Condition plastic faced wood doors to the average prevailing humidity in the building prior to fitting and hanging.

3.3 INSTALLATION

- A. General: Installation of doors shall comply with the applicable requirements of Section 1700 Installation of Architectural Woodwork (Interior) of the AWI Quality Standards.
- B. Hang doors to maintain uniform clearances. Doors shall be out of wind and shall operate smoothly and quietly after adjustment. Replace doors damaged during installation.
- C. Cutting and fitting of plastic laminate faced doors at the project site will not be permitted. Doors which do not fit properly shall be replaced.
- D. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80. Trim stiles and rails of fire-rated doors only to extent permitted by labeling agency.
- E. Pilot drill screw and bolt holes.
- F. Machine cut for hardware. Core for handsets and cylinders.
- G. Coordinate installation of doors with installation of frames specified in SECTION 08 11 00 - HOLLOW METAL DOORS AND FRAMES and hardware specified in SECTION 08 71 00 - DOOR HARDWARE.
- H. Coordinate installation of glass and glazing.

3.4 INSTALLATION TOLERANCES

- A. Conform to AWI requirements for fit and clearance tolerances.
- B. Maximum Diagonal Distortion (Warp): 1/8" measured with straight edge or taut string, corner to corner, over an imaginary 36" x 84" surface area.
- C. Maximum Vertical Distortion (Bow): 1/8" measured with straight edge or taut string, top to bottom, over an imaginary 36" x 84" surface area.
- D. Maximum Width Distortion (Cup): 1/8" measured with straight edge or taut string, edge to edge, over an imaginary 36" x 84" surface area.

3.5 ADJUSTING

- A. Adjust work under provisions of SECTION 01 77 00 - CLOSEOUT PROCEDURES.
- B. Adjust door for smooth and balanced door movement.

END OF SECTION

SECTION 08 41 13

ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Aluminum entrance and storefront systems with associated aluminum doors.
- B. Related Sections:
 - 1. Section 07 92 00 - Joint Sealants: caulking of perimeter joints.
 - 2. Section 08 71 00 - Door Hardware; hardware for aluminum doors.
 - 3. Section 08 80 00 - Glazing.

1.2 SUBMITTALS

- A. General: Submit in accordance with SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings: Include drawings showing elevations of each entrance and storefront type, detail sections of typical composite members, and glazing details.
- C. Samples: Submit for approval duplicate samples showing the limits of color range to which the entrance, storefront, and door materials will be processed. Samples shall be representative of the materials to be furnished, and the color of the installed materials shall be within the range of the approved samples.
- D. Verify that field measurements are as indicated on shop drawings and as instructed by the manufacturer.

1.3 SYSTEM DESCRIPTION AND PERFORMANCE

- A. Architectural Requirements
 - 1. Drawings are diagrammatic and do not purport to identify or solve problems of thermal or structural movement, glazing or anchorage.
 - 2. Requirements shown by details are intended to establish basic dimensions of units, sightlines and profiles of members.
 - 3. Provide concealed fastening wherever possible.
 - 4. Provide continuous snap-in thermally-broken aluminum backer plate at head and jamb conditions.
- B. Structural Requirements
 - 1. System to provide for expansion and contraction within system components caused by a cycling temperature range of 170°F. without causing detrimental effects to system or components.
 - 2. Design and size members to withstand dead loads and live loads caused by pressure and suction of wind as calculated in accordance with building code, and measured in accordance with ANSI/ASTM E 330.
 - 3. Limit mullion deflection to L/175, or flexure limit of glass with full recovery of glazing materials, whichever is less.
 - 4. System to accommodate, without damage to system or components, or deterioration of perimeter seal: Movement within system; movement between system and perimeter framing components; dynamic loading and release of loads; and deflection of structural support framing.
 - 5. Storefront manufacturer shall be responsible for design and engineering of storefront system, including necessary modifications to meet specified requirements and maintaining visual design concepts.
 - 6. Attachment considerations shall take into account site peculiarities and expansion and contraction movements so there is no possibility of loosening, weakening or fracturing connection between units and building structure or between units themselves.
 - 7. Design anchors, fasteners and braces to be structurally stressed not more than 50% of allowable stress when maximum loads are applied.
 - 8. Engineer storefront and entrances to be free from rattles, wind whistles and noise due to thermal and structural movement and wind pressure.
- C. Environmental Requirements
 - 1. Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to exterior. No leakage shall occur in wall when tested in accordance with ASTM E 331 at test pressure of 6.24 lbs/sq ft.

2. Limit air infiltration through assembly to 0.06 cu ft/min/sq ft of assembly surface area, measured at a reference differential pressure across assembly of 1.57 lbs/sq ft. as measured in accordance with ANSI/ASTM E 283.
3. Maintain continuous air and vapor barrier throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound.

1.4 QUALITY ASSURANCE

- A. Erector Qualifications: Erection of the entrance and storefront systems and doors shall be by an experienced erector approved by the manufacturer.
- B. Design Criteria:
 1. Deflection of glass framing members under design loads shall not exceed $L/175$ or $3/4"$, whichever is less.
 2. Deadload deflection of horizontal glass framing members shall not exceed 0.125".
 3. Exterior Entrances and Storefront: Design windload shall be 22 psf.
- C. Perform work in accordance with AAMA SFM-1 and AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and handle system components under provisions of SECTION 01 65 00 - PRODUCT DELIVERY REQUIREMENTS.
- B. Store and protect system components under provisions of SECTION 01 66 00 - PRODUCT STORAGE AND HANDLING REQUIREMENTS.
- C. Provide wrapping to protect prefinished aluminum surfaces.

1.6 COORDINATION

- A. Manufacturer shall be responsible for details and dimensions not controlled by job conditions and shall show on his shop drawings required field measurements beyond his control.
- B. Coordinate with responsible trades to establish, verify and maintain field dimensions and job conditions.

1.7 ENVIRONMENTAL CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40°F. during and 48-hours after installation.

1.8 WARRANTY

- A. Special Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that deteriorate 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 caused by thermal movements.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. Water leakage through fixed glazing and framing areas.
 - e. Failure or operating components to function properly.
 2. Warranty Period: 2 years from date of substantial completion.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Provide aluminum entrances and storefronts as manufactured by one of the following:
- EFCO Corp.
 - Kawneer North America
 - Oldcastle Building Envelope
 - Tubelite, Inc
 - YKK AP America, Inc.

2.2 MATERIALS

- A. Extruded Aluminum: ASTM B 221; AA 6063-T5 alloy, temper.
- B. Sheet Aluminum: ASTM B 209; 5005-H34 alloy, temper; or other alloys and temper recommend by manufacturer appropriate for specified finish.
- C. Sheet Steel: ASTM A 446; hot-dipped galvanized.
- D. Steel Sections: ASTM A 36; shapes to suit mullion sections.
- E. Primer and Touch-Up Primer for Galvanized Surfaces: High-zinc-dust-content paint complying with SSPC-Paint 20.
- F. Fasteners: Stainless steel.

2.3 FABRICATED COMPONENTS

- A. General: Form section true to details with clean, straight, sharply defined profiles, free from defects impairing strength or durability.
- B. Framing:
1. Framing Types Basis of Design shall be Kawneer: Provide 1-3/4" x 4-1/2" and 2" x 4-1/2" Framing System: Kawneer Trifab® VG 450
 2. Fabricate the aluminum entrance and storefront systems with the shapes and sections detailed.
 3. Design the glass framing system to minimize loads on the glass due to building movement and incorporate provisions for thermal expansion by means of expansion joints. Where insulating glass is to be installed, design the glass framing system so that moisture does not accumulate in the glazing channel for prolonged periods.
 4. Construction: Mill joints to a hairline fit. Assemble and connect members to form rigid, watertight assemblies. No exposed fastenings will be permitted. Reinforce the framing internally as required to meet the design criteria specified above.
 5. Continuous Solid Closures: Fabricate required closures and covers to detail of aluminum sheet, plate, and angles. Provide solid continuous thermally-broken backer plate closures at head and all jams.
 6. Accessories: Provide glazing gaskets, flashing, and miscellaneous shims and other parts detailed or otherwise required to complete the work.
 7. Provide manufacturer's standard closure plate at perimeter framing members to cover open side of framing member against surrounding construction.
- C. Doors: Kawneer 500 Heavy Wall Doors and Heavy Wall Framing System. The aluminum doors shall be wide-stile type with 5" stiles, 6-1/2" top rail, and 10¼" bottom rail; square glazing stops.
1. Construction: Doors shall be mortised and have reinforced welded corner construction with hairline watertight joints. Fastenings shall be concealed.
 - a. Doors shall be factory fabricated by aluminum entrance and storefront manufacturer.
 - b. Glazing Beads: Fixed or theft proof snap-in glazing beads on exterior or security side of doors. Interior glazing beads shall be snap-in type. All glazing beads shall have vinyl inserts and glazing gaskets.
 - c. Weatherstripping: Continuous contact weatherstripping on stiles and top rails of exterior doors.
- D. Hardware Preparation: Prepare and reinforce doors and door frames for hardware.
1. Mortising, reinforcing, drilling, and tapping for mortised hardware shall be done at the factory.
 2. Wherever possible, concealed steel reinforcement for surface-applied hardware shall be installed at the factory. The drilling and tapping for surface-applied hardware shall be done in the field.

- E. Reinforced Mullion: Same profile as non-reinforced frames, of extruded aluminum cladding with internal reinforcement of steel shaped structural section.
- F. Flashings:
 - 1. Form from sheet aluminum with same finish as extruded sections. Apply finish after fabrication. Material thickness as required to suit condition without deflection or "oilcanning"; of proper alloy to match the finished extrusions.
 - 2. Subsill Flashing: Provide manufacturer's standard high-performance, thermally-broken aluminum subsill flashing with integral weep holes. End dams shall be manufacturer's standard fiberglass, plastic or thermally-broken aluminum end dams.
- G. Extruded Aluminum:
 - 1. Framing System: Principal extrusions shall have a minimum wall thickness of 0.08". Moldings, trim, and glass stops shall be not less than 0.050" thick.
 - 2. Doors and Door Framing System: Principal extrusions shall have a minimum wall thickness of 3/16". Moldings, trim, and glass stops shall be not less than 0.050" thick.
- H. Reinforcement: Concealed reinforcements for hardware in doors and frames and mullions shall be plated or galvanized steel and shall be secured in place.
- I. Fabricate doors and frames allowing for minimum clearances and shim spacing around perimeter of assembly, yet enabling installation.
- J. Rigidly fit and secure joints and corners with internal reinforcement, except that door corners will be welded. Make joints and connections flush, hairline, and weatherproof.
- K. Develop drainage holes with moisture pattern to exterior.
- L. Prepare components to receive anchor devices. Fabricate anchorage items.
- M. Arrange fasteners, attachments, and jointing to ensure concealment from view.
- N. Prepare components with internal reinforcement for door hardware.
- O. Reinforce framing members for imposed loads.

2.4 HARDWARE

- A. Weatherstripping: Provide manufacturer's Polymeric Weathering System or approved equivalent, continuous at head, jamb, sill, and meeting stile.
- B. Refer to SECTION 08 71 00 - DOOR HARDWARE for balance of hardware.

2.5 FINISHES

- A. Finish coating to conform to AAMA 611. Finish for aluminum storefront and entrances shall match.
- B. Aluminum Finishes: Provide finish as selected by Architect to match existing storefront.
 - 1. Exposed aluminum surfaces of entrances, storefronts, frames, doors, and all their associated parts shall be Architectural Class I AA-M10C22A44 Hard Coat Color Anodic Coating Dark bronze color, .7 mil minimum. Screw and bolt heads exposed to view shall be finished to match the exposed aluminum surfaces.
 - 2. Aluminum Finish: Exposed aluminum surfaces of entrances, storefronts, frames, doors, and all their associated parts shall be Architectural Class I AA-M10C22A41 Clear Anodic Coating, .7 mil minimum. Screw and bolt heads exposed to view shall be finished to match the exposed aluminum surfaces.
- C. Concealed Steel Items: Galvanized in accordance with ANSI/ASTM A 123 to 2.0 oz/sq ft.
- D. Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine areas to receive entrances and storefronts for conditions that will adversely affect the execution and quality of work. Do not start this work until unsatisfactory conditions are corrected.
- B. Field check dimensions, elevations, and slopes on the connecting work affecting the entrance and storefront to assure a proper fit and weathertight installation.
- C. Verify that field measurements are as indicated on shop drawings and as instructed by the manufacturer.

3.2 INSTALLATION

- A. Install wall system, doors, and glazing in accordance with manufacturer's instructions and AAMA - Metal Curtain Wall, Window.
- B. Erecting Storefronts: Erect the members to be plumb, level, square and in proper alignment with other work, and free from sags, waves and buckles.
 - 1. Materials shall be accurately cut and fitted and rigidly anchored in place to resist safely all normal stresses to which the work will be subjected.
 - 2. Cut and machined ends and recesses shall be true, accurate and free of burrs and rough edges.
 - 3. Provide subsill extrusions positioned to collect water leakage through mullions and storefront. Subsill shall drain to the exterior. It shall run continuously across the opening width. The ends are sealed with end dams.
 - 4. Create end dams at ends of window heads, sills, at edges of storefronts, and other vertical elements to channel water to nearest weep hole away from window mullions and other items which might allow water to travel vertically.
 - 5. Provide clearance around the perimeter between entrance and storefront metal and the opening substrate (concrete, masonry, or stucco) for caulking.
- C. Hanging Doors: Fit the doors with hardware and hang to operate smoothly, without bind or chatter.
 - 1. Where concealed reinforcement for hardware cannot be provided, install and use Riv-Nuts for fastening surface applied hardware.
 - 2. Use sex bolts and nuts for fastening closers and closer arms to aluminum doors.
 - 3. The use of sheet metal or self-tapping screws to mount hardware is prohibited.
- D. Sealing Joints: Seal the metal-to-metal framing joints properly with butene tape and sealant in conformance with the manufacturer's standard procedure.
- E. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- F. Install hardware using templates provided. Refer to SECTION 08 71 00 - DOOR HARDWARE for installation requirements.
- G. Install glass and infill panels in accordance with SECTION 08 80 00 - GLAZING, using exterior dry method of glazing.
- H. Install perimeter 2 part polyurethane type sealant, backing materials, and installation requirements in accordance with SECTION 07 92 00 - JOINT SEALANTS.

3.3 TOLERANCES

- A. Maximum Variation from Plumb: 0.06" every 3' non-cumulative or 1/16" per 10', whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32".

3.4 ADJUSTING

- A. Adjust operating hardware for smooth operation.

3.5 PROTECT AND CLEAN

- A. Protection of Aluminum:
 - 1. Protect concealed aluminum surfaces that will contact masonry, concrete and steel with neoprene gaskets or a coat of bituminous paint to prevent galvanic and corrosive action.
 - 2. If drainage of moisture from incompatible metal passes over aluminum, paint the incompatible metal with a coat of aluminum pigmented paint.
 - 3. Protect finished aluminum surfaces from staining by gypsum and cement materials until all adjacent masonry and plaster work has been completed.

- B. Cleaning: Upon completion of the work, wash down aluminum surfaces with water and soft cloths and leave in first class condition.

END OF SECTION

SECTION 08 71 00
DOOR HARDWARE

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 commercial door hardware for the following:
1. Swinging doors.
- B. Door hardware includes, but is not necessarily limited to, the following:
1. Mechanical door hardware.
 2. Electromechanical door hardware.
 3. Cylinders specified for doors in other sections.
- C. Related Sections:
1. Division 08 Section "Door Hardware Schedule".
 2. Division 08 Section "Hollow Metal Doors and Frames".
 3. Division 08 Section "Flush Wood Doors".
 4. Division 08 Section "Access Control Hardware".
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 2. ICC/IBC - International Building Code.
 3. NFPA 70 - National Electrical Code.
 4. NFPA 80 - Fire Doors and Windows.
 5. NFPA 101 - Life Safety Code.
 6. NFPA 105 - Installation of Smoke Door Assemblies.
 7. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards:
1. ANSI/BHMA Certified Product Standards - A156 Series
 2. UL10C – Positive Pressure Fire Tests of Door Assemblies

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Shop Drawings: Details of electrified access control hardware indicating the following:
1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
 - a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
 - b. Complete (risers, point-to-point) access control system block wiring diagrams.
 - c. Wiring instructions for each electronic component scheduled herein.
 2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.
- D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- E. Informational Submittals:
1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

- F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals.

1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware 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.
- C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- D. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
 - 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
 - 2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
- E. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- F. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
 - 1. Function of building, purpose of each area and degree of security required.
 - 2. Plans for existing and future key system expansion.
 - 3. Requirements for key control storage and software.
 - 4. Installation of permanent keys, cylinder cores and software.
 - 5. Address and requirements for delivery of keys.
- G. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
 - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 - 3. Review sequence of operation narratives for each unique access controlled opening.
 - 4. Review and finalize construction schedule and verify availability of materials.
 - 5. Review the required inspecting, testing, commissioning, and demonstration procedures

- H. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.
- C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. 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. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.

D. Special Warranty Periods:

1. Ten years for mortise locks and latches.
2. Five years for exit hardware.
3. Twenty five years for manual surface door closer bodies.
4. Twenty five years for manual surface door closer bodies.
5. Twenty five years for manual surface door closer bodies.
6. Two years for electromechanical door hardware.

1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
1. Quantity: Provide the following hinge quantity:
 - a. Two Hinges: For doors with heights up to 60 inches.
 - b. Three Hinges: For doors with heights 61 to 90 inches.
 - c. Four Hinges: For doors with heights 91 to 120 inches.
 - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
4. Hinge Options: Comply with the following:
 - a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
5. Manufacturers:
 - a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK).

B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:
 - a. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).

2.3 POWER TRANSFER DEVICES

A. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

1. Provide one each of the following tools as part of the base bid contract:
 - a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - Electrical Connecting Kit: QC-R001.
 - b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - Connector Hand Tool: QC-R003.
2. Manufacturers:
 - a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) – QC-C Series.

2.4 DOOR OPERATING TRIM

A. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.

3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
5. Manufacturers:
 - a. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.5 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
- C. Cylinders: Original manufacturer cylinders complying with the following:
 1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
 2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
 4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 5. Keyway: Match Facility Standard.
- D. Keying System: Each type of lock and cylinders to be factory keyed.
 1. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.
 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
 3. Existing System: Key locks to Owner's existing system.
- E. Key Quantity: Provide the following minimum number of keys:
 1. Change Keys per Cylinder: Two (2)
 2. Master Keys (per Master Key Level/Group): Five (5).
 3. Construction Keys (where required): Ten (10).
- F. Construction Keying: Provide construction master keyed cylinders.
- G. Key Registration List (Bitting List):
 1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
 2. Provide transcript list in writing or electronic file as directed by the Owner.
- H. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.
 1. Manufacturers:
 - a. Lund Equipment (LU).
 - b. MMF Industries (MM).
 - c. Telkee (TK).

- I. Key Control Software: Provide one network version of "Key Wizard" branded key management software package that includes one year of technical support and upgrades to software at no charge. Provide factory key system formatted for importing into "Key Wizard" software.

2.6 MECHANICAL LOCKS AND LATCHING DEVICES

- A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 certified. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.

1. Manufacturers:

- a. Corbin Russwin Hardware (RU) – ML2000 Series.
- b. No Substitution.

2.7 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

- B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.8 ELECTRIC STRIKES

- A. Standard Electric Strikes: Heavy duty, cylindrical and mortise lock electric strikes conforming to ANSI/BHMA A156.31, Grade 1, UL listed for both Burglary Resistance and for use on fire rated door assemblies. Stainless steel construction with dual interlocking plunger design tested to exceed 3000 lbs. of static strength and 350 ft-lbs. of dynamic strength. Strikes tested for a minimum 1 million operating cycles. Provide strikes with 12 or 24 VDC capability and supplied standard as fail-secure unless otherwise specified. Provide latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike where specified.

1. Manufacturers:

- a. HES (HS).

- B. Provide electric strikes with in-line power controller and surge suppressor by the same manufacturer as the strike with the combined products having a five year warranty.

2.9 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
 2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
 3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
 4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
 5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
 6. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
 7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
 8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
 9. Rail Sizing: Provide exit device rails factory sized for proper door width application.
 10. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.
1. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
 - b. No Substitution.
- C. Security Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified rim panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be constructed of high grade, heat treated, corrosion resistant nickel steel alloy, and have a full 3/4" throw projection with slide action positive deadlocking.
1. Static Load Force Resistance: Minimum 3000 lbs certified independent tested.

2. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - ED4000S / ED5000S Series.

D. Tube Steel Removable Mullions: ANSI/BHMA A156.3 removable steel mullions with malleable-iron top and bottom retainers and a primed paint finish.

1. Provide keyed removable feature where specified in the Hardware Sets.
2. Provide stabilizers and mounting brackets as required.
3. Provide electrical quick connection wiring options as specified in the hardware sets.
4. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - 700/900 Series.

2.10 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.
2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.
4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.
5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Manufacturers:
 - a. Norton Door Controls (NO) - 7500 Series.
 - b. No Substitution.

- C. Door Closers, Surface Mounted (Unitrol): Unitrol arms to have door stop mechanism to absorb dead stop shock on arm and top hinge. Hold-open arms to have a spring loaded mechanism in addition to shock absorber assembly. Arms to be provided with rigid steel main arm and secondary arm lengths proportional to the door width.

1. Manufacturers:
 - a. Norton Door Controls (NO) - Unitrol Series.
 - b. No Substitution – Facility Standard.

2.11 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
 - a. Stainless Steel: 300 grade, 050-inch thick.
5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:
 - a. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.12 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
 1. Manufacturers:
 - a. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

- C. Overhead Door Stops and Holders: ANSI/BHMA A156.6, Grade 1 certified overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

- 1. Manufacturers:

- a. Rixson Door Controls (RF).
- b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.13 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

- 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

- 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

- F. Manufacturers:

- 1. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).

2.14 ELECTRONIC ACCESSORIES

- A. Push-Button Switches: Industrial grade momentary or alternate contact, back-lighted push buttons with stainless-steel switch enclosures. 12/24 VDC bi-color illumination suitable for either flush or surface mounting.

- 1. Manufacturers:

- a. Securitron (SU) - PB Series.

- B. Request-to-Exit Motion Sensor: Request-to-Exit Sensors motion detectors specifically designed for detecting exiting through a door from the secure area to a non-secure area. Include built-in timers (up to 60 second adjustable timing), door monitor with sounder alert, internal vertical pointability coverage, 12VDC or 24VDC power and selectable relay trigger with fail safe/fail secure modes.

- 1. Manufacturers:

- a. Securitron (SU) - XMS Series.

- C. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.

- 1. Manufacturers:

- a. Securitron (SU) - DPS Series.

- D. Power Supplies: Provide Nationally Recognized Testing Laboratory Listed 12VDC or 24VDC (field selectable) filtered and regulated power supplies. Include battery backup option with integral battery charging capability in addition to operating the DC load in event of line voltage failure. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.

- 1. Manufacturers:

- a. Securitron (SU) - BPS Series.

2.15 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.16 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
 - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
- B. The supplier is responsible for handing and sizing all products and providing the correct option for the appropriate door type and material where more than one is presented in the hardware sets. Quantities listed are for each pair of doors, or for each single door.

3.9 SCHEDULED DOOR HARDWARE

1. MK - McKinney
2. PE - Pemko
3. RO - Rockwood
4. RU - Corbin Russwin
5. BE - Best
6. HS - HES
7. NO - Norton
8. OT - OTHER
9. SU - Securitron

Controlled Entry at 15 Campuses
 Birdville ISD
 North Richland Hills, Haltom City, Hurst and Watauga, Texas

Hardware Sets

Set: 1.0

Doors: [B104](#), [B108](#), [D103](#), [G104](#), [J104](#), [M104](#), [N107](#), [N113](#), [N114](#)
 Description: Office

3 Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1 Mortise Lock (office)	ML2051 LSA	626	RU	087100
1 Cylinder	BEST 6-Pin as Req	626/630	BE	
1 Surface Closer	7500 SN-134 Reg/Parallel as Req	689	NO	087100
1 Wall Stop	406/409 to suit	US32D	RO	087100
1 Gasketing	S88BL x perimeter W x H		PE	087100

Set: 2.0

Doors: [B107](#), [D115](#), [G113](#), [J113](#), [M113](#), [N105](#)
 Description: Classroom

3 Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1 Classroom Lock	ML2003 LSA	626	RU	087100
1 Cylinder	BEST 6-Pin as Req	626/630	BE	
1 Surface Closer	7500 SN-134 Reg/Parallel as Req	689	NO	087100
1 Wall Stop	406/409 to suit	US32D	RO	087100
1 Gasketing	S88BL x perimeter W x H		PE	087100

Set: 3.0

Doors: [B105](#), [B109](#)
 Description: Storeroom

3 Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1 Mortise Lock (storeroom)	ML2057 LSA	626	RU	087100
1 Cylinder	BEST 6-Pin as Req	626/630	BE	
1 Surface Closer	7500 SN-134 Reg/Parallel as Req	689	NO	087100
1 Wall Stop	406/409 to suit	US32D	RO	087100
1 Gasketing	S88BL x perimeter W x H		PE	087100

Set: 4.0

Doors: [B103](#)
 Description: Storeroom Pair STC

2 Manual Flush Bolts	550/555	US26D	RO	087100
1 Dust Proof Strike	570	US26D	RO	087100
1 Mortise Lock (storeroom)	ML2057 LSA	626	RU	087100
1 Cylinder	BEST 6-Pin as Req	626/630	BE	
2 Door Closer	CLP7500 SN-134	689	NO	087100

Notes: STC rated cam lift hinges, threshold, perimeter seals, astragal, door bottom by door mfg

Set: 5.0

Doors: [G102](#)
 Description: Storeroom Pair

6 Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
2 Manual Flush Bolts	550/555	US26D	RO	087100

Controlled Entry at 15 Campuses
Birdville ISD
North Richland Hills, Haltom City, Hurst and Watauga, Texas

1 Dust Proof Strike	570	US26D	RO	087100
1 Mortise Lock (storeroom)	ML2057 LSA	626	RU	087100
1 Cylinder	BEST 6-Pin as Req	626/630	BE	
2 Door Closer	CLP7500 SN-134	689	NO	087100
1 Gasketing	S773D		PE	087100
1 Astragal	18041CNB x Height Required		PE	087100

Set: 6.0

Doors: N106
Description: Privacy

3 Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1 Mortise Lock (privacy)	ML2020 LSA	626	RU	087100
1 Surface Closer	CLP7500	689	NO	087100
1 Wall Stop	406/409 to suit	US32D	RO	087100
1 Gasketing	S88BL x perimeter W x H		PE	087100

Set: 7.0

Doors: K101A, K101C, P101C
Description: Auditorium to Vestibule

1 Continuous Hinge	CFM__SLF-HD1		PE	087100
1 Exit Device	ED5200S_955 x Cylinder LSA	630	RU	087100
2 Cylinder	BEST 6-Pin as Req	626/630	BE	
1 Surface Closer	UNI7500	689	NO	087100
1 Kick Plate	K1050 10 X 2" Idw (10 X 1" Idw pairs)	US32D	RO	087100
1 Wall Stop	406/409 to suit	US32D	RO	087100
1 Threshold	171A		PE	087100
1 Gasketing	S773D		PE	087100
1 Sweep	315CN		PE	087100

Controlled Entry at 15 Campuses
 Birdville ISD
 North Richland Hills, Haltom City, Hurst and Watauga, Texas

Set: 8.0

Doors: [G103C](#), [J103C](#), [M103C](#)

Description: Interior Card Reader (Electric Strike)

3 Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100	
1 Mortise Lock (storeroom)	ML2057 LSA	626	RU	087100	
1 Cylinder	BEST 6-Pin as Req	626/630	BE		
1 Electric Strike	1600	630	HS	087100	↘
1 Surface Closer	UNI7500	689	NO	087100	
1 Wall Stop	406/409 to suit	US32D	RO	087100	
1 Gasketing	S773D		PE	087100	
1 Position Switch	DPS-M-BK		SU	087100	↘
1 Motion Sensor	XMS		SU	087100	↘
1 Power Supply	AQD3		SU	087100	↘

Set: 9.0

Doors: [N102B](#)

Description: Interior Card Reader (HM/WD)

2 Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100	
1 Hinge	TA2714 QC12 4-1/2" x 4-1/2"	US26D	MK	087100	
1 Electrified Mortise Lock	ML20906-SEC LSA M92	626	RU	087100	↘
1 Cylinder	BEST 6-Pin as Req	626/630	BE		
1 Surface Closer	7500 SN-134 Reg/Parallel as Req	689	NO	087100	
1 Wall Stop	409	US32D	RO	087100	
1 Gasketing	S773D		PE	087100	
1 ElectroLynx Harness	QC-CXXX as Req		MK	087100	↘
1 ElectroLynx Harness	QC-C1500P		MK	087100	↘
1 Position Switch	DPS-M-BK		SU	087100	↘
1 Power Supply	BPS-12/24-1		SU	087100	↘
1 Card Reader	By Security Consultant	BLK	OT		

Notes: N102B: Remote Release from Reception

Set: 10.0

Doors: [G106](#), [J106](#), [K101B](#), [P101B](#), [P101D](#)

Description: Pair Classroom ED (Auditorium)

2	Continuous Hinge	CFM__SLF-HD1		PE	087100
1	Removable Mullion	910KM x Hgt Req'd		RU	087100
2	Exit Device	ED5200S_955 x Cylinder LSA	630	RU	087100
5	Cylinder	BEST 6-Pin as Req	626/630	BE	
2	Surface Closer	UNI7500	689	NO	087100
2	Kick Plate	K1050 10 X 2" Idw (10 X 1" Idw pairs)	US32D	RO	087100
2	Wall Stop	409	US32D	RO	087100
1	Threshold	171A		PE	087100
1	Gasketing	S773D		PE	087100
2	Sweep	315CN		PE	087100

Set: 11.0

Doors: [A102B](#), [D102B](#), [G103B](#), [J103B](#), [K103B](#), [M103B](#), [P103B](#)

Description: Reception (CR + 2 Push Buttons)

3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1	Mortise Lock (storeroom)	ML2057 LSA	626	RU	087100
1	Cylinder	BEST 6-Pin as Req	626/630	BE	
1	Electric Strike	1600	630	HS	087100 ↘
1	Surface Closer	UNI7500	689	NO	087100
1	Wall Stop	409	US32D	RO	087100
1	Gasketing	S773D		PE	087100
1	Position Switch	DPS-M-BK		SU	087100 ↘
1	Motion Sensor	XMS		SU	087100 ↘
2	Push Button	PB2		SU	087100 ↘
1	Power Supply	AQD3		SU	087100 ↘
1	Card Reader	By Security Consultant	BLK	OT	

Notes: Remote release from reception

Set: 12.0

Doors: [A102A](#), [C102A](#), [D102A](#), [E102](#), [F102](#), [G103A](#), [H102](#), [J103A](#), [L102](#), [M103A](#), [P103A](#), [Q102A](#)

Description: Reception (No Card Reader)

3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1	Mortise Lock (office)	ML2051 LSA	626	RU	087100
1	Cylinder	BEST 6-Pin as Req	626/630	BE	
1	Surface Closer	UNI7500	689	NO	087100
1	Wall Stop	409	US32D	RO	087100
1	Threshold	171A		PE	087100
1	Gasketing	S773D		PE	087100
1	Sweep	315CN		PE	087100

Notes: C102A, H102: if existing door is aluminum, allocate to set 18.0B

Set: 13.0

Doors: [N102A](#)

Description: Reception (office function) Alum

Controlled Entry at 15 Campuses
 Birdville ISD
 North Richland Hills, Haltom City, Hurst and Watauga, Texas

1	Continuous Hinge	CFM__SLF-HD1		PE	087100
1	Mortise Lock (office)	ML2051 LSA	626	RU	087100
1	Cylinder	BEST 6-Pin as Req	626/630	BE	
1	Surface Closer	UNI7500	689	NO	087100
1	Wall Stop	409	US32D	RO	087100
1	Threshold	252A		PE	087100
1	Perimeter Seals	By Alum SF Mfg		OT	
1	Sweep	345_		PE	087100

Set: 14.0

Doors: K100D, P100D
 Description: Vestibule CR Single (Alum)

1	Continuous Hinge	CFM83SLI/SLF-HD1 EL-CEPTx32D		PE	087100
1	Exit Device (nightlatch)	ED5200S_957 M92 MELR M97	630	RU	087100 ↘
1	Cylinder	BEST 6-Pin as Req	626/630	BE	
1	Door Closer	CLP7500 SN-134	689	NO	087100
1	Wall Stop	409	US32D	RO	087100
1	Threshold	252A		PE	087100
1	Perimeter Seals	By Alum SF Mfg		OT	
1	Sweep	345_		PE	087100
1	ElectroLynx Harness	QC-C1500P		MK	087100 ↘
1	ElectroLynx Harness	QC-C006 (Exit)		MK	087100 ↘
1	Position Switch	DPS-M-BK		SU	087100 ↘
1	Power Supply	BPS-12/24-1		SU	087100 ↘
1	Card Reader	By Security Consultant	BLK	OT	

Set: 15.0

Doors: H100F, L100G, P101A

Description: Vestibule CR Single (WD/HM)

1	Continuous Hinge	CFM83SLI/SLF-HD1 EL-CEPTx32D		PE	087100	
1	Exit Device (nightlatch)	ED5200S_957 M92 MELR M97	630	RU	087100	↗
1	Cylinder	BEST 6-Pin as Req	626/630	BE		
1	Door Closer	CLP7500 SN-134	689	NO	087100	
1	Wall Stop	409	US32D	RO	087100	
1	Threshold	171A		PE	087100	
1	Gasketing	S773D		PE	087100	
1	Sweep	315CN		PE	087100	
1	ElectroLynx Harness	QC-C1500P		MK	087100	↗
1	ElectroLynx Harness	QC-C006 (Exit)		MK	087100	↗
1	Position Switch	DPS-M-BK		SU	087100	↗
1	Power Supply	BPS-12/24-1		SU	087100	↗
1	Card Reader	By Security Consultant	BLK	OT		

Notes: Remote Release at L100G, H100F

Set: 16.0

Doors: D100H, G100E, J100E, M100E

Description: Interior Vestibule CR (Alum Electric Strike)

1	Continuous Hinge	CFM_SLF-HD1		PE	087100	
1	Exit Device (nightlatch)	ED5200S_957	630	RU	087100	
1	Cylinder	BEST 6-Pin as Req	626/630	BE		
1	Electric Strike	9400/9500/9600 as Req	630	HS	087100	↗
1	Surface Closer	UNI7500	689	NO	087100	
1	Wall Stop	409	US32D	RO	087100	
1	Threshold	252A		PE	087100	
1	Perimeter Seals	By Alum SF Mfg		OT		
1	Sweep	345_		PE	087100	
1	Position Switch	DPS-M-BK		SU	087100	↗
1	Motion Sensor	XMS		SU	087100	↗
1	Power Supply	AQD3		SU	087100	↗
1	Card Reader	By Security Consultant	BLK	OT		

Controlled Entry at 15 Campuses
 Birdville ISD
 North Richland Hills, Haltom City, Hurst and Watauga, Texas

Set: 17.0

Doors: A100D, A100F, D100E, G100H, J100H, K100F, M100H, P100F
 Description: Vestibule Exit Only (Alum)

1	Continuous Hinge	CFM__SLF-HD1		PE	087100
1	Exit Device (nightlatch)	ED5200S_957	630	RU	087100
1	Cylinder	BEST 6-Pin as Req	626/630	BE	
1	Door Closer	CLP7500 SN-134	689	NO	087100
1	Wall Stop	409	US32D	RO	087100
1	Threshold	252A		PE	087100
1	Perimeter Seals	By Alum SF Mfg		OT	
1	Sweep	345_		PE	087100

Set: 18.0

Doors: H100D, L100E
 Description: Vestibule Exit Only (WD/HM)

1	Continuous Hinge	CFM__SLF-HD1		PE	087100
1	Exit Device (nightlatch)	ED5200S_957	630	RU	087100
1	Cylinder	BEST 6-Pin as Req	626/630	BE	
1	Door Closer	CLP7500 SN-134	689	NO	087100
1	Wall Stop	409	US32D	RO	087100
1	Threshold	171A		PE	087100
1	Gasketing	S773D		PE	087100
1	Sweep	315CN		PE	087100

Set: 19.0

Doors: A100E, D100F, D100G, G100F, G100G, J100F, J100G, K100E, M100F, M100G, P100E, Q100C
 Description: Interior Vestibule Pair (Alum)

2	Continuous Hinge	CFM__SLF-HD1		PE	087100
1	Removable Mullion	910KM x Hgt Req'd		RU	087100
2	Exit Device (nightlatch)	ED5200S_957	630	RU	087100
3	Cylinder	BEST 6-Pin as Req	626/630	BE	
2	Door Closer	CLP7500 SN-134	689	NO	087100
1	Threshold	252A		PE	087100
1	Perimeter Seals	By Alum SF Mfg		OT	
2	Sweep	345_		PE	087100

Set: 20.0

Doors: [H100E](#), [M106](#)

Description: Interior Vestibule Pair / Corridor (HM/W/D)

2	Continuous Hinge	CFM__SLF-HD1		PE	087100
1	Removable Mullion	910KM x Hgt Req'd		RU	087100
2	Exit Device (nightlatch)	ED5200S_957	630	RU	087100
3	Cylinder	BEST 6-Pin as Req	626/630	BE	
2	Door Closer	CLP7500 SN-134	689	NO	087100
1	Threshold	171A		PE	087100
1	Gasketing	S773D		PE	087100
2	Sweep	315CN		PE	087100

Set: 21.0

Doors: [N100C](#), [Q101](#)

Description: Interior Vestibule Pair CR (Alum)

2	Continuous Hinge	CFM83SLI/SLF-HD1 EL-CEPTx32D		PE	087100
1	Removable Mullion	910KM x Hgt Req'd		RU	087100
2	Exit Device (nightlatch)	ED5200S_957 M92 MELR M97	630	RU	087100 ↗
3	Cylinder	BEST 6-Pin as Req	626/630	BE	
2	Surface Closer	CLP7500	689	NO	087100
2	Wall Stop	409	US32D	RO	087100
1	Threshold	252A		PE	087100
1	Perimeter Seals	By Alum SF Mfg		OT	
2	Sweep	345_		PE	087100
2	Position Switch	DPS-M-BK		SU	087100 ↗
1	Power Supply	BPS-12/24-1		SU	087100 ↗
1	Card Reader	By Security Consultant	BLK	OT	

Notes: N100C, Q101: Remote Release from Reception

Set: 22.0

Doors: [E104B](#), [K101D](#), [K103A](#)

Description: Classroom Pair w/ threshold

2	Continuous Hinge	CFM__SLF-HD1		PE	087100
1	Removable Mullion	910KM x Hgt Req'd		RU	087100
2	Exit Device	ED5200S_955 x Cylinder LSA	630	RU	087100
5	Cylinder	BEST 6-Pin as Req	626/630	BE	
2	Door Closer	CLP7500 SN-134	689	NO	087100
2	Kick Plate	K1050 10 X 2" Idw (10 X 1" Idw pairs)	US32D	RO	087100
1	Threshold	171A		PE	087100
1	Gasketing	S773D		PE	087100
2	Sweep	315CN		PE	087100
2	Astragal	18041CNB x Height Required		PE	087100

Set: 23.0

Doors: [A100A](#), [A100C](#), [D100A](#), [D100D](#), [G100A](#), [G100D](#), [J100A](#), [J100D](#), [K100A](#), [K100C](#), [M100A](#), [M100D](#), [P100A](#), [P100C](#)

Description: Exterior Single Alum CR ED

1	Continuous Hinge	CFM83SLI/SLF-HD1 EL-CEPTx32D		PE	087100
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Controlled Entry at 15 Campuses
 Birdville ISD
 North Richland Hills, Haltom City, Hurst and Watauga, Texas

1 Exit Device (nightlatch)	ED5200S_957 M92 MELR M97	630	RU	087100	↘
1 Cylinder	BEST 6-Pin as Req	626/630	BE		
1 Surface Closer	UNI7500	689	NO	087100	
1 Door Stop	441H	US26D	RO	087100	
1 Threshold	252A		PE	087100	
1 Rain Guard	346C (4" + ODW)		PE	087100	
1 Perimeter Seals	By Alum SF Mfg		OT		
2 Sweep	345_		PE	087100	
1 ElectroLynx Harness	QC-C1500P		MK	087100	↘
1 ElectroLynx Harness	QC-C006 (Exit)		MK	087100	↘
1 Position Switch	DPS-M-BK		SU	087100	↘
1 Power Supply	BPS-12/24-1		SU	087100	↘
1 Card Reader	By Security Consultant	BLK	OT		

Notes: Verify if rain guard required

Set: 24.0

Doors: E100A, E100C, F100A, F100B, F100C, H100A, H100C, L100A, L100D

Description: Exterior Single HM CR ED

1 Continuous Hinge	CFM83SLI/SLF-HD1 EL-CEPTx32D		PE	087100	
1 Exit Device (nightlatch)	ED5200S_957 M92 MELR M97	630	RU	087100	↘
1 Cylinder	BEST 6-Pin as Req	626/630	BE		
1 Surface Closer	UNI7500	689	NO	087100	
1 Door Stop	441H	US26D	RO	087100	
1 Threshold	171A		PE	087100	
1 Rain Guard	346C (4" + ODW)		PE	087100	
1 Gasketing	332CS		PE	087100	
2 Sweep	315CN		PE	087100	
1 ElectroLynx Harness	QC-C1500P		MK	087100	↘
1 ElectroLynx Harness	QC-C006 (Exit)		MK	087100	↘
1 Position Switch	DPS-M-BK		SU	087100	↘
1 Power Supply	BPS-12/24-1		SU	087100	↘
1 Card Reader	By Security Consultant	BLK	OT		

Notes: Verify if rain guard required

Set: 25.0

Doors: B102A
Description: Exterior ML CR (Alum) Single

1	Continuous Hinge	CFM83SLI/SLF-HD1 EL-CEPTx32D		PE	087100	
1	Electrified Mortise Lock	ML20906-SEC LSA M92	626	RU	087100	↘
1	Cylinder	BEST 6-Pin as Req	626/630	BE		
1	Surface Closer	UNI7500	689	NO	087100	
1	Door Stop	441H	US26D	RO	087100	
1	Threshold	252A		PE	087100	
1	Rain Guard	346C (4" + ODW)		PE	087100	
1	Perimeter Seals	By Alum SF Mfg		OT		
1	Sweep	345_		PE	087100	
1	ElectroLynx Harness	QC-CXXX as Req		MK	087100	↘
1	ElectroLynx Harness	QC-C1500P		MK	087100	↘
1	Position Switch	DPS-M-BK		SU	087100	↘
1	Power Supply	BPS-12/24-1		SU	087100	↘

Set: 26.0

Doors: A100B, B100A, B100B, C100A, C100B, D100B, D100C, G100B, G100C, J100B, J100C, K100B, M100B, M100C, N100A, N100B, P100B, Q100A, Q100B
Description: Exterior Pair CR (Alum)

2	Continuous Hinge	CFM83SLI/SLF-HD1 EL-CEPTx32D		PE	087100	
1	Removable Mullion	910KM x Hgt Req'd		RU	087100	
2	Exit Device (nightlatch)	ED5200S_957 M92 MELR M97	630	RU	087100	↘
3	Cylinder	BEST 6-Pin as Req	626/630	BE		
2	Surface Closer	UNI7500	689	NO	087100	
1	Threshold	252A		PE	087100	
1	Rain Guard	346C (4" + ODW)		PE	087100	
1	Perimeter Seals	By Alum SF Mfg		OT		
2	Sweep	345_		PE	087100	
2	ElectroLynx Harness	QC-C1500P		MK	087100	↘
2	ElectroLynx Harness	QC-C006 (Exit)		MK	087100	↘
2	Position Switch	DPS-M-BK		SU	087100	↘
1	Power Supply	BPS-12/24-1		SU	087100	↘
1	Card Reader	By Security Consultant	BLK	OT		

Notes: Do not provide removable mullion at openings with fixed mullions

Controlled Entry at 15 Campuses
 Birdville ISD
 North Richland Hills, Haltom City, Hurst and Watauga, Texas

Set: 27.0

Doors: [E100B](#), [H100B](#), [L100B](#), [L100C](#)
 Description: Exterior Pair CR (HM)

2	Continuous Hinge	CFM83SLI/SLF-HD1 EL-CEPTx32D		PE	087100	
1	Removable Mullion	910KM x Hgt Req'd		RU	087100	
2	Exit Device (nightlatch)	ED5200S_957 M92 MELR M97	630	RU	087100	↗
3	Cylinder	BEST 6-Pin as Req	626/630	BE		
2	Surface Closer	UNI7500	689	NO	087100	
1	Threshold	171A		PE	087100	
1	Rain Guard	346C (4" + ODW)		PE	087100	
1	Gasketing	332CS		PE	087100	
2	Sweep	315CN		PE	087100	
2	ElectroLynx Harness	QC-C1500P		MK	087100	↗
2	ElectroLynx Harness	QC-C006 (Exit)		MK	087100	↗
2	Position Switch	DPS-M-BK		SU	087100	↗
1	Power Supply	BPS-12/24-1		SU	087100	↗
1	Card Reader	By Security Consultant	BLK	OT		

Notes: Do not provide removable mullion at openings with fixed mullions. Combine door marks into pairs at fixed mullion locations.

Set: 28.0

Doors: [A103A](#), [L100F](#)
 Description: Interior Pair CR ED (WD/HM)

2	Continuous Hinge	CFM83SLI/SLF-HD1 EL-CEPTx32D		PE	087100	
1	Removable Mullion	910KM x Hgt Req'd		RU	087100	
2	Exit Device (nightlatch)	ED5200S_957 M92 MELR M97	630	RU	087100	↗
2	Cylinder	BEST 6-Pin as Req	626/630	BE		
2	Door Closer	CLP7500 SN-134	689	NO	087100	
2	Kick Plate	K1050 10 X 2" Idw (10 X 1" Idw pairs)	US32D	RO	087100	
2	Wall Stop	409	US32D	RO	087100	
1	Gasketing	S773D		PE	087100	
2	ElectroLynx Harness	QC-C1500P		MK	087100	↗
2	ElectroLynx Harness	QC-C006 (Exit)		MK	087100	↗
2	Position Switch	DPS-M-BK		SU	087100	↗
1	Power Supply	BPS-12/24-1		SU	087100	↗
1	Card Reader	By Security Consultant	BLK	OT		

Notes: L100F: Remote Release by Reception

Set: 29.0

Doors: B102B, F100D

Description: Interior Pair CR ED (WD/HM) + 2 Push Buttons

2	Continuous Hinge	CFM83SLI/SLF-HD1 EL-CEPTx32D		PE	087100	
1	Removable Mullion	910KM x Hgt Req'd		RU	087100	
2	Exit Device (nightlatch)	ED5200S_957 M92 MELR M97	630	RU	087100	↘
3	Cylinder	BEST 6-Pin as Req	626/630	BE		
2	Door Closer	CLP7500 SN-134	689	NO	087100	
2	Kick Plate	K1050 10 X 2" Idw (10 X 1" Idw pairs)	US32D	RO	087100	
2	Wall Stop	409	US32D	RO	087100	
1	Threshold	171A		PE	087100	
1	Gasketing	S773D		PE	087100	
2	Sweep	315CN		PE	087100	
2	ElectroLynx Harness	QC-C1500P		MK	087100	↘
2	ElectroLynx Harness	QC-C006 (Exit)		MK	087100	↘
2	Position Switch	DPS-M-BK		SU	087100	↘
2	Push Button	PB2		SU	087100	↘
1	Power Supply	BPS-12/24-1		SU	087100	↘
1	Card Reader	By Security Consultant	BLK	OT		

Set: 30.0

Doors: C100C

Description: Interior Pair CR ED (Alum) + 2 Push Buttons

2	Continuous Hinge	CFM83SLI/SLF-HD1 EL-CEPTx32D		PE	087100	
1	Removable Mullion	910KM x Hgt Req'd		RU	087100	
2	Exit Device (nightlatch)	ED5200S_957 M92 MELR M97	630	RU	087100	↘
3	Cylinder	BEST 6-Pin as Req	626/630	BE		
2	Door Closer	CLP7500 SN-134	689	NO	087100	
2	Wall Stop	409	US32D	RO	087100	
1	Threshold	252A		PE	087100	
1	Perimeter Seals	By Alum SF Mfg		OT		
2	Sweep	345_		PE	087100	
2	ElectroLynx Harness	QC-C1500P		MK	087100	↘
2	ElectroLynx Harness	QC-C006 (Exit)		MK	087100	↘
2	Position Switch	DPS-M-BK		SU	087100	↘
2	Push Button	PB2		SU	087100	↘
1	Power Supply	BPS-12/24-1		SU	087100	↘
1	Card Reader	By Security Consultant	BLK	OT		

Controlled Entry at 15 Campuses
 Birdville ISD
 North Richland Hills, Haltom City, Hurst and Watauga, Texas

Set: 31.0

Doors: [E100D](#), [E104A](#)

Description: Interior Pair CR ED (WD/HM) w/ Threshold

2	Continuous Hinge	CFM83SLI/SLF-HD1 EL-CEPTx32D		PE	087100	
1	Removable Mullion	910KM x Hgt Req'd		RU	087100	
2	Exit Device (nightlatch)	ED5200S _957 M92 MELR M97	630	RU	087100	↘
3	Cylinder	BEST 6-Pin as Req	626/630	BE		
2	Surface Closer	UNI7500	689	NO	087100	
2	Kick Plate	K1050 10 X 2" Idw (10 X 1" Idw pairs)	US32D	RO	087100	
2	Wall Stop	409	US32D	RO	087100	
1	Threshold	171A		PE	087100	
1	Gasketing	S773D		PE	087100	
2	Sweep	315CN		PE	087100	
2	ElectroLynx Harness	QC-C1500P		MK	087100	↘
2	ElectroLynx Harness	QC-C006 (Exit)		MK	087100	↘
2	Position Switch	DPS-M-BK		SU	087100	↘
1	Power Supply	BPS-12/24-1		SU	087100	↘
1	Card Reader	By Security Consultant	BLK	OT		

Notes: E100D: Remote Release from Reception

END OF SECTION

SECTION 08 80 00

GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Glass and glazing accessories.
- B. Related Sections:
 - 1. Section 07 92 00 - Joint Sealants
 - 2. Section 08 11 00 - Hollow Metal Doors and Frames.
 - 3. Section 08 14 00 - Wood Doors.
 - 4. Section 08 14 23 - Plastic-laminate-faced Wood Doors.
 - 5. Section 08 41 13 - Aluminum-framed Entrances and Storefronts.

1.2 PERFORMANCE REQUIREMENTS

- A. Glass and glazing materials of this section shall provide continuity of building enclosure vapor and air barrier
 - 1. In conjunction with materials described in SECTION 07 92 00 - JOINT SEALANTS.
 - 2. Maintain continuous air and vapor barrier throughout glazed assembly from glass pane to heel bead of glazing sealant.
- B. Design and size glass to withstand dead loads and live loads caused by pressure and suction of wind as calculated in accordance with building code, and measured in accordance with ASTM E 330.
- C. Limit glass deflection to 1/200 or flexure limit of glass with full recovery of glazing materials, whichever is less.

1.3 SUBMITTALS

- A. Submit product data and samples under provisions of SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
- B. Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
- C. Provide data on glazing sealant. Identify colors available.
- D. Samples:
 - 1. Submit 2 samples of each type of glass (except clear glass), 12" x 12" in size, illustrating glass unit, coloration, design.
 - 2. Submit 4" long bead of glazing sealant in color selected.

1.4 QUALITY ASSURANCE

- A. Glazing Standards: Comply with recommendations of Glass Association of North America (GANA) "Glazing Manual."
- B. Source Quality Control: Glass shall be identified by the manufacturer's labels of grade and quality. Temporary labels shall not be removed until final cleaning. Permanent labels on tempered glass shall not be removed.
- C. Safety Glazing Standard: Where safety glass is indicated or required, provide type of products indicated which comply with ANSI Z97.1 and testing requirements of CPSC 16 CFR Part 1201 for Category II materials.
- D. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.

- E. Fire-Rated Window Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 257.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect glass and glazing materials during delivery, storage, and handling as required to prevent edge damage to glass, and damage to glass and glazing materials from effects of moisture including condensation, or temperature changes, and other causes.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Basis of Design products are **Vitro Architectural Glass (PPG)**: Provide glass as manufactured by one of the following:
 - AGC Glass North America
 - Guardian Industries Corp.
 - Technical Glass Products
 - Oldcastle Building Envelope
 - Pilkington North America, Inc. (NSG Group)
 - Vitro Architectural Glass (formerly PPG Glass)

2.2 GLASS

- A. (CT4) Tempered Glass, Clear: ASTM C 1048, Type I, Class 1 (Clear), Quality q3 (Glazing select). Kind FT - Fully Tempered, Condition A - Uncoated surfaces, 1/4" thickness.
- B. (FR) Fire- and Impact Safety-Rated Ceramic Laminated Glazing (20-180 min.): Clear, ceramic flat glass; laminated 5/16x3/8 inch nominal thickness; complying with testing requirements in ANSI Z97.1 and 16CFR1201 for Category I and II materials and is hose stream tested. Subject to compliance with requirements, provide one of the following:
 - Technical Glass Products.; FireLite Plus (800.426.0279)
 - Schott North America, Inc.; Pyran Platinum L (SAFTIFIRST, 888.653.3333)

2.3 BULLET RESISTANT GLASS

- A. Provide bullet resistant glass for new and existing aluminum framed doors and windows as indicated. Include glazing anchor system for existing framing to improve safety and security performance meeting National Institute of Justice (NIJ) Level IIA, or UL 752 Level 2 requirements and NIJ Level III, or UL Level 8 requirements.
- B. Bullet Resistant Glass (BR-1 - Alternate No. 1): Provide Level IIA products by C-Bond or Global Security Glazing, 1/2-inch thick clear laminated safety glass with 3 layers of 15 mil security film applied to the interior (secure)-side face
 - 1. Accessories: BondKap.
- C. Bullet Resistant Glass (BR-2 - Alternate No. 2): Provide Level IIIA products by Global Security Glazing, 1-9/16"-inch thick glass-clad polycarbonate and contains an exposed polycarbonate surface with an abrasion resistant coating on the witness (safe) side.

2.4 GLAZING MATERIALS

- A. Glazing Compound: Comply with ASTM C 1311 or FS TT-S-00230, one-part, non-sag acrylic polymeric sealant. Product/manufacturer; one of the following:
 - Acryl-R Acrylic Sealant; Schnee-Moorehead, Inc.
 - Mono 555; Tremco
- B. Channel Glazing Strips; Hollow Metal Doors and Frames: Provide black vinyl channel glazing strips, Glazing Vinyl for 990 Sliders Part #6062-01 as manufactured by Kawneer.
- C. Accessories: Setting blocks, tape, vinyl gaskets and spacer strips as required for a complete installation.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine areas to receive glass for conditions that will adversely affect the execution and quality of work. Do not start this work until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Setting Glass: Glazing shall be done at the site by skilled glaziers in conformance with the general conditions governing glazing in the GANA Glazing Manual.
 - 1. Glazing of aluminum windows and storefront shall be done in conformance with the methods recommended by the manufacturer of the aluminum items. Beads or stops furnished with the items to be glazed shall be used to secure the glass in place.
 - 2. For interior hollow metal door and frame glazing, install channel glazing strips and place glass within glazing strips. Install the removable stop and position the channel glazing strip to seal completely the void around the glass.
 - 3. Verify glass sizes for required edge clearances by measuring the openings. Cut each piece accurately and fit to its particular position. Center glass in the opening vertically and horizontally. Use edge blocks in vertical jambs to prevent lateral "walking" of the glass.
 - 4. Glass shall have clean cut edges. Do not seam, nip, stone or strike edges, or scarf corners, and do not install glass with flared edges at the bottom. Do not bump, drag, or rest the edge of a glass light against metal or other hard objects.
 - 5. Set tempered glass with tong marks completely concealed or in as inconspicuous a location as possible.
- B. Application of Ballistic Resistant Film to Existing Glass and frame without Dismantlement: Apply security film past the edge of the visible glass and extend onto the frame.
 - 1. Apply to all glass 7 feet and below.
 - 2. Apply 15mil security film on secured side of glass, anchored to frame with Dow 995 structural sealant with BondKap over sealant. Must achieve minimum 1/2-inch contact between Dow 995 bead to frame and minimum 1/2-inch contact between Dow 995 bead to window film.
 - 3. Doors with Glass - 15mil security film applied glass edge-to-glass edge on secure side of glass and Dow 995 applied under caps/stops to adhere film-to-frame-to-cap/stop. Splicing: Splices and seams in security film are permitted only when a sheet of glass has a dimension exceeding 58 inches in both directions. Apply seams with a minimum overlap of 1/4 inch unless submitted test reports indicate impact performance is not diminished when seam is applied with a different overlap or a gap.

3.3 CLEANING

- A. Upon completion of the building, clean glass on both sides and remove labels, paint spots, putty and other defacement. Replace damaged glass with new.

END OF SECTION

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SECTION 09 21 16

GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal stud wall framing.
2. Furred wall framing.
3. Metal channel ceiling framing.
4. Gypsum board partitions, ceilings, and furrings
5. Finishing of panel joints.

B. Related Sections:

1. Section 07 21 00 - Building Insulation: acoustical insulation.
2. Section 07 84 00 - Firestopping.

1.2 SUBMITTALS

A. Product Data: Submit in accordance with Section 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, SAMPLES. Submit materials list of items proposed to be provided, manufacturer's data indicating compliance with specified requirements, and manufacturer's recommended installation procedures.

B. Submit diagrams of proposed control joint and expansion joint layout prior to starting work.

1.3 QUALITY ASSURANCE

A. Tolerances for Drywall: Do not exceed a variation of 1/8" in 10'-0" and 1/16" in 5'-0" from plumb, level, and flat (all directions) and do not exceed 1/16" offset of planes at joints between panels. Shim panels as necessary to comply with tolerances.

B. Perform Work in accordance with ASTM C 840, GA-216, GA-223 and GA-600.

1.4 PROJECT CONDITIONS

A. Environmental Requirements: In cold weather, maintain the temperature of the building reasonably constant at no less than 55° F. during gypsum panel application and joint finishing. Provide adequate ventilation to carry off excess moisture.

1.5 DELIVERY, STORAGE, HANDLING

A. Deliver, store, handle, and protect products in conformance with manufacturer's instructions and in accordance with Section 01 65 00 - PRODUCT DELIVERY REQUIREMENTS and Section 01 66 00 - PRODUCT STORAGE AND HANDLING REQUIREMENTS.

B. Store inside building, on sleepers, and out of water.

1.6 QUALIFICATIONS

A. Applicator: Company specializing in performing the work of this section with minimum three years documented experience.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Gypsum Board (20A): ASTM C 1396. Provide Type X fire-rated; 48" w x 5/8" thick by maximum permissible length gypsum board with tapered edges. Product/manufacturer; one of the following:
CertainTeed Type X; CertainTeed Gypsum
ToughRock Fireguard X Gypsum Board: G-P Gypsum Corp.
Fire-Shield Gypsum Wallboard; National Gypsum Co.
Sheetrock Brand Firecode Core Gypsum Panel; USG Corporation
- B. Water- and Mold-Resistant Gypsum Board: ASTM C 1396. Provide Type X, water and mold resistant; 48" w x 5/8" thick by maximum permissible length gypsum board with tapered edges. Gypsum board to be covered with ceramic tile, EWC alcoves, and other wet areas (except showers) shall be specially processed moisture-resistant gypsum board. Product/manufacturer; one of the following:
M2Tech Type X; CertainTeed Gypsum
ToughRock Fireguard X Mold-Guard Gypsum Board: G-P Gypsum Corp.
Gold Bond XP Fire-Shield Gypsum Wallboard; National Gypsum Co.
Sheetrock Brand Mold Tough Firecode Core Gypsum Panel; USG Corporation
- C. Studs: ASTM C 645. Non-loadbearing channel type roll-formed from minimum 25 gauge electro- or hot-dipped galvanized steel.
1. Provide 20 gauge studs at interior ceramic tile partitions.
- D. Slotted Top Track: Sliptrack Systems, SLP-TRK®, (phone 888.475.7875 web site: www.sliptrack.com).
1. 25 ga thick, to ASTM A653/A653M, Grade 33 with a minimum yield point of 33,000 psi, electro- or hot-dipped galvanized steel.
2. 2-1/2" down-standing legs with 1/4" wide by 1-1/2" high slots spaced at 1" on center.
3. Track width shall match stud size by manufacturer's standard length.
4. Fasteners: ASTM C 1002, self-drilling, self-tapping screws.
- E. Furring, Framing and Accessories: Provide in conformance with ASTM C 645, GA-216, and GA-600 and as follows:
1. Cold Rolled Channels: 3/4", 1-1/2" and 2" x 9/16", 16 gauge, steel channels prime painted.
2. Furring Channels: ASTM 645, 7/8" deep x 1-1/4" face, roll-formed from 25 gauge electro-galvanized steel and furnished with galvanized wire clips.
3. Resilient Furring: 1/2" deep x 2" x 1-1/4" screw flange, 25 gage, galvanized with one leg attached only, Style RC-1 PRO™ as manufactured by ClarkDietrich Building Systems.
- F. Fasteners: ASTM C 514 for nails and C 1002 for screws as follows:
1. Inserts, clips, bolts, nails or other screws as recommended by wallboard manufacturer, of type and size to suit application and to rigidly secure materials in place.
2. Self-drilling, self-tapping bugle head screws for use with power drive tool.
3. Screws: Drywall Screws, Type S Bugle Head.
4. Metal framing to structure: Power driven screw fasteners to withstand 190 lb. single shear resistance and 200 lb. bearing force when drive through structural head or base and without exceeding allowable design stress in runner, fastener, or structural support.
5. Metal to metal: 3/8", Type S or S-12, pan head screws.
6. Gypsum board to sheet metal application: Type S Bugle Head screws.
7. Gypsum board to gypsum board application: Type G screws.
- G. Adhesive: Utilize adhesive meeting requirements of GA-216 over metal framing.
- H. Accessories:
1. Runners: ASTM C 645, channel type sections roll-formed from electro-galvanized steel with unhemmed edges. Same gauge as studs with which used.
2. Hangers: No. 8 gauge annealed, galvanized wire.
3. Tie Wire: No. 16 gauge annealed, galvanized wire.
4. Trim: Galvanized steel corner reinforcements, edge trim angles and casings; USG No. 200 series.
5. Reinforcing Tape: 2-3/16" minimum width, cross laminated, spark perforated fiber tape.
6. Joint Compound: Quick-drying, polyindurate-type, pre-fill material.
7. Joint Topping: Vinyl base all-purpose finishing material.
8. Acoustical Sealant: A one-part acrylic base sealant designed for use with drywall construction.
9. Edge Sealant: USG Sheetrock Brand W/R Sealant for use in high-moisture room areas.

10. Control Joints: Roll-formed zinc control joints with 1/4" slot (USG #093).

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Workmanship: The completed gypsum wallboard surfaces shall be smooth, level or plumb, and acceptable to the finish material applicators. All joint treatment on exposed wallboard shall be invisible after painting.
- B. Ceiling Furring:
1. Install in accordance with ASTM C 754, GA-216, GA-223 and GA-600 and manufacturer's instructions.
 2. Space ceiling hangers 48" o.c. along runner channels and within 6" of ends of channel runs. Wrap or saddle-tie hangers around the runner channels to prevent twisting.
 - a. Under steel construction, wrap hangers around or clip or bolt hangers to a structural steel member (not steel deck).
 - b. Under bar joists suspend hangers from top chord or from bottom chord at panel points only.
 - c. Under ductwork, employ trapeze system of hangers to support ceiling. Do not suspend hangers from ducts, piping or conduit.
 3. Erect runner channels at 48" o.c. maximum and locate a channel within 4" of each parallel wall. Level channels with hangers taut and do not make kinks or bends in the hangers as a means of leveling. At channel splices, overlap ends 12" with flanges interlocked; secure each end with tie wire.
 4. Erect furring channels at 16" o.c. for 1/2" thick gypsum or 24" o.c. for 5/8" thick gypsum board and at right angles to runner channels or main support members; secure with clips or saddle-tie to supports with tie wire. Make end splices by nesting channels 8" and wire tying each end.
 5. At light troffers or other openings that interrupt the runner or furring channels, install additional reinforcing to restore lateral stability of the grillage.
 6. No part of the suspended grillage (main runners and cross furring) shall be permitted to come in contact with abutting masonry walls and partitions.
- C. Wall Furring: For gypsum wallboard over masonry, space furring channels vertically at 24" o.c. maximum and attach with power driven anchors through alternate wing flanges (staggered), spaced 24" o.c. Make end splices with 8" nested laps anchored to wall with two fasteners in each wing. Where necessary, install furring with adjustable furring brackets and 1/2" x 3/4" steel channels to which the furring channels shall be clipped or tied.
- D. Partitions:
1. Follow recommendations of U.S. Gypsum Co., "Gypsum Construction Handbook".
 2. Install studding in accordance with ASTM C 754, GA-216, GA-223 and GA-600.
 3. Erect partitions with studs aligned to be plumb and true. Anchor studs top and bottom with runners, shoes and clips.
 4. Attach floor runners to concrete slabs using shielded screws or power driven fasteners. Locate fasteners at corners and at runner ends and spaced not to exceed 24" o.c.
 5. Under drywall ceilings, attach metal runner to ceiling and position studs to engage the ceiling runner. Elsewhere, extend studs above the ceiling and brace securely to the floor above or roof structure above with a continuous top runner and channel braces unless specifically detailed otherwise. Where studs extend more than 24" above finished ceiling line, provide either 5/8" gypsum board on both sides of studs or horizontal bracing at 16" o.c. attached with mechanical fasteners to both flanges of studs.
 6. For fire rated partitions and where specifically detailed or noted, extend studs full height to the floor or roof structure above.
 7. Space studs as shown and noted but not more than 16" o.c. Locate studs not more than 2" from abutting partitions and partition corners. Anchor studs to runner flanges with positive screw engagement where located at corners and at door frame jambs.
 8. At door frame jambs of doorways up to 4'-0" wide, double the studs or reinforce with 20 gauge steel studs. At jambs of doorways over 4'-0" wide, reinforce with two 20 gauge steel studs placed back to back. Fasten reinforcing studs to the anchor clips on each door frame with bolts or screws. Place horizontally over each frame a cut-to-length section of runner track; attach with screws to the adjacent vertical studs.
 9. In chase wall construction, set studs opposite each other with the flanges in the same direction and cross brace between the rows of studs with three 12" high pieces of gypsum board or three pieces of metal stud attached to each pair of studs at the quarter points with drive screws.
 10. Double the studs at vertical control joints in partitions.
 11. Brace partitions to top chord of the structure above with 20 ga. diagonal braces at 4'-0" o.c. minimum. Where floor to structure height exceeds 16'-0", in addition to extending and fastening studs to structure, add 20 ga. stud diagonal braces at 4'-0" o.c. minimum.

- E. Slotted Top Track: Install slotted track in strict accordance with manufacturer's written instructions and recommendations.
1. Secure studs to slotted top track with #8 wafer-head screws.
 2. Maintain minimum deflection gap of 0.65 inch between top of stud and top of slotted track.
 3. Limit vertical movement to 1 inch, plus or minus 1/2 inch.
- F. Sealant Application: Caulk those gypsum drywall partitions which have sound attenuation blankets, serving as sound barriers.
1. Apply sealant in two continuous beads underneath runners at the floor and ceiling and where runners are used at partition intersections with dissimilar wall construction.
 2. Fill with sealant the grooves around the edges of wallboard at the floor, ceiling, and intersections with dissimilar walls.
 3. Caulk fully the openings around all cut-outs at electrical boxes, heating ducts and the like.
- G. Wallboard Application:
1. Apply gypsum wallboard first to the ceilings and then to the partitions. Use maximum practical lengths to minimize end joints. Fit ends and edges closely but not forced together.
 2. For single-layer ceiling application, apply wallboard with the long dimension either parallel or at right angles to the framing members. All abutting ends and edges shall occur over framing members, except in horizontal application. Stagger end joints in adjacent rows.
 3. For single-layer wall application with a ceiling height of 8'-2" or less, use either the horizontal or the vertical application method. With a ceiling height over 8'-2" and for fire-rated partitions, use only the vertical application method without any exposed horizontal joints. Stagger the vertical joints on opposite sides of a partition. Extend wallboard full height to the floor or roof structure above where so detailed.
 4. Fasten wallboard firmly to studs and furring channels with power-driven drywall screws. Gypsum board shall extend to within 1/4" of floor line. Drive screw heads close without cutting the surface paper or fracturing the core. Maximum screw spacing shall be 12" o.c. for ceilings and 16" o.c. for partitions. For fire-rated partitions, maximum spacing shall be 12" o.c. Do not drive screws closer than 3/8" from any edge.
 5. For two-layer wall application, apply the base layer of wallboard vertically; attach with screws spaced 16" o.c. Apply the face layer vertically with joints offset 24" from base layer joints; attach with adhesive and 1-5/8" screws spaced 16" o.c.
 6. Wallboard joints in single layer or in face layer of two layer applications shall not occur within 12" of the corners of door frame, window frames, and openings larger than 12" x 12", unless control joints are installed at the corners.
 7. Accurately cut and fit abutting ends, edges and holes for pipes and electrical fixtures. Support the edges of gypsum wallboard at cutouts and openings.
 8. Reinforce exposed external corners with metal corner reinforcement.
 9. Where wallboard surfaces abut dissimilar intersecting surfaces such as metal and masonry, trim the meeting edge with a metal trim angle held approximately 1/4" away from the intersecting surface. Caulk the joint full with sealant; tool smooth.
 10. After application, check all gypsum wallboard for loose fasteners; drive tight any found loose.
- H. Control Joints:
1. Isolate gypsum wallboard surfaces with control joints where specifically detailed and where the following conditions exist:
 - a. Partition or furring run exceeds 30 feet without a corner or a ceiling-height door frame.
 - b. Ceiling dimensions exceed 50 feet in either direction.
 - c. Construction changes within the plane of the partition.
 - d. Each side of column furring within a partition run.
 - e. Above each door jamb from head to top of partition.
 - f. At each side of furr downs.
 2. Locate control joints in partitions at less-than-ceiling-height door frames with control joints extending to the ceiling from both top corners.
 3. Make joints with roll-formed zinc control joints (USG #093) with 1/4" slot.
 - a. Do not install roll-formed joint behind ceramic tile. Provide a 1/4" wide gap in the substrate only.
 - b. At acoustical partitions, seal behind the joints with acoustical sealant.
 4. Back-block ceiling control joints with face panel strips laid over the joints.
 5. At acoustical partitions, seal behind partition control joints with batt acoustical insulation stuffed between the doubled studs.

- I. Edge Sealing: On wallboard partitions to be covered with ceramic tile, treat cut edges, holes, corner joints, and intermediate joints with edge sealant before installation of wallboard panels. Treat all fastener heads with edge sealant after installation. Caulking of openings through ceramic tile is specified in SECTION 09 30 13 - CERAMIC TILING.
- J. Joint Treatment:
1. Finish the joints in exposed wallboard, wallboard which is to be covered with vinyl wall covering and carpet wall covering, and wallboard in sound partitions to deck. Joints in wall board to be covered with ceramic tile shall be filled but may be left unfinished.
 2. Fill the V-grooves between boards with quick drying joint compound. Wipe joints clean of excess compound and allow to harden.
 3. Apply a thin layer of joint topping to joints. Immediately embed tape reinforcement over joints, follow with a skim coat of compound.
 4. Apply joint topping over the tape to fill flush with the board surface.
 5. Apply joint topping over the fill coat and feather out smoothly beyond fill coat edge. Sand between coats as necessary to provide a smooth surface ready for painting.
 6. Fill screw head depressions flush with three coats of compound.
 7. Finish metal corner reinforcements and edge and control joint trim with two or three coats of joint compound, using edge of trim as a screed to secure a smooth, flat finish.

3.2 TOLERANCES

- A. Maximum variation from true flatness: 1/8" in 10 feet in any direction.

END OF SECTION

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SECTION 09 30 13

CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Ceramic tile.
- B. Related Sections:
 - 1. Section 07 92 00 - Joint Sealants.
 - 2. Section 09 21 16 - Gypsum Board Assemblies.

1.2 SUBMITTALS

- A. General: Submit in accordance with SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples: Submit tile samples of the same size scheduled for each particular type of tile required.
- C. Certificate: Furnish one master grade certificate on ceramic tile executed prior to delivery of the tile to the site.

1.3 QUALITY ASSURANCE

- A. Standard: Ceramic tile shall be Standard Grade complying with the requirements of ANSI A 137.1. Deliver tile to the project site in grade sealed containers.

1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is completed and ambient temperature and humidity conditions are being maintained.
- B. Do not install adhesives in a closed, unventilated environment.
- C. Maintain 50°F. during installation of mortar materials.

1.5 MAINTENANCE

- A. Extra Materials: Upon completion of work, deliver to the project site one box for each type, color, pattern, and size of ceramic tile installed. Furnish maintenance materials from same manufactured lot as materials installed and enclose in protective packaging with appropriate identifying labels.

PART 2 - PRODUCTS

2.1 TILE

- A. Ceramic tile and trim as manufactured by **American Olean, Dal-Tile Corp., Interceramic, and Crossville Ceramics** shall set all standards in the areas of trim shapes availability, tile size, color, pattern, and texture.
- B. Provide factory made fitters and trim shapes required for a finished installation. Keep job-cut fitters and trim shapes to a minimum. Provide bullnose tile at horizontal and vertical tile edges.
- C. Ceramic Tile: All tile will be as selected by Architect to match existing.

2.2 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150, domestic manufacture.
- B. Dry-Set Mortar: ANSI A 118.1, factory sanded mortar mix.

- C. Adhesive: ANSI A 136.1, Type I, prepared organic adhesive.
- D. Grout:
 - 1. Walls: Modified acrylic, premixed Mastic Grout or dry-set grout complying with ANSI A118.7, color(s) as selected by Architect from Custom Building Products, Laticrete, Mapei or approved equal. If Contractor elects to provide dry-set grout, the installation shall be damp cured.
- E. Lime: ASTM C 207, Type S, hydrated lime.
- F. Sand: ASTM C 144, clean, masonry sand.
- G. Water: Clean and potable.

2.3 ACCESSORIES

- A. Metal Corner and Top of Wainscot Trim: Provide RONDEC aluminum corner trim by Schluter Systems L.P. Finish shall be selected from manufacturer's complete color range.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General Workmanship:
 - 1. Center and balance areas of tile, if possible.
 - 2. Do not make an excessive amount of cuts. Usually, no cuts smaller than half size should be made. Make all cuts on the outer edges of the field.
 - 3. Smooth cut edges. Install tile without jagged or flaked edges.
 - 4. Fit tile closely where edges will be covered by trim, escutcheons or other similar devices.
 - 5. The splitting of tile is expressly prohibited except where no alternative is possible.
 - 6. Maintain the heights of tilework in full courses to the nearest obtainable dimension where heights, given in feet and inches, are not required to fill vertical spaces exactly.
 - 7. Make corners of all tile flush and level with corners of adjacent tile, with due allowance to tolerances for tile as specified in ANSI A137.1.
 - 8. Keep all joint lines straight and even width, including miters.
 - 9. Thoroughly back-up with thin-set bonding material all thin-set units, molded or shaped pieces; secure firmly in place.
 - 10. Thoroughly back-up with mortar-bed mix thick-bed nosings, coves, curbing, gutters, flat tile and trimmers, molded or shaped pieces; secure firmly in place.
 - 11. Bond coat mix shall not be used to back-up thick-bed trim and angles. Coat all thick-bed trim shapes with 1/32" to 1/16" of bond coat mix.
 - 12. Finish wall areas level and plumb with no variations exceeding 1/8" in 8' from the required plane.
 - 13. Install accessories in tile work to be evenly spaced, properly centered with tile joints, and level, plumb and true to the correct projection. Install accessories at locations and heights designated.
 - 14. Finished tile work shall be clean. Replace pitted, chipped, cracked and scratched tiles.
- B. Setting Wall Tile:
 - 1. Set base and wall tile over masonry in straight joint pattern using dry-set cement mortar in conformance with ANSI A 108.5.
 - 2. Set base and wall tile of size less than 12" x 12" over gypsum wallboard in straight joint pattern using organic adhesive in conformance with TCA W242 and ANSI A 108.4.
 - 3. Set base and wall tile of size more than 12" x 12" over gypsum wallboard in straight joint pattern using Latex Portland cement mortar in conformance with TCA W243 and ANSI A 108.5.
 - 4. Surfaces to be tiled shall be dry, firm and proper for bond.
 - a. Treat gypsum wallboard surfaces with a primer-sealer; caulk openings around pipes and fixtures with a non-hardening waterproof sealant.
 - b. Apply leveling coat of sanded dry-set mortar over irregular surfaces if and as required to secure plumb, flat surfaces for the application of tile.
 - 5. Mix and apply mortar and adhesive in conformance with best trade practice and the recommendations of the manufacturer of the materials used. Cover surfaces evenly, with no bare spots, and comb with a notched trowel within 10 minutes of applying tile.
 - 6. Apply tile before skinning of the adhesive or mortar has taken place. Press and beat firmly into place to obtain at least 75 percent contact area of adhesive or mortar on the tile back.
 - 7. If tile is face mounted, remove paper and glue before the adhesive or mortar is firmly set; adjust tiles that are out of line.

8. Provide control joints at all inside corners of wall tile areas. Install sealant in joint. Color as selected by Architect.
- C. Grouting:
1. Force a maximum amount of grout into the joints.
 2. Clean the joints of cushion-edge tile to depth of cushion. Fill joints of square-edge tile flush with face of tile.
 3. Fill all gaps and skips. Mortar shall not show through grouted joints.
 4. Finished grout shall be uniform in color, smooth, and without voids and low spots.
 5. Grout joint width as recommended by tile manufacturer.
 6. Damp cure Portland cement grout for at least 72 hours.
- D. Wall Control Joints:
1. Provide a caulked control joint at same width as grout joints, minimum of 1/8".
 2. After tile work and grout are dry, clean the open control joint and roll-in foam rod stock to leave a joint depth of 1/4".
 3. Fill the joint with primerless one-part acrylic polymeric sealant. Color shall be as selected by Architect.
 4. Tool the sealant smooth.
 5. Where tile on wallboard abuts tile on masonry, provide a 1/4" caulked control joint to separate the two areas.
- E. Joints at Frames: Where ceramic tile abuts frame, provide a minimum 1/8" caulked expansion joint to separate tile from the frame.
1. After tile work and grout are dry, clean the joint at the frame.
 2. Fill the joint with primerless one-part acrylic polymeric sealant.
 3. Color shall be as selected by Architect.
 4. Tool the sealant smooth.
- F. Metal Corner and Top of Wainscot Trim:
1. Provide at all outside corners [and top of wainscot] of ceramic wall tile.
 2. Set metal corner trim prior to installing wall tile.
 3. Set tile up to corner trim with a factory cushion edge. Provide a 1/8" joint between tile and trim. Trim shall be flush with faces of ceramic tile.
 4. After tile work and grout are dry, clean the joint between the trim and the tile.
 5. Fill joint with sealant to match grout.

3.2 CLEANING

- A. When the work of other trades is completed, clean down tile and marble surfaces and leave in first class condition.
1. The use of wire brushes or acids is expressly prohibited.
 2. Replace cracked, broken, and chipped tile with new units.
 3. Correct uneven and stained joints.

END OF SECTION

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SECTION 09 51 00

ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Acoustical panels and exposed suspension systems for ceilings.

1.2 SUBMITTALS

- A. Samples: Submit in accordance with Section 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, SAMPLES. Submit a 12" x 12" sample of each type of acoustic panel. Submit a 6" long sample of each component of each type of exposed suspension system.
- B. Certificate: Submit written certification that the ceiling assemblies installed meet the requirements for the specified UL Time-Design Rating.

1.3 QUALITY ASSURANCE

- A. Erector Qualifications: This work shall be performed by an experienced erector approved by the acoustical material manufacturer.
- B. Fire Protection: The acoustical ceilings so designated on the drawings shall be composed of fire-rated panels and fire-rated suspension systems to meet the requirements for a fire-resistive Time-Design Rating of 1-hour in conformance with Underwriters Laboratories (U.L.) classification.
- C. Pre-ceiling conference:
1. Prior to start of ceiling grid installation, convene pre-ceiling conference at project site.
 2. Attendance is required by Contractor, installer, and Architect.
 3. Review specifications and drawings of ceiling installation and layout.

1.4 PROJECT CONDITIONS

- A. Environmental Requirements:
1. Before acoustical work is started, all wet work such as concrete and plastering shall be completed and thoroughly dried out.
 2. Acoustical ceiling shall not begin until building has been closed to the weather and suitable mechanical ventilation is supplied to maintain condition ranges of 60°F. to 85°F. at not more than 70% R.H. These conditions shall be maintained prior to, during, and after installation.
 3. Acoustical panels shall be unpacked and allowed to stabilize for a period of 72 hours, in the environment as defined above, prior to installation.
- B. Work Sequence:
1. Do not start acoustical work until mechanical and electrical work to be covered up has been inspected and approved.
 2. Coordinate the related work of other trades involved in the ceiling installation.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Store tile and panel cartons open at each end to stabilize moisture content.

1.6 WARRANTY

- A. Acoustic Lay-in Panels: Submit manufacturer's standard 10-year warranty against sagging or warping (defined as greater than 1/8" measured in the panel center) from the date of installation.

1.7 MAINTENANCE

- A. Extra Materials: Upon completion of work, deliver maintenance materials to the project site, packaged with protective covering for storage and identified with appropriate labels. Furnish two boxes of full size acoustical ceiling units of each type installed.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Acoustic Lay-in Panels (22A): ASTM E 1264, mineral fiber panels, Class 25 (non-combustible) and having an NRC range of 0.50-0.60.
 - 1. Sizes: 24" x 24" x 5/8".
 - 2. Design: Fine, non-directional fissured surface.
 - 3. Product/manufacturer; standard or fire rated panels to match existing:
 - Fine Fissured Humiguard; Armstrong World Industries, Inc.
 - Fine Fissured Safetone; CertainTeed Corporation
 - Radar ClimaPlus; USG Interiors, Inc.
 - 4. Finish: Washable factory applied vinyl latex paint.
 - 5. Edges: Square.
- B. Suspension System; Acoustic Lay-in Panels: Exposed type for panel ceilings as manufactured by the ceiling panel manufacturer or one of the following:
 - Armstrong World Industries, Inc.
 - CertainTeed Corp.
 - Chicago Metallic Corp./Rockfon
 - USG Interiors, Inc.
 - 1. Components shall be roll-formed from steel to meet ASTM C 635 and conform to the requirements for Intermediate duty structural classification. Exposed main tee runners shall be double web with capped face.
 - 2. Components shall be electro-zinc coated or hot-dip galvanized and exposed surfaces shall have white enamel finish.
 - 3. System shall be designed and sized to support the ceiling assembly with a maximum deflection of L/360 of the span.
 - 4. Color shall be white to match color of lay-in panels.
 - 5. Fire resistive systems shall be UL listed and labeled for a 1-hour time-design rating.
- C. Hangers: 12 gage annealed and galvanized steel wire.
- D. Hold-down Clips: UHDC Universal Hold Down Clip by Armstrong.
- E. Column Rings: Prefabricated clamp rings to support suspended ceiling, as manufactured by Fry Reglet.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine areas to receive acoustical treatment for conditions that will adversely affect the execution and quality of work. Designate any areas of potential interference between ceiling components and components of other trades. Do not start this work until unsatisfactory conditions are corrected.

3.2 CEILING INSTALLATION

- A. General: Installation procedures shall meet or exceed the manufacturer's recommendations and ASTM C 636.
 - 1. Lay out each area so that the panel patterns are symmetrical, joints parallel to walls and borders generally equal in width.
 - 2. Coordinate the patterns with ceiling lights and grilles in conformance with the reflected ceiling plans and as directed.
 - 3. Verify types and sizes of light fixtures and grilles to be accommodated and arrange the work accordingly.

- B. Suspension: Locate main and cross tee runners to form the indicated patterns.
 - 1. Use a laser leveling method to direct-suspend the main tees with hangers spaced not more than 48" o.c.
 - 2. Provide hangers within 6" of the corners of recessed lighting fixtures.
 - 3. Under steel construction, wrap hangers around or clip or bolt hangers to a structural steel member (not steel deck).
 - 4. Under bar joists, suspend hangers from top chord or from bottom chord at panel points only.
 - 5. Under ductwork, employ trapeze system for hanging ceiling.
 - 6. Do not suspend hangers from ducts, piping, conduit, or fireproofing membrane.
 - 7. Use a laser beam system to level the main tee runners to within 1/8" in 12 ft. Level with hangers taut; do not make kinks or bends in hangers as a means of leveling.
- C. Moldings: Install finish channel and angle moldings where ceilings abut walls, furrings and other intersecting vertical surfaces.
 - 1. Moldings shall be in long lengths, secured to adjoining surfaces with at least two fasteners for each piece or more as may be required. Pull the molding snugly against the vertical surface without any gaps.
 - 2. No molding length shall be less than 3 ft. except at short offsets.
 - 3. Use prefabricated corner pieces where possible to eliminate field mitering.
- D. Lay-in Panels: Install the acoustic panels in the exposed suspension system with bottom surfaces flush and in a true, level plane.
 - 1. Hold-down clips are required at all vinyl covered gypsum panels for cleaning purposes.
 - 2. Provide hold-down clips at lay-in panels within 6' of exterior exits.
- E. Access: Provide access through acoustic panel ceilings with one or more access locations in each room to maintain a maximum spacing of 30 ft. between access panels.
- F. Light Fixture Protection: Provide incombustible enclosures over recessed light fixtures as required to attain the specified Time-Design fire Rating. Fixture protection shall be in accordance with UL Design selected.

3.3 TOLERANCES

- A. Variation from flat and level surface: 1/8 inch in 10 ft.
- B. Variation from plumb of grid members caused by eccentric loads: Two degrees (2°) maximum.

3.4 ADJUSTING AND PATCHING

- A. Replace damaged members of exposed suspension system. Replace ceiling board and tile that is damaged, installed improperly, or shows visible signs of sagging.

3.5 CLEANING

- A. After installation, clean soiled and discolored surfaces. Remove damaged units and replace with new.

END OF SECTION

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SECTION 09 65 00

RESILIENT FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Vinyl composition tile flooring, rubber base, and accessories.

1.2 SUBMITTALS

- A. Samples: Submit in accordance with SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES. Submit manufacturer's standard color samples of tile, not less than 3" x 3", full thickness. Submit samples of each accessory, full height or width by not less than 2" length.
- B. Concrete Slab Testing
1. Alkalinity and Adhesion Testing:
 - a. Submit result of pH tests.
 - b. Submit written documentation of acceptable pH levels of selected flooring manufacturer.
 - c. Submit letter from flooring manufacturer stating that floor alkalinity is acceptable and manufacturer will issue warranty.
 - d. Proceed with installation only after substrates pass testing.
 2. Relative Humidity Probe Tests:
 - a. Submit results for in situ relative humidity probe tests.
 - b. Submit date and time measurements were made.
 - c. Submit locations and depth of probe holes.
 - d. Submit temperature and relative humidity in each probe hole.
 - e. Submit ambient air temperature.
 - f. Acceptable relative humidity is typically 75% or less. Submit written documentation of tolerances for selected flooring manufacturer. Proceed with installation only after substrates have relative humidity percentage stated as acceptable by manufacturer.
 - g. Submit letter from flooring manufacturer stating that relative humidity is acceptable and manufacturer will issue warranty.
 3. Anhydrous Calcium Chloride Testing
 - a. Submit time and date of placement and retrieval.
 - b. Submit ambient air temperature and humidity during test duration
 - c. Submit manufacturer's instructions and relative technical data.
 - d. Acceptable moisture emission rates are typically 3 lbs. per 1000 sq. ft. or less, in 24 hours. Submit written documentation of tolerances for selected flooring manufacturer. Proceed with installation only after substrates have maximum moisture-vapor-emission rate as stated by manufacturer.
 - e. Submit letter from flooring manufacturer stating that floor moisture emission rates are acceptable and manufacturer will issue warranty.

1.3 DELIVERY

- A. Deliver floor materials to the project site in unbroken containers and cartons bearing the manufacturer's labels.
- B. Deliver resilient floor materials to an acclimatized building at least 36 hours prior to installation of vinyl composition tile and 48 hours for installation of rubber products.

1.4 PROJECT CONDITIONS

- A. Environmental Requirements: Maintain the temperature inside the building reasonably constant at not less than 65°F. for 48 hours before installation, during installation, and for 48 hours after installation.
- B. After installation, maintain temperatures within range recommended by manufacturer, but not less than 55°F. or more than 95°F.

1.5 WARRANTY

- A. Vinyl Composition Tile Warranty Terms: Standard 5-year manufacturer's warranty on defective materials. Reasonable labor costs will be reimbursed at 100% if the defect is reported within the first year of the

original purchase, and at 50% if the defect is reported within the second year of the original purchase. Labor costs will not be reimbursed if the defect is reported within the third, fourth, or fifth year of the original purchase.

- B. Rubber Base Warranty: Provide Standard 2-year manufacturers' warranty that materials is free from manufacturing defects.

1.6 MAINTENANCE

- A. Extra Materials: Upon completion of work, deliver to the project site not less than one box for each 50 boxes or fraction thereof, for each type, color, pattern, and size installed. Furnish maintenance materials from same manufactured lot as materials installed and enclose in protective packaging with appropriate identifying labels.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Luxury Vinyl Tile (15F-1): ASTM F 1700, Class 3, Type B, 6" x 48", Basis of Design is Highland Forest 6" as manufactured by Patcraft. Color as selected by Architect.
- B. Luxury Vinyl Tile (15F-2): ASTM F 1700, Class 3, Type B, 12" x 18", Basis of Design is Spacia Abstract & Stone as manufactured by Mannington Commercial. Color as selected by Architect.
- C. Luxury Vinyl Tile (15F-3): ASTM F 1700, Class 3, Type B, 24" x 24", Basis of Design is Typography Letterpress as manufactured by Patcraft. Color as selected by Architect.
- D. Rubber Base (14B): ASTM F 1861, Type TS (rubber, vulcanized thermoset), Style Cove (with top-set toe), 1/8" thick, 4" high, color(s) as selected by Architect. Furnish base in manufacturer's continuous rolls. Outside corners shall be factory formed pre-molded units matching base in color and finish. Product/manufacturer; one of the following:
 - Wallflowers® Premium Wall Base; Flexco
 - Baseworks™ Thermoset Rubber Wall Base; Johnsonite
 - Pinnacle Type TS Rubber Base; Roppe Rubber Corp.NO SUBSTITUTIONS
- E. Edge Strips: 1" wide by 1/8" thick rubber tile reducer with beveled surface.
- F. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement based or blended hydraulic cement based formulation provided or approved by vinyl composition tile manufacturer.
- G. Adhesive: Moisture-resistant type recommended by flooring manufacturer.
- H. Cleaner: Neutral, chemical cleaner such as Hillyard "Super Shine-All" designed to be safe to use on any surface not damaged by water.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive resilient flooring, base, and accessories for conditions that will adversely affect the execution and quality of work. Do not start this work until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Testing of concrete slabs
 - 1. Anhydrous Calcium Chloride Testing
 - a. Conduct anhydrous calcium chloride testing per ASTM F1869, modified to include testing over concrete containing lightweight aggregate.
 - b. Environmental requirements of area to be tested are to match that of the finished floor covering. Doors, windows, roofing, etc. must be installed and the temperature of the building controlled to a finished building atmosphere. Ensure interior building climate is 75 degrees F ± 10 degrees F and 50% Relative Humidity ± 10% for 72 hours prior to, and throughout the duration of the tests.

- c. The number of test kits required is determined by the square footage of areas scheduled to receive finish flooring. A minimum of three test kits are required in the first 1,000 sq. ft. a minimum of one test kit per each additional 1,000 sq. ft. with consideration given to separation of test areas. Time of exposure is a minimum of 60 hours and a maximum of 72 hours.
 - d. A prepackaged calcium chloride test kit is equipped with a sealed dish of anhydrous calcium chloride, a metering dome with gasket and instructions.
 - 1) Clean substrate in area to be tested by removing dust solvent, paint, wax, oil, grease, residual adhesive, adhesive removers, curing, sealing, hardening, or parting compounds, alkaline salts, excessive carbonation, or laitance, mold mildew and other foreign materials.
 - 2) Weigh the tape sealed dish on a gram scale with 1/10th gram gradation. Record start weight, date and time on dish's label and instruction document.
 - 3) Unseal dish and expose test according to preprinted test kit instructions.
 - 4) Allow 60 to 72 hours of exposure. Retrieve test dish re-seal and re-weigh according to instructions.
 - 5) Provide a diagram of the building, with calculations, documenting each test location with its results in writing.
 - e. Acceptable moisture emission rates are typically 3 lbs. per 1000 sq. ft. or less, in 24 hours; however, submit written tolerances for selected flooring manufacturer. Proceed with installation only after substrates have maximum moisture-vapor-emission rate as stated by manufacturer.
 - f. Submit letter from flooring manufacturer stating that floor moisture emission rates are acceptable and manufacturer will issue warranty.
2. In Situ Relative Humidity Probe Test:
- a. Conduct in situ relative humidity probe testing per ASTM F2170.
 - b. Concrete floor slabs shall be at the service temperature and the occupied air space above the slab shall be at the service temperature service relative humidity for at least 48 hours before taking relative humidity measurements in the concrete slab.
 - c. Perform 3 tests for the first 1,000 sq/ft. and a minimum of 1 test for every 1,000 sq/ft. thereafter.
 - d. For slabs on-grade and below-grade choose a testing location within 3 feet of each exterior wall.
 - e. Drill probe holes 40% into depth of slab for slabs drying from the top only and 20% into the slab for slabs drying from top and bottom.
 - f. Remove dust from hole using vacuum cleaner and allow 72 hours to achieve moisture equilibration within hole before taking relative humidity measurements.
 - g. After inserting probe allow necessary amount of time for probe to reach temperature equilibrium before measuring relative humidity.
 - h. Use the relative humidity probe to measure the ambient air temperature and relative humidity above the slab in the vicinity of the hole.
 - i. Proceed with installation only after substrates pass testing.
 - j. Submit letter from flooring manufacturer stating that floor relative humidity percentage is acceptable and manufacturer will issue warranty.
3. Alkalinity and Adhesion Testing
- a. Conduct pH test per ASTM F710.
 - b. Test for alkalinity prior to installation of flooring materials.
 - c. pH levels shall not exceed the written recommendation of the flooring manufacturer and the adhesive manufacturer.
 - d. A pH range of 5-9 is optimum, not to exceed 9 pH. Submit written acceptable pH levels of selected flooring manufacturer.
 - e. Proceed with installation only after substrates pass testing.
 - f. Submit letter from flooring manufacturer stating that floor alkalinity is acceptable and manufacturer will issue warranty.
- B. Concrete Substrates: Prepare according to ASTM F 710.
1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners. Surfaces shall be clean and dry before flooring is laid.
 2. Remove substrate coatings 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.
 3. Sweep the surfaces free of dust and dirt and remove oil, grease, paint, dried mortar and curing compound residue.
 4. Fill low spots, cracks, minor holes and crevices in concrete floors with latex underlayment patching material. Re-surface rough and irregular surfaces with the same underlayment material.

3.3 INSTALLATION

A. Laying Flooring:

1. Install floor tile in straight joint pattern as directed and in conformance with the manufacturer's recommended procedure.

2. Start at centerlines of spaces and adjust borders to maintain full tiles in the field and equal borders. Except as required in irregularly shaped areas, no tile shall be less than one-half the width of field tile, and in no event shall any tile piece be less than 3" wide.
 3. Install tile to square grid pattern with all joints aligned, with pattern grain alternating with adjacent unit to produce basket weave pattern. Allow minimum 1/2 full size tile width at room or area perimeter. Lay tile starting at center of room working toward walls, square with room axis. Joints shall be tight butt joints, true to line.
 4. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.
 5. Install edge strips at unprotected or exposed edges and where flooring terminates.
 6. Bed tile firmly and maintain joints tight, straight, and square with the room axes. The completed surfaces shall be free of buckles, waves, and projecting tile. Scribe tiles neatly at columns, corners, and casework.
 7. Where flooring edges are not concealed by thresholds or other materials, install rubber edge strips.
- B. Applying Rubber Base:
1. Install coved base after the floor tile, mat, and carpet have been laid. Do not use less than manufacturer's continuous rolls, except where required for last piece in any one run of wall length.
 2. Apply base with adhesive covering 100% of the back surface, not just in spots. Apply adhesive with a notched trowel. Use headless brads in addition to adhesive where required. Use preformed outside corners and miter inside corners. Joints shall be tight.
 3. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.

3.4 PROTECTION

- A. Prohibit traffic on floor finish for 48 hours after installation.
- B. Repair or replace damaged surfaces that are soiled or scarred in a manner acceptable to the Owner.

3.5 CLEANING

- A. Clean in accordance with Section 01 74 13 - PROGRESS CLEANING.
 1. Remove excess adhesive and other foreign matter from tile flooring and base.
 2. Scrub floor with cleaner in conformance with manufacturer's instructions and rinse.
 3. Replace defective or loose material.

END OF SECTION

SECTION 09 91 00

PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: On-the-job painting and finishing of exterior and interior surfaces.
1. Included: Paint and finish the following materials, fittings, and equipment items which are exposed-to-view.
 - a. Iron, steel, and galvanized metal.
 - b. Wood.
 - c. Concrete masonry units.
 - d. Interior concrete ceiling and beam surfaces.
 - e. Gypsum board.
 - f. Interior caulked joints.
 - g. Portland cement plaster.
 - h. Bare and insulation covered piping and ductwork, conduit, hangers, grilles and registers, and primed metal surfaces and factory-finished surfaces of mechanical and electrical equipment.
 2. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels, including the following:
 - a. Factory-finished metal lockers and finished light fixtures.
 - b. Architectural aluminum and stainless steel.
 - c. Interior concrete floors and steps and all exterior concrete.
 - d. Acoustic panel ceilings, unless noted on drawings.
 - e. Pre-finished cabinets.
 - f. Operating parts: Moving parts of operating mechanical and electrical equipment, such as: valve and damper operators, linkages, sensing devices, motor and fan shafts
 - g. Labels: UL, FM, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.
 3. Contractor shall examine the drawings for mechanical and electrical work, and all materials installed throughout the building which require painting shall be painted under this section of the specifications.
- B. Related Sections:
1. Section 05 50 00 - Metal Fabrications: shop priming of metal fabrications.

1.2 SYSTEM DESCRIPTION

- A. For purposes of this painting specification, the following areas and spaces are not considered finished, occupied areas and there will be no painting therein except for doors and frames and as may be specifically scheduled in article paint schedule.
1. Mechanical chases.
 2. Spaces above suspended ceilings.

1.3 SUBMITTALS

- A. Samples:
1. Submit in accordance with SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
 2. Submit two 8-1/2" x 11" samples of each paint color scheduled on the color schedule prepared by the Architect. Samples shall be on heavy cardboard and shall be made with the actual mixed paints to be used on the project.
 3. Samples for Initial Selection of each type of texture finish product.
- B. Paint Schedule: If painting materials other than those specified are proposed for use, submit a complete schedule of the materials to be substituted. This schedule, in triplicate, shall be in the same form as the paint schedule included in this section, and shall list materials by manufacturer, brand name, and type for each surface to be finished.
- C. Federal law requires renovation firms (including sole proprietorships) to be certified and requires individuals to be trained in the use of lead-safe work practices. Contractors who perform renovation, repairs, and painting jobs shall:
1. Provide a copy of your EPA lead training certificate.

2. Show what lead-safe methods you will use to perform the job.
 3. Provide references from at least three recent jobs involving projects before 1978.
 4. Keep records to demonstrate that you and your workers have been trained in lead-safe work practices and that you follow lead-safe work practices on the job.
- D. Close-out Schedule: Upon completion of work, furnish a full schedule of paint types and colors actually used and formulas for each to the Owner.

1.4 QUALITY ASSURANCE

- A. Product Manufacturer: Company specializing in manufacturing quality paint and finish products with 3 years' experience.
- B. Applicator: Company specializing in commercial painting and finishing with 2 years' experience.
- C. Product Labels: Include manufacturer's name, type of paint, stock number, color and label analysis on label of containers.
- D. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as final coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.
- E. V.O.C. (Volatile Organic Compound) Compliance: Products listed in the schedules and/or substitutes proposed for use by Contractor must be formulated to meet all applicable ordinances and regulations regarding maximum V.O.C. content. Utilize products which have been specially formulated to meet such requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials in original containers with seals unbroken and labels intact.
- B. Storage: Contractor shall designate a specific space at the project site for storing and mixing materials. Protect this space and repair all damage resulting from use. Do not store kerosene nor gasoline in this space. Remove oily rags at the end of each day's work.

1.6 PROJECT CONDITIONS

- A. Environmental Requirements: Maintain the temperature inside the building at not less than 60°F. during painting and finishing.
- B. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 65°F. for 24 hours before, during, and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.
- C. Minimum application temperatures for latex paints: 45°F. for interiors; 50°F. for exterior; unless required otherwise by manufacturer's instructions.
- D. Minimum application temperature for varnish and finishes: 65°F. for interior or exterior, unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft.-candles measured mid-height at substrate surface.
- F. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85%; or to damp or wet surfaces; unless otherwise permitted by the paint manufacturer's printed instructions. Painting may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified during application and drying periods of 24 hours between coats and 72 hours after final coat.
- G. Protection: Provide sufficient drop cloths to fully protect adjacent finished work.

1.7 PRECAUTIONS

- A. Do not store paints, oils, thinners and other flammable items inside the building. They shall be stored in approved containers when not in actual use during the painting job. The fire hazard shall be kept at a minimum.
- B. Take precautions to protect the public and construction workers during the progress of the work.
- C. Furnish a temporary fire extinguisher of suitable chemicals and capacity, located near flammable materials.

1.8 MAINTENANCE

- A. Extra Materials: Upon completion of the work, deliver to project site 2 gallons of each type and color of paint applied to interior and exterior surfaces. Provide formula for custom match colors.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Provide paint as manufactured by one of the following:
 - Kelly-Moore Paint Co. (<http://www.kellymoore.com>)
 - PPG Paints (<http://www.ppgpaints.com>)
 - The Sherwin-Williams Co. (<http://www.sherwin.com/default.asp>)
- B. Materials described are based on the specifications of the above listed manufacturers, and are given to designate the quality of materials required. Materials of best quality grade are representative of the standard of quality required. Materials not displaying manufacturer's identification as a first line, best-grade product will not be acceptable.
- C. Colors: The Architect will prepare a color schedule. Regardless of which brand of paint is selected for use the Contractor shall intermix and blend as required to obtain an exact match to each color on the color schedule.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and substrate conditions are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report to Architect any condition that may potentially affect proper application.
- C. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Gypsum wallboard: 12 percent.
 - 2. Interior located wood: 15 percent, measured in accordance with ASTM D 4442.
 - 3. Concrete: 12 percent.
 - 4. Masonry: 12 percent.
 - 5. Plaster: 12 percent
- D. Test shop-applied primers for compatibility with subsequent cover materials.
- E. Perform the following Test procedure prior to painting. This will determine if Passivators exist on galvanized metal. This procedure is not necessary on galvanized metal with G 90 Paint Grip.
 - 1. Prepare a solution by dissolving 20 grams of copper sulfate in one liter (1000 grams) of water. Copper sulfate crystals may be purchased at most drug stores.
 - 2. Solvent wash a small area per the procedure of SSPC-SP1.
 - 3. Sand a small washed area using emery cloth.
 - 4. Using a cotton swab saturated with the copper sulfate solution, apply a swipe to both sanded and unsanded washed areas.
 - 5. If the sanded and unsanded surfaces turn black at the same time and that time is less than 10 seconds, there is no passivation on the surface other than light oil, and a normal degreasing/cleaning operation is

sufficient preparation prior to the coating application. If the unsanded surface turns slower than the sanded surface, or not at all, a passivator of some type is present on the surface. If neither surface turns, the surface is probably an alloy of zinc or some other metal.

6. If the galvanized steel has been treated or passivated, the treatment or passivator must be removed by brush blasting. If this method is prohibited by environmental regulations, then chemical etching with Amchem's GALVAPREP SG-3 will be acceptable, if previously approved by the Architect. The chemical etching manufacturer's procedures should be followed carefully.
 7. If the surface is determined to be an alloy by this test procedure, notify Architect and adhesion tests of the proposed coating applied over the proposed surface preparation must be conducted.
 8. If no passivators are present, wash galvanized metal surfaces with mineral spirits to remove residual grease and oil.
- F. Beginning of installation means acceptance of existing surfaces and substrate.

3.2 PREPARATION

- A. Perform preparation and cleaning procedures in accordance with coating manufacturer's instructions for each substrate condition.
- B. Fill open joints, cracks and crevices on steel buck frames with metal putty and sand smooth before painting.
- C. Sand woodwork surfaces smooth before priming.
- D. Coat pine knots and pitch streaks with shellac before painting.
- E. Putty nail holes after the prime coat.
- F. Remove hardware and accessories, plates, lighting fixtures and similar items which are not to be finish-painted or provide adequate surface-applied protection for these items in place.
- G. Uncoated steel and iron surfaces: Remove grease, scale, dirt, and rust. Where heavy coatings of scale are evident, remove by wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
- H. Shop primed steel surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.

3.3 APPLICATION

- A. Workmanship shall be of the highest quality. Mix and use paint materials in accord with the manufacturer's directions. Spread materials evenly, flow smoothly, and brush out without sags or runs.
- B. Provide finish coats which are compatible with primer paints used. Provide barrier coats over incompatible primers where required.
- C. When undercoats, stains or other conditions show through final paint coat, apply additional coats until paint film is of uniform color and sheen.
- D. Finish the insides of wood cabinets, including backs of cabinet doors, as scheduled for the fronts and ends.
- E. Between coats, sand enamel and lacquer finish on wood and metal surfaces to produce a smooth, even finish. Use #220 grit sandpaper or finer.
- F. Tint priming coats and undercoats to approximate shade of final coat to assure uniformity of color in the finish. Touch up suction spots and "hot spots" before applying the last coat to produce an even result in the finish coat.
- G. Exposed ductwork, piping and conduit in finished, occupied areas shall be painted the same color as the wall or ceiling against which it is installed, unless otherwise noted.
- H. Apply the finish coat on gypsum board, plaster, and concrete surfaces with rollers.

- I. On concrete masonry unit wall surfaces without a block filler, apply the first coat of paint with a spray gun.

3.4 TOUCH UP AND CLEAN

- A. Touching Up: On completion, carefully touch up all holidays, marred and damaged spots, and work over all surfaces that have been repaired by other trades.
- B. Cleaning: Remove spilled, splashed, and splattered paint from all surfaces. Do not mar surface finish of item being cleaned.
- C. Reinstall the items removed under the provisions of paragraph above.

3.5 RE-PAINTING

- A. Locations and Extent: The re-painting of existing surfaces shall be as follows:
 - 1. Painted wall, door and frame surfaces which have been reworked, cut into or patched, whether specifically designated on the drawings or not. Re-painting shall include all openings in existing walls.
 - 2. Entire rooms/areas, as designated on the drawings.
- B. Colors: Match existing colors of corresponding surfaces except where new colors are scheduled.
- C. Preparation:
 - 1. Clean surfaces to remove dust and dirt. Remove oil, grease, wax, loose paint, mill scale dirt, foreign matter, rust, mold, mildew, mortar, efflorescence, and sealers and other contaminants which would inhibit paint bonding to the old paint.
 - 2. Remove rust and loose and flaking paint by scraping and sanding.
 - 3. Glossy surfaces of old paint films must be clean and dull before repainting. Thorough washing with an abrasive cleanser will clean and dull in one operation, or wash thoroughly and dull by sanding.
 - 4. Spot prime any bare areas with an appropriate primer in conformance with the following paint schedule for new work.
 - 5. Check for compatibility by applying a test patch of the recommended coating system, covering at least 2 to 3 Sq.Ft. Allow to dry one week before testing adhesion per ASTM D 3359. If the coating system is incompatible, complete removal of existing finish is required.
- D. Painting: Generally, apply one coat of finish paint over old surfaces, using the same materials scheduled in the paint schedule for like new surfaces.
- E. Verification: Verify the extent of re-painting work at the building and make due allowance for cutting and patching required for installation of mechanical and electrical work.

3.6 PAINT SCHEDULE

- A. The products listed below represent top of the line products of each manufacturer. These products are not presented as being equivalent, as there are too many variables to match each product across the board. Manufacturer's designations are:
 - KM Kelly-Moore Paint Co.
 - PPG Pittsburgh Paints
 - SW The Sherwin-Williams Co.
- B. Interior Metal
 - 1. Steel door frames, borrowed light frames, louvers and vision panel frames in doors and hollow metal doors.
 - 1 primer coat
 - KM 1710--Kel-Guard Zinc Chromate Red Oxide Primer
 - PPG Red Inhibitive Steel Primer, 6-208
 - SW Kromik Metal Primer E41N1
 - 2 finish coats
 - KM 1630--Kel-Cote Alkyd Semi Gloss Enamel
 - PPG Speedhide 6-1110
 - SW ProMar 200 Alkyd Semi-Gloss Enamel, Series B34 W 200

2. Grilles, diffusers and registers in walls and ceilings.
 - 1 finish coat
 - KM 1620--Kel-Cote Alkyd Eggshell Enamel
 - PPG Speedhide Alkyd Lo-Sheen, 6-90
 - SW ProMar 200 Alkyd Eg-Shel Enamel, Series B33 W 200
 3. Other exposed iron and steel.
 - 1 primer coat
 - KM 1711--Kel-Guard White Rust-Inhibitive Primer
 - PPG Speedhide Inhibitive Steel Primer, 6-208
 - SW Kem Kromik Metal Primer, B50 W 1
 - 1 finish coat
 - KM 1620--Kel-Cote Alkyd Eggshell Enamel
 - PPG Speedhide Alkyd Lo-Sheen, 6-90
 - SW ProMar 200 Alkyd Eg-Shel Enamel, Series B33 W 200
 4. Metal ductwork, hangers, supports and brackets.
 - 1 primer coat
 - KM 1722--Kel-Guard Galvanized Iron Primer
 - PPG Speedhide White Galvanized Steel Primer, 6-209
 - SW Galvite Paint, B50 WZ30
 - 1 finish coat
 - KM 1620--Kel-Cote Alkyd Eggshell Enamel
 - PPG Speedhide Alkyd Lo-Sheen, 6-90
 - SW ProMar 200 Alkyd Eg-Shel Enamel, Series B33 W 200
 5. Items of mechanical and electrical machinery and equipment.
 - 1 finish coat
 - KM 1700--Kel-Guard Rust Inhibitive Enamel
 - PPG Int/Ext Industrial Gloss Alkyd, 7-282 Series
 - SW Industrial Enamel, Series B54
- C. Interior Wood
1. Inside of cabinet drawers.
 - 1 finish coat clear satin polyurethane
- D. Interior Masonry
1. Concrete masonry unit walls scheduled to have Epoxy Paint.
 - 1 filler coat
 - KM 521--Acrylic Block Filler
 - PPG Pitt-Glaze Int/Ext Latex Block Filler 16-90
 - SW Heavy Duty Block Filler, B42 W 46
 - 2 finish coats
 - KM Kel-Guard Acrylic Epoxy - Semi-Gloss
 - PPG Auquapon WB Waterborne Semi-Gloss Epoxy coating
 - SW Water-Based Catalyzed Epoxy, Semi-Gloss Hardener
 2. Concrete masonry unit walls in Mechanical Rooms.
 - 2 finish coats
 - KM 1650--Acry-Plex Latex Semi-Gloss Enamel
 - PPG Speedhide Interior Acrylic Latex Semi-Gloss Enamel, 6-510 Series
 - SW Pro-Mar 200 Latex Semi-Gloss, B31 W 200
 3. Other concrete masonry unit walls.
 - 1 filler coat
 - KM 521--Acrylic Block Filler
 - PPG Pitt-Glaze Int/Ext Latex Block Filler 16-90
 - SW Heavy Duty Block Filler, B42 W 46
 - 2 finish coats
 - KM 1650--Acry-Plex Latex Semi-Gloss Enamel
 - PPG Speedhide Interior Acrylic Latex Semi-Gloss Enamel, 6-510 Series
 - SW Pro-Mar 200 Latex Semi-Gloss, B31 W 200

E. Gypsum Wallboard

1. Gypsum board walls scheduled to have Epoxy Paint.
 - 1 primer coat - fine sanded texture
 - KM 970--Acry-Plex Hi-Hide Vinyl Wall Sealer
 - SW ProMar 200 Latex Wall Primer, B28 W 200
 - 2 finish coats
 - KM 1790 Kel-Guard Acrylic Epoxy
 - PPG Aquapon WB Waterborne Gloss Epoxy Coating 98-1 Series
 - SW Water-Based Catalyzed Epoxy, Series B70, Gloss Hardener
2. All other gypsum board walls.
 - 1 texture coat
 - USG Multi-Purpose Texture - sprayed splatter light finish texture
 - PPG Speedhide Acrylic Texture Coating, light 4-50
 - 1 primer coat
 - SW PrepRite 200 Latex Wall Primer B28W200 or approved equivalent
 - 2 finish coats
 - KM 1650--Acry-Plex Latex Semi-Gloss Enamel
 - PPG Speedhide Interior Semi-Gloss Latex Enamel 6-510 Series
 - SW Pro-Mar 200 Latex Semi-Gloss, B31 W 200

F. Interior Caulked Joints

1. Caulking
 - 2 finish coats
 - KM 1650--Acry-Plex Latex Semi-Gloss Enamel
 - PPG Speedhide Interior Semi-Gloss Latex Enamel 6-510 Series
 - SW Pro-Mar 200 Latex Semi-Gloss, B31 W 200

END OF SECTION

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SECTION 10 14 00

IDENTIFYING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Room identification signs.
- B. Related Sections:
 - 1. Section 01 21 00 - Allowances.

1.2 SUBMITTALS

- A. General: Submit in accordance with SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples: Submit manufacturer's complete line of color samples, 1" x 3", for initial color selection.
- C. Invoices: Submit certified copies of invoices indicating description and quantity of signs delivered and installed.
- D. Template: Submit full-size template drawing for approval of aluminum letter size, stock, spacing, anchorage devices, etc.

1.3 PRE-INSTALLATION CONFERENCE

- A. Pre-installation Meeting: Contractor shall schedule a pre-installation meeting at the project site with the Architect, Contractor and building letter installer for approval of template field layout prior to beginning of installation.

1.4 QUALITY ASSURANCE

- A. Interior signs shall be provided by a single source with at least five years' experience successfully providing signs of similar type and scope.
- B. Signs shall comply with the Texas Accessibility Standards (TAS) and other laws and ordinances of authorities having jurisdiction. Braille shall be Grade II, having dimensions as required to meet TAS.

1.5 PACKING, DELIVERY, AND STORAGE

- A. Deliver components correctly packaged to prevent damage. Pack modules and back-up plates unassembled to allow for mechanical mounting of backplate to wall with concealed fasteners.
- B. Individually and clearly identify each sign number, type, location to be installed, mounting instructions, and other pertinent information.

PART 2 - PRODUCTS

2.1 INTERIOR IDENTIFICATION GRAPHICS

- A. Provide room identification signs as selected by Architect by allowance.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Identification Graphics:

1. On hard surfaces (i.e. ceramic tile, masonry, or plastic laminate), install room identification signs plumb and square with the "Tuff-bond" silicone adhesive furnished by the manufacturer (foam tape is not allowed).
2. On painted gypsum wallboard or vinyl wallcovering, install room identification signs on backing plates with the "Tuff-bond" silicone adhesive furnished by the manufacturer (foam tape is not allowed).
 - a. The backing plate shall be 1/8" thick and shall be the same size as the face panel.
 - b. Screw the backing panel into molly bolts in the wall with two countersunk, flathead screws.
3. Tactile characters on signs shall be located 48 inches minimum above the finish floor or ground surface, measured from the baseline of the lowest tactile character and 60 inches maximum above the finish floor or ground surface, measured from the baseline of the highest tactile character.
4. Unless noted otherwise, install signs on latch side of the door such that clear floor space of 18 inches minimum by 18 inches minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45 degree open position.
5. Installation shall comply with ADA requirements.
6. For signs mounted on glass, install matching coverplate on opposite side of glass and aligned with the sign.

3.2 CLEANING

- A. On completion, clean exposed surfaces and leave free of defects.
- B. Do not use abrasives.

3.3 COORDINATION

- A. Contractor shall coordinate the installation of the identifying devices with other trades involved in the project.

3.4 DAMAGE

- A. An identifying device which is scratched or defaced will be rejected.

END OF SECTION

SECTION 10 22 19

DEMOUNTABLE PARTITIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Provide new demountable gypsum board panels in demountable partition framing system.
2. Provide new demountable glass panels in demountable partition framing system.

B. Related Requirements:

1. Section 08 14 23 - Plastic Laminated-Faced Wood Doors: fire-rated doors and non-rated doors.
2. Section 08 80 00 - Glazing.
3. Division 26 Sections for electrical service, wiring, and connections within partitions.
4. Division 27 Sections for voice and data communication service, wiring, and connections within partitions.

1.2 PRE-INSTALLATION MEETINGS

- A. Pre-demolition Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

B. Shop Drawings: For demountable partitions.

1. Include plans, elevations, and sections; attachment details at floors, columns, permanent partitions, and ceilings; and method of disassembly, transport and erection.
2. Include diagrams for power-, signal-, and control-wiring raceways; and details of access to raceways.

- C. Samples: For each exposed product and for each color and texture specified, in manufacturer's standard sizes.

D. Samples for Initial Selection: For each type of exposed finish.

1. Include Samples of hardware and accessories involving color or finish selection.

E. Samples for Verification: For each type of the following products:

1. Face-Panel Finish: Manufacturer's standard-size unit, but not less than 6 inches square.
2. Linear Trim: 12-inch-long Samples.
3. Glazing: Manufacturer's standard-size unit, but not less than 3 inches square.
4. Hardware and Accessories: Whole units.

1.4 INFORMATIONAL SUBMITTALS

- A. A. Coordination Drawings: Reflected ceiling plans and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from the installers of the items involved.

1. Suspended-ceiling components and dimensioned ceiling-grid layout.
2. Locations of fixed door and window mullions.
3. Bracing and related structural members.
4. Ductwork above ceiling.

- B. Product Certificates: For each type of demountable partition.

- C. Product Test Reports: For each type of demountable-partition assembly, for tests performed by manufacturer and witnessed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For demountable partitions to include in maintenance manuals.

1.6 FIELD CONDITIONS

- A. Removal and processing of existing partitions shall occur prior to the demolition of surrounding finishes and sub-structures.
- B. Finished Spaces: Do not return or install demountable partition system until finishes in spaces to receive system are complete, including suspended ceilings, floors, carpeting, and painting.
- C. Field Measurements: Indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Requirements for Demountable Partitions: Provide demountable-partition system that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25.
 - 2. Smoke-Developed Index: 450.
- C. Structural Performance: Provide demountable partitions capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Load-Bearing Capacity: Not less than 2.3-lb/linear inch distributed proof load when tested according to BIFMA X 5.6.
 - 2. Transverse-Load Capacity: Lateral deflection of not more than 1/240 of the overall span when tested under a uniformly distributed load of 5 lb/sq. ft. according to ASTM E 72.

*** not for glass***

- D. Acoustical Performance: Where acoustical rating is indicated, provide demountable-partition assembly tested by a qualified testing agency for sound transmission loss performance according to ASTM E 90, calculated according to ASTM E 413, and rated for not less than the 35 STC value without acoustical insulation and rated not less than 45 STC value with 2 1/2-inches of acoustical insulation.

2.2 SITE-ASSEMBLED DEMOUNTABLE PARTITIONS

- A. General: Site-assembled, nonprogressive, demountable-partition assembly and components that are the standard products of manufacturer.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Gravity Lock Systems, Inc.
 - b. Steelcase, Inc.
- B. Face Panels:
 - 1. Manufacturer's standard vinyl faced gypsum board.
 - 2. Thickness: Manufacturer's standard.
 - 3. Panel Widths: Modular, as selected by Architect from manufacturer's standard widths, except for required filler panels.
 - 4. Facing: Factory primed for field painting. Color, texture, and pattern as selected by Architect from manufacturer's full range.
- C. Trim: Continuous, factory-finished, snap-on type; adjustable for variations in floor level.
 - 1. **Trim Material: Aluminum trim with PVC snap-on trim at battens, base, ceiling trim and corners.**
 - 2. Panel Joints: Butt joints without trim.
 - 3. **Outside Corner Trim: Square**
 - 4. **Base Profile: Projected**
 - 5. **Ceiling Trim Profile: Projected.**
 - 6. Cornice Trim: Continuous over tops of partial-height units for maximum stability.
 - 7. **Exposed-Metal Trim Finish: Clear-aluminum or Color-anodized trim as selected by Architect to match existing school aluminum.**

- D. Door Frames: Manufacturer's standard aluminum frames for 1-3/4-inch doors, reversible, factory mortised to receive hardware.
 - 1. Frame Finish: Factory-applied anodized finish as selected by Architect.
- E. Hardware: As specified in Division 08 Section "Door Hardware".
- F. Glazing Frames: Manufacturer's standard aluminum frames for glazing thickness indicated.
 - 1. Frame Finish: As selected by Architect.
- G. Seals: Manufacturer's standard.
- H. Electrical Devices: Integral, concealed raceways to serve electrical power and communication devices indicated on Drawings.
 - 1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a qualified testing agency, and marked for intended location and application.

2.3 FABRICATION

- A. General: Fabricate demountable walls for installation with concealed fastening devices and pressure-fit members that will not damage ceiling or floor coverings. Fabricate systems for installation with continuous seals at floor, ceiling, and other locations where partitions abut fixed construction.
- B. Panels for Site-Assembled Demountable Partitions: Face panels fabricated and finished in modular widths indicated.
- C. Wiring: Conceal conductors and cables in raceways. Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.

2.4 OTHER MATERIALS

- A. Gypsum Board: ASTM C 1396/C 1396M.
- B. Adhesives: As recommended by demountable-partition manufacturer and with a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Acoustical Batt Insulation: Refer to Section 07 21 00 - BUILDING INSULATION for acoustical insulation installed at all demountable partitions.

2.5 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, Class I, 0.018 mm or thicker over a nonspecular as fabricated mechanical finish.
- B. Color Anodic Finish: AAMA 611, Class I, 0.018 mm or thicker over a nonspecular as fabricated mechanical finish.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install demountable partitions after other finishing operations have been completed.
 - 1. Install partitions rigid, level, plumb, and aligned. Install seals at connections with floors, ceilings, fixed walls, and abutting surfaces to prevent light and sound transmission.

2. Broken, cracked, chipped, deformed, or unmatched panels and components are not acceptable.
 3. Except for filler panels scribed to fixed walls or columns, do not modify manufacturer's standard components.
- B. Suspended-Ceiling System: Make alterations to suspended-ceiling system required by partition installation or to gain access to electrical or communication systems without affecting the structural integrity of suspended-ceiling system. Make alterations so they are not noticeable after panel installation.
- C. Doors and Frames: Install door-and-frame and glazing-and-glazing-frame assemblies securely anchored to partitions and with doors aligned and fitted. Install and adjust door hardware for proper operation.
1. Install fire-rated door frames according to NFPA 80.

3.2 ERECTION TOLERANCES

- A. Install each demountable partition so surfaces vary not more than 1/8 inch from the plane formed by the faces of adjacent partitions.

3.3 ADJUSTING

- A. Inspect installation, correct misalignments, and tighten loose connections.
- B. Adjust doors to operate smoothly and easily, without binding or warping.
- C. Check and readjust operating hardware. Verify that latches and locks engage accurately and securely without forcing or binding; lubricate as recommended by manufacturer.
- D. Clean soiled surfaces to remove dirt, fingerprints, adhesives, and other foreign materials according to manufacturer's written instructions.
- E. Remove and replace defaced or damaged components [that cannot be satisfactorily repaired].
- F. Remove and replace components that are wet, moisture damaged, or mold damaged.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain demountable partitions.

END OF SECTION

SECTION 10 99 00

MISCELLANEOUS SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Knox Box.
- B. Related Sections:
 - 1. Section 06 10 00 - Rough Carpentry; blocking.

1.2 SUBMITTALS

- A. General: Submit following items in accordance with SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Product Data: Include complete manufacturer's catalog cuts and data sheets, complete parts list, installation requirements, and all pertinent performance characteristics and criteria.
- C. Shop Drawings: Indicate materials, construction, sizes, quantities, finishes, and installation details.

1.3 QUALITY ASSURANCE

- A. Products: Provide products of the same manufacturer throughout the project.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, handle, and protect products in accordance with SECTION 01 65 00 - PRODUCT DELIVERY REQUIREMENTS and SECTION 01 66 00 - PRODUCT STORAGE AND HANDLING REQUIREMENTS.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Knox Box: Fire/Rapid Entry System as manufactured by The Knox Company.
 - 1. Model 3200 RTS with 3200 RMK Recessed Mounting Kit.
 - 2. Model 3200, surface mounted.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare substrate surfaces as recommended by manufacturer.

3.2 EXAMINATION

- A. Verify that surfaces and conditions are ready to receive work of this Section.
- B. Notify Architect of any existing conditions which will adversely affect execution.
- C. Beginning of execution will constitute acceptance of existing conditions.

3.3 INSTALLATION

- A. Knox Box:
 - 1. Surface Mounted:
 - a. Mount the Knox Box unit with the yellow mounting marker pointing up so that the small moisture drain hole is on the bottom side.

- b. Use a small level to plumb the box square.
 - c. Use at least 4 mounting fasteners (Carriage Bolts, etc.) of 5/16" diameter, bolting completely through solid, secure wall. The Knox Box unit may also be welded in place. NOTE: Do not mount unit on drywall, plywood, pressboard or any other limited strength materials.
 - d. To install door, first attach retaining chain through the hole in the chain tab on the back side of the door and close link with pliers. Door should be inserted bottom side first so that tail piece fits over bottom of door frame. Top of door will now swing shut.
2. Recessed Mounting:
- a. The Mounting Kit may be set in place during construction of the masonry wall. Care should be taken to insure that the front of the shell housing, including the cover plate and screw heads, are flush with the finish wall. The shell housing should be plumbed with a level. Leave cover and screws in place until the KNOX-BOX unit is ready to be mounted inside. The five (5) mounting studs may be replaced with bolts or longer studs if required. Do not over tighten mounting nuts, as they may distort the outside flange. With the housing held firmly in place, drill two (2) 1/8" holes through the form wall and the housing front cover. Insert screws and pull housing tight against the form wall. Remove screws before removing form.
 - b. Model 3200-RTS is shipped with a door tamper switch mounted in place. Before mounting, carefully remove the door tamper switch and set aside. This will give clear access to inside mounting holes. Do not allow the upper right-hand fastener to extend too far into the box so as to interfere with the door tamper switch. Push-On type terminals are supplied for connection to tamper switch. Tamper switch can be connected for either open or close circuits.

3.4 ADJUSTING

- A. Adjust and fit items to be flush with adjacent construction.
- B. Fasten or adhere for tight connections and joints.

3.5 PROTECTION

- A. Protect the completed work from damage. Replace damaged items which cannot be repaired. Protect finished installation in accordance with SECTION 01 66 00 - PRODUCT STORAGE AND HANDLING REQUIREMENTS.

3.6 CLEANING

- A. Upon completion of the building, clean area. Leave free of defects and in ready-to-use condition.
- B. Perform final cleaning in accordance with SECTION 01 74 13 - PROGRESS CLEANING.

END OF SECTION

SECTION 11 31 00

APPLIANCES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Appliances.
- B. Related Sections:
 - 1. Section 12 32 16 - Manufactured Plastic-laminate-clad Casework
 - 2. Division 22 - Plumbing: plumbing rough-in.
 - 3. Division 26 - Electrical: electrical rough-in.

1.2 SUBMITTALS

- A. General: Submit in accordance with SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
- B. Product Data: Include list of optional features, operating characteristics, and dimensions of individual appliances.
- C. Operating and Maintenance Manuals: Provide per SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA.
- D. Shop Drawings: Submit rough-in drawings showing dimensioned locations of electrical and plumbing stub-outs for appliances.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements: Provide electrical components required as part of appliances that are listed and labeled by UL and that comply with applicable NEMA standards.
- B. Accessibility Standards: Where appliances are required to comply with accessibility requirements, comply with Texas Accessibility Standards (TAS).

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Appliances shall be of the quality manufactured by **U-Line Corp.** and are listed by U-Line catalog numbers for convenience in identification. The use of a catalog number as a description of an item shall be taken to include the description or specification for the item in the manufacturer's catalog. Equivalent items of the following manufacturers are acceptable:

- Hotpoint
- GE Appliances
- KitchenAid
- LG Electronics
- Maytag
- Sharp
- Samsung
- Whirlpool Corp.

2.2 EQUIPMENT

- A. Undercounter Refrigerator/Ice Maker: Provide Model No. CO1224F as manufactured by U-Line. Color as selected by Architect, 4.2 cf refrigerator capacity, 8 lbs ice daily with storage of 13 lbs, no drain required, frost free technology.
 - 1. Undercounter Refrigerator/Ice Maker; Accessible Counter Height: Provide Model No. CO29F Combo as manufactured by U-Line. Color as selected by Architect, 2.1 cf Refrigerator, 8 lbs ice daily with 13 lbs storage, no drain required, frost-free technology.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in for piping systems to verify actual locations of piping connections before appliance installation. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written instructions.
- B. Built-in Appliances: Securely anchor units to supporting cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and rough openings are completely concealed.

3.3 CLEANING AND PROTECTION

- A. Test each item of appliances to verify proper operation. Make necessary adjustments. Verify that accessories required have been furnished and installed.
- B. Remove packing material from appliances and leave units in clean condition, ready for operation.
- C. Protection: Protect the completed work from damage.

END OF SECTION

SECTION 12 21 13

HORIZONTAL BLINDS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Horizontal blinds.
- B. Related Sections:
 - 1. Section 08 11 00 - Hollow Metal Doors and Frames; glazed openings.
 - 2. Section 08 41 13 - Aluminum-framed Entrances and Storefronts.

1.2 SYSTEM DESCRIPTION

- A. Horizontal metal slat louver blinds installed at storefront, curtain wall, glazed openings, and mirrors manual control of raising and lowering by cord; blade angle adjustable by control wand. Horizontal blinds shall be indicated as "HB" on the drawings.

1.3 SUBMITTALS

- A. General: Submit in accordance with SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Product Data: Include manufacturer's catalog cuts and data sheets, and installation instructions and data certifying blinds are lead-free.
- C. Shop Drawings: Include details of attachment and schedule of each size and location.

1.4 QUALITY ASSURANCE

- A. Measurements: Provide custom size blinds for the openings or mirrors in which they are to be installed. Take careful measurements of each opening so that the blinds will fit properly. Plan dimensions shall not be used. Verify head, jamb, and sill conditions.
- B. All blinds shall be lead-free.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of SECTION 01 65 00 - PRODUCT DELIVERY REQUIREMENTS.
- B. Deliver blinds wrapped and crated in a manner to prevent damage to components or marring of surfaces.
- C. Store and protect products under provisions of SECTION 01 66 00 - PRODUCT STORAGE AND HANDLING REQUIREMENTS.
- D. Store in a clean, dry area, laid flat and blocked off ground to prevent sagging, twisting, or warping.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Horizontal Blinds: 1" wide by 0.0085" thick slat type, with valance for each blind. Product/manufacturer; one of the following:
 - Bali Classics Mini Blinds; Springs Window Fashions Division, Inc.
 - Levolor 1" (25mm) Riviera Classic Blind; Levolor Corp.

2.2 MATERIALS AND FABRICATION

- A. Head channel shall be 0.025" thick Tomized steel with a plastic type coating. Channel shall be "U" shaped, approximately 1" high by 1-9/16" wide, with flanged edges at the top.
- B. Slat supports shall be braided of polyester yarn. The vertical component shall have a diameter of not less than 0.045" nor greater than 0.066". Braiding shall be accurate to hold slats equally spaced, parallel and straight, and to assure proper tilt control and adequate overlay of slats. Provide 31 rungs per 2 feet of ladder, equally spaced. Distance between ladders shall not exceed 21". The horizontal component shall consist of not less than four cables interbraided with the vertical component.
- C. Slats shall be virgin aluminum alloy approximately 1" wide by 0.0085" thick. Slats shall have sufficient crown to prevent sagging and radius corners.
- D. Bottom rail shall be 0.023" thick Tomized steel with a plastic type coating.
- E. Tilter shall be Tomized steel of enclosed construction. Unit shall tilt the slats to any desired angle and hold them at that angle. An automatic disengagement of worm and gear shall eliminate overdrive to prevent strain or damage to wand, worm, gear, ladder or top slat. Operation shall be by wand of sufficient length and swivel for easy operation.
- F. Lift cord shall be of adequate diameter, braided of high strength synthetic fibers.
- G. Finish: The factory finish for the exposed surfaces shall be a plastic type finish coat baked on. Color shall be as selected by Architect from manufacturer's standard color range.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine areas to receive blinds for conditions which will adversely affect the installation of the blinds. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Attach installation end brackets at each end of blind location. For blinds over 55" long or over 50 square feet in area, provide intermediate brackets.
- B. Blinds shall be mounted in brackets inside frame jambs by skilled mechanics under the supervision of an authorized representative of the manufacturer. The completed blinds shall be left clean and in perfect working order. Crates, cartons, and rubbish shall be removed from the premises; rooms shall be left broom clean.

3.3 TOLERANCES

- A. Maximum Variation of Gap at Window Opening Perimeter: 1/4".
- B. Maximum Offset From Level: 1/8".

3.4 ADJUSTING

- A. Adjust work under provisions of SECTION 01 77 00 - CLOSEOUT PROCEDURES.
- B. Adjust blinds for smooth operation.

3.5 CLEANING

- A. Clean work under provisions of SECTION 01 74 13 - PROGRESS CLEANING.

END OF SECTION

SECTION 22 05 00

COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Conditions of the Contract including the General Conditions, Supplementary Conditions, and Division One, apply to all work of this Division, whether attached or not.
- B. The requirements specified in this Section shall be applicable to work specified in other Sections within this Division.

1.2 SCOPE OF WORK

- A. All Division 22 sections of these specifications shall include all labor and material to complete the entire mechanical systems as specified and shown on the Drawings.
- B. All work shown and specified shall be completely installed and connected by mechanics properly qualified to perform the work required. All work shall be left in a satisfactory operating condition as determined by the Owner and Owner's Representative.
- C. Provide all services and perform all operations required in connection with, or properly incidental to, the construction of complete and fully operating systems with all accessories as herein specified and shown on the Drawings.
- D. Refer to "Conditions of Work" in Division 1

1.3 GENERAL

- A. The accompanying Drawings show diagrammatically the sizes and location of the various equipment items and the sizes of the major interconnecting piping and without showing exact details as to elevations, offsets, control lines, and other installation details. The Contractor shall carefully lay out his work to conform to the site conditions, to avoid obstructions and provide proper grading of lines. Exact locations of outlets, apparatus, and connections thereto shall be determined by reference to the Drawings, reviewed Shop Drawings, including equipment drawings, and rough-in drawings, by measurements at the building, and in cooperation with work specified in other sections of these specifications. Minor relocations necessitated by the conditions at the site or directed by the Architect shall be made without any additional cost to the Owner.
- B. These specifications and the accompanying Drawings are intended to describe and illustrate systems which will not interfere with the structures, which will fit into available spaces, and which will insure complete and satisfactorily operating installations. Contractor shall coordinate the proper fitting of all material and apparatus into the building and shall prepare larger scale installation drawings for all critical areas, areas with limited working clearances, and areas of significant congestion requiring a higher level of coordination illustrating the installation of work specified in Division 22 in relation to all other portions of work specified in other Sections of these Specifications. Interferences with other portions of work, or the building structure, shall be corrected before any work proceeds. Should changes become necessary on account of the failure of the Contractor to comply with these stipulations, Contractor shall make all necessary changes at no expense to the Owner.
- C. All work shall be run parallel or perpendicular to the lines of the building unless otherwise noted on the Drawings.

- D. It is the intent of the Contract Documents to provide an installation complete and operational in every respect. In the event that additional details or special construction may be required for work indicated or specified in this section, or work specified in other sections, it shall be the responsibility of the Contractor to provide same as well as to provide material and equipment usually furnished with such systems and required to complete the installation.
- E. Contractor sets forth that all personnel have the necessary technical training and ability; and that all work specified in this Division will be installed to the best standard of each trade, and will be complete and in good working order. If any of the requirements of the Drawings and specifications are impossible to perform, or if the installation when made in accordance with such requirements will not perform satisfactorily, report same to the Architect promptly after discovery of the discrepancy.
- F. No extra compensation will be allowed for extra work or changes caused by failure to comply with the above requirements.

1.4 EXAMINATION OF THE SITE

- A. Contractor shall visit the site, verify all items indicated on the Drawings or specified, and familiarize himself with the work conditions, hazards, grades, actual formations, soil conditions, points of connection, utility locations, and local requirements.
- B. Contractor shall take these conditions into consideration, and the lack of specific information on the Drawings shall not relieve the Contractor of any responsibility.
- C. All site visits shall be coordinated and scheduled with the Owner.

1.5 CUTTING AND PATCHING

- A. Excessive cutting of the building structure, walls, floors, ceilings, roof, etc., will not be permitted. No structural member shall be notched or cut unless specifically shown on the Drawings, or unless such cutting is authorized by the Architect.
- B. Provide for all holes or openings of proper size and shape as may be necessary for the proper installation of work specified in Division 22, consulting with the Architect regarding proper locations and sizes.
- C. Where deemed necessary, and after consulting with the Architect, perform all cutting and patching required for the installation of piping, etc. This shall include the cutting of concrete floors, concrete and tile floors, walls, ceilings, roofs, etc. It shall also include patching them as required to restore work to match existing finishes, following installation, testing, backfilling, insulation, etc.
- D. Holes through concrete shall be drilled with "Mole", "Core-It", or other diamond point hole saw.
- E. Refer to Division 01, Cutting and Patching.

1.6 CODE REQUIREMENTS

- A. Contractor is required to comply with the requirements of all National, State, and local codes and utility companies having jurisdiction. In no case does this relieve the Contractor of the responsibility of complying with the requirements of these specifications and Drawings where specified conditions are of higher quality than the requirements of the above specified offices. Where requirements of the specifications and Drawings are below the requirements of the above offices having jurisdiction, the Contractor shall make installations in compliance with the requirements of the above offices and shall notify the Architect promptly.
- B. Contractor shall comply with the requirements and standards set forth by, but not limited to, the following:
 - 1. (NFPA) National Fire Protection Association.
 - 2. (OSHA) Occupational Safety and Health Administration.

3. (NEC) National Electric Code.
4. (IECC) International Energy Conservation Code.
5. Local Plumbing Code.
6. Local Building Code.
7. Local Fire Code.
8. Local Energy Code.

Contractor shall obtain all permits, inspections, and approvals as required by all authorities having jurisdiction. Fees and costs incidental to these permits, inspections, and approvals must be assumed and paid by the Contractor.

1.7 RECORD DRAWINGS

- A. Contractor shall, during the execution of work, maintain a complete set of "Record Drawings" upon which all locations of equipment, ductwork, piping, and all deviations and changes in the work shall be neatly recorded for use in producing "As Builts" at Project Close- Out. This shall include the incorporation of all Supplemental Drawings issued during the Construction Period.
- B. All "Record Drawings" shall be reviewed monthly during the Construction Period, along with the monthly Pay Application Request.
- C. Refer to Division 01, Execution and Close-Out Requirements.

1.8 RECORDS AND INSTRUCTIONS FOR OWNER

- A. Accumulate during the job's progress the following sets, in triplicate, in accordance with the provisions of Division 01, Execution and Close-Out Requirements:
 1. Warranties and guarantees and manufacturer's directions on equipment and material covered by the Contractor.
 2. Equipment and fixture brochures, wiring diagrams, and control diagrams.
 3. Copies of reviewed Shop Drawings, and material and equipment submittals. Copies of rejected submittals and Shop Drawings are not to be provided.
 4. Operating instructions for heating and other plumbing systems. Operating instructions shall include recommended maintenance and seasonal change-over procedures.
 5. Other data and drawings required during construction.
 6. Repair parts lists of all major items and equipment including name, address, and telephone number of local supplier or agent.
 7. Valve tag charts and diagrams specified elsewhere herein.
 8. "As-Built" Record Drawings shall be provided in electronic format on a CD (provide two (2) copies) in a PDF or DWG format as determined by the Owner.
 9. Provide copies of all City Inspection Certificates of Approval.
 10. Provide Contractor's Certification Statement that all equipment furnished and all work performed is in compliance with all applicable codes referenced in these specifications, or those which are currently in effect.
- B. Provide not less than one (1) day of operating instructions per building, during the adjustment and testing period, to the Owner's operating personnel in order to familiarize them with the proper care and operation of all equipment.
- C. All of the above data should be submitted to the Architect for approval at such time as the Contractor asks for his last payment request, just prior to his final payment request. In no case will any portion of retainage be released until these documents are submitted and accepted.
- D. Refer to related portions of Division 1 for Project Close-Out requirements, Operation and Maintenance Data, Warranties, and other related certificates.

1.9 SHOP DRAWINGS AND SUBMITTALS

- A. Contractor shall submit to the Architect shop drawings, product submittals, and catalog data on all piping, equipment, and materials designated on the Drawings and specified herein. Electronic Pdf copies of each shall be submitted.
- B. Contractor shall submit full product data shop drawings and shall prepare and submit 1/4" = 1'-0" scale plumbing piping shop drawings. Contractor shall fully coordinate all piping shop drawings with sheet metal shop drawings and other trades. Failure to submit shop drawings in a timely manner, as required to keep pace with the construction and work of all other trades, will result in delays, and possible stoppage, of payment to the contractor. Additionally, no work may proceed until such shop drawings are submitted, reviewed, and found to be acceptable by the engineer.
- C. Each submittal will be reviewed for compliance with general requirements of design and arrangement only; it is not a contract document and acknowledgment of compliance does not relieve the Contractor from responsibilities for performance of the work in compliance with all provisions and requirements of the Contract Documents. Job measurements and the coordination of all dimensions for proper fit of all parts of the work and performance of all equipment supplied to meet specification requirements are, and remain, specific responsibilities of the Contractor.
- D. Shop Drawings shall be furnished by the Contractor for the work involved after receiving approval on the make and type of material and in sufficient time so that no delay or changes will be caused. This is done in order to facilitate progress on the job, and failure on the part of the Contractor to comply shall render him liable to stand the expense of any and all delays, changes in construction, etc., occasioned by his failure to provide the necessary detailed drawings. Also, if the Contractor fails to comply with this provision, the Architect reserves the right to go directly to the manufacturer he selects and secure any details he might deem necessary; and, should there be any charges in connection with this, they shall be borne by the Contractor.
- E. Shop Drawings submitted shall not consist of manufacturers' catalogues or tear sheets therefrom that contain no indication of the exact item offered. Rather, the submission on individual items shall designate the exact item offered and accessories as specified.
- F. Shop Drawings are not intended to cover detailed quantitative lists of valves, devices, fixtures, and similar items, as the Drawings and specifications illustrate those items; and it is the Contractor's responsibility to procure the proper quantities required to comply with the established requirements.
- G. Shop Drawings prepared to illustrate how equipment, piping, etc., can be fitted into available spaces will be examined under the assumption that the Contractor has verified the conditions shown. Review by the Architect shall not relieve the Contractor of responsibility in the event the material cannot be installed as shown on those Shop Drawings.
- H. Various material submissions of such items as plumbing fixtures, drains, and other related items or accessories shall be assembled in brochures or in other suitable package form and shall not be submitted in a multiplicity of loose sheets. Cover sheets for each item submitted shall have sufficient bare space to allow for shop drawing review stamps.
- I. Contractor shall process his submitted data to insure that it conforms to the requirements of the Drawings and specifications, and there are no omissions and/or duplications.
- J. Shop Drawings and Submittals shall be accompanied by certification from the Contractor, and firm preparing such, that Shop Drawings have been checked for, and are in compliance with, the Contract Documents.
- K. All Submittals and Shop Drawings shall have been submitted for review by the Architect and Engineer within 90 days after Contract Award Date.

1.10 PENETRATIONS THROUGH FIRE-RATED ASSEMBLIES

- A. Seal voids around pipes penetrating fire-rated assemblies and partitions using fire-stopping materials and methods in accordance with provisions in Section 07 84 00, Fire-Stopping.

1.11 DRAWINGS

- A. Drawings show diagrammatically the locations of the various pipes, fixtures, and equipment, and the method of connecting and controlling them. It is not intended to show every connection in detail and all fittings required for a complete system. The systems shall include, but are not limited to, the items shown on the drawings. Exact locations of these items shall be determined by reference to the general plans and measurements at the building, and in full cooperation with work specified in other Divisions of these specifications; and, in all cases, shall be subject to the approval of the Architect. The Architect reserves the right to make any reasonable change in the location of any of this work without additional cost to the Owner.
- B. Should any changes be deemed necessary in items shown on the Contract Drawings, the shop drawings, descriptions, and the reason for the proposed changes shall be submitted to the Architect for approval.
- C. Exceptions and inconsistencies in plans and specifications shall be brought to the Architect's attention prior to bids being submitted; otherwise, the Contractor shall be responsible for the cost of any and all changes and additions that may be necessary to accommodate the installation of any particular apparatus.
- D. Lay out all work maintaining all lines, grades, and dimensions according to these Drawings with due consideration for the work of others. Verify all dimensions at the site prior to any fabrication or installation. Should any conflict develop or installation be found impractical, the Architect shall be notified before any installation or fabrication, and the existing conditions shall be investigated and proper changes effected without any additional cost.
- E. Titles of Sections and Paragraphs in these specifications are introduced merely for convenience and are not to be construed as a correct or complete segregation or tabulation of the various units of materials and work. The Architect does not assume any responsibility, either direct or implied, for omissions or duplications by the Contractor due to real or alleged error in the arrangement of matter in the Contract Documents.

1.12 CONNECTION OF EQUIPMENT FURNISHED BY OTHERS

- A. Equipment supplied as portions of work specified under other Divisions of these specifications shall be furnished with proper roughing-in diagrams and shall be installed as a part of Division 22.
- B. Furnish materials and labor required for the connection of this equipment.
- C. Contractor shall ascertain that all equipment so specified is included as part of this work.

1.13 COOPERATION

- A. Coordinate all work indicated in Division 22 with work specified in other Divisions to assure proper and adequate interface with other portions of the work.
- B. Maintain contact and be familiar with the progress of the general construction and the timely installation of sleeves and inserts, etc., before concrete is placed. Install the required systems in their several stages, at the proper time to expedite the work and avoid unnecessary delays in the progress of other portions of the work.
- C. Should any questions arise between work specified in Division 22 with respect to other portions of work specified in other Divisions of the Specifications, reference shall be made to the Architect for instructions.

1.14 MATERIALS AND EQUIPMENT

- A. All materials and equipment purchased shall be new. No used or reconditioned equipment will be allowed.
- B. All material shall be manufactured in the United States and/or shall comply with the North America Free Trade Agreement, NAFTA**
- C. Substitutions: Products of same functions, performance and design will only be considered if in full accordance with the requirements of Section 01 60 00, Product Requirements. The products of other manufacturers will be acceptable; only if, in the opinion of the Architect, the substitute material is of a quality as good or better than the material specified, and will serve with equal efficiency, maintainability, and dependability, the purpose for which the items specified were intended.
- D. Listed Manufacturers:
 - 1. Manufacturers listed in a product or system specification are those manufacturers considered capable of manufacturing products conforming to the specification requirements, and are listed therein to establish a standard.
 - 2. The "listing" of a manufacturer does not imply "acceptance" or "approval" of any standard product of that manufacturer.
 - 3. Products offered by listed manufacturers shall be equal to, or superior in all respects to, that specified by named products; and shall meet or exceed specification requirements.
 - 4. The description of specific qualities takes precedence over the reference standards and the description of qualities and reference standards together take precedence over the named product of listed manufacturers.
- E. Product Options:
 - 1. Products specified only by Reference Standards or by Description only means that any product meeting those standards or descriptions, by any manufacturer, will be considered.
 - 2. Products specified by naming several products or manufacturers means that only the manufacturers named will be considered.
 - 3. Products specified by naming only one product and manufacturer means that no option exists unless a substitution is accepted. Submit a request for substitution for any product or manufacturer not specifically named.
 - 4. Products specified by Description, Reference Standard, and naming several products or manufacturers means that any product and manufacturer named meeting those descriptions and standards will be considered. Submit a request for substitution for any product or manufacturer not specifically named.
- F. Limitations or Substitutions:
 - 1. During Bidding Period, Instructions to Bidders, in Division 1, will govern times for submitting requests for substitutions under requirements specified in this Section.
 - 2. No later than ten (10) days prior to the bid date, Contractor shall notify the Architect in writing of any desired substitutions of products in place of those specified. These requests will be considered; and, if a favorable response is determined, this will be documented in the form of an Addenda.
 - 3. Substitutions will not be considered when indicated or implied on Shop Drawings or product data submittals without separate formal request, when requested directly by subcontractor or supplier, or when acceptance will require substantial revision of Contract Documents.
 - 4. Substitute products shall not be ordered or installed without written acceptance.
 - 5. Only one request for substitution for each product will be considered. If substitution is not accepted, Contractor shall provide specified product.
 - 6. Architect will determine acceptability of any and all substitutions.
- G. It is fully the Contractor's responsibility to assemble and submit sufficient technical information to fully illustrate that the material or equipment proposed for substitution is equal or superior, as the Architect is under no obligation to perform the service for the Contractor. The proposal shall be accompanied by manufacturer's engineering data, specification sheet, and a sample, if practical or if requested or specified. In no event shall a proposal for substitution be cause for delay of work. This shall include a detailed comparison to each product specification paragraph.

- H. Should a substitution be accepted under the above provisions, and should the substitution prove defective or otherwise unsatisfactory for the intended service, within the warranty period, the Contractor shall replace the substitution with the equipment or material specified, and on which the specifications required him to base his proposal.
- I. No substitutions will be considered contingent upon pending certification and rating agency approvals. Such certifications and ratings shall be in effect at the time of bidding.

1.15 EQUIPMENT SIZES AND REQUIREMENTS

- A. Space allocations in machinery and mechanical equipment spaces are based on equipment scheduled in each case. Should the Contractor request a substitution for equipment of another make that requires more space in any critical dimension, the Contractor shall submit, together with other submittal data on the equipment, prints of drawings indicating how the equipment may be installed, indicating room for servicing and revisions in piping or ducting and any other details necessary for the Architect to form a judgement as to the suitability of the substitute material, as to performance, suitability for the space and other variables.
- B. Duties of certain equipment items, horsepowers of driving motors and electrical characteristics are scheduled for equipment items of a particular make in each case. Should requests for a substitute material be accepted which has other requirements that would involve allied equipment or other portions of work, the Contractor shall be responsible for all modifications required at no change in contract price. As examples:
 - 1. If an accepted pump motor has a brake horsepower requirement above the motor horsepower scheduled, the Contractor shall be responsible for providing a larger motor and heavier drive and any change in size of the protective device, conduit run and conductors serving that motor. The latter shall be extended through an individual branch protective device and branch circuit on through the panel, feeder, feeder protective device, etc.
 - 2. If accepted, water heaters having a different power voltage, phase or breaker size than those on which the heater were based, the Contractor shall be responsible for adjusting electrical service work accordingly.
- C. Structural steel members are indicated to provide supports for certain specific sizes and weights of equipment. Should a substitution request involve other equipment, the spacing of the supports shall be varied to suite the equipment. Should the weight or size of a proposed substituted item of equipment require additional supporting steel members, the Contractor shall include documentation of the additional supports in the request for substitution and install them at no change in contract price if the substitution is accepted.
- D. Various large apparatus to be installed may require that the apparatus be installed prior to the installation of portions of structural, walls, or door frames. Coordinate the installation of these items to insure that no demolition of general construction is necessary for equipment installation or that the apparatus does not have to be disassembled for installation.

1.16 STORAGE AND PROTECTION OF MATERIALS

- A. Store and protect materials and equipment as specified in Section 01 60 00, Product Requirements.
- B. Contractor shall provide storage space for protection and storage of his materials and assume complete responsibility for all losses due to any cause whatsoever. All storage shall be within the property lines of the building site, and as directed by the Architect. In no case, shall storage interfere with traffic conditions in any public or project thoroughfare.
- C. All work and material shall be protected at all times. Contractor shall make good any damage caused, either directly or indirectly, by his workmen. He shall be responsible for safe handling of all mechanical equipment and shall replace, without charge, all items damaged prior to acceptance by the Owner.

- D. On site storage shall not be inside the building during construction progress, but shall be in approved trailers or as specifically approved otherwise by the Architect. Storage inside the building shall only be allowed when so allowed by the Architect.

1.17 FOUNDATIONS

- A. Provide equipment foundations associated with the work specified in Division 22.
- B. All top corners and edges of all foundations shall be neatly chamfered at a one inch (1") high 45 degree angle.
- C. Foundation bolts shall be placed in the forms when the concrete is poured. Allow one inch (1") below the equipment bases for alignment, leveling, and grouting with non-shrinking grout. Grouting shall be done after the equipment is leveled in place. After the grout has hardened, the foundation bolts shall be pulled up tight and the equipment shimmed, if necessary.
- D. After removal of the forms, the surface of the foundation shall be rubbed until smooth.
- E. Unless otherwise noted, foundations shall be four inches (4") thick for plumbing equipment, unless specifically noted otherwise on the Drawings.
- F. All concrete work shall conform to the requirements of Division 03, Cast-in-Place Concrete.
- G. Provide housekeeping pads and foundations for every item of floor mounted equipment specified in Division 22 specifications. Pads shall extend a minimum of two inches (2") in each direction beyond the equipment size.

1.18 EXCAVATION AND BACKFILLING

- A. Contractor shall do all necessary excavating and backfilling for the installation of his work. Trenches for underground piping shall be excavated to required depths with bell holes provided as necessary to insure uniform bearing. Care shall be taken not to excavate below depth, and any excavation below depth shall be refilled with sand or gravel firmly compacted. Where rock or hard objects are encountered, they shall be excavated to a grade six inches (6") below the lowermost part of the piping and refilled to grade as specified. Installation shall comply with ASTM D2321. After the piping has been installed and reviewed by Architect and local building authorities, trenches shall be backfilled to grade with approved non-expansive materials, well tamped or puddled compactly in place. Where streets, sidewalks, etc., are disturbed, cut, or damaged by this work, the expense of repairing same in a manner approved by Architect shall be a part of this contract.
- B. Contractor shall bear sole responsibility for design and execution of acceptable trenching and shoring procedures, in accordance with State of Texas Regulations. On trench excavations in excess of five feet (5') in depth, Contractor shall pay a qualified engineer to prepare detailed Drawings and specifications directing Contractor in the safe execution of trenching and shoring. It is understood that trench safety systems constitute a means and method of construction for which the Architect, Engineer, and Owner are not responsible. Accordingly, such documents when prepared, shall be separately issued by Contractor's Consultant, independent of project contract Documents.

1.19 WIRING

- A. Unless otherwise noted, all wiring for motors, starters, and equipment is specified in Division 26.
- B. Wiring of temperature controls shall be performed in accordance with the requirements of Division 26 but shall be performed as outlined in other sections of these specifications.

- C. All power for control circuits required for the Temperature Control System shall be provided and installed where indicated on the Division 26 Drawings, but shall otherwise be provided as indicated in other sections of these specifications.
- D. Each supplier of equipment requiring control shall have wiring diagrams furnished with submittals. This shall be used to determine conduit layouts required to complete the electrical portions of the instrumentation and control systems.
- E. All motors furnished as a portion of work specified in Division 22 shall be wired as specified in Division 26.
- F. Except where combination starter-disconnects are specified elsewhere herein or in Division 26, all motors shall be provided with safety disconnect switches in accordance with the National Electrical Code as specified in Division 26.
- G. Furnish all necessary wiring diagrams for equipment specified in Division 22, as a part of equipment submittals, for installation under other sections of these specifications.

1.20 EQUIPMENT STANDARDS

- A. All basic materials and equipment shall be standard catalog products of a reputable manufacturer and shall essentially duplicate equipment which has been in satisfactory service for at least one (1) year.
- B. First of a kind new technology devices will not be considered.
- C. Accessory equipment that is required to make a complete and functioning system that is not of the same manufacturer furnishing the basic materials or equipment shall carry the guarantee of the basic material or equipment manufacturer and repair and replacement parts shall be available through normal trade channels locally.

1.21 CLEAN UP

- A. Contractor shall be responsible for cleaning up after and during all work performed under this Division of the Specifications.
- B. Contractor shall, on a daily basis, remove construction trash and debris accumulation to minimize the entrance of dust, dirt, and debris in piping, ductwork, and mechanical equipment.
- C. At the completion of construction, just prior to Substantial Completion and sustained operation of equipment, thoroughly clean the inside of piping, ductwork, and equipment.
- D. Refer to Division 1.

1.22 FINAL CONSTRUCTION REVIEW

- A. Schedule: Upon completion of the work specified in Division 22, there shall be a final construction review of the completed plumbing systems installations. Prior to this walk-thru, all work specified in this Division shall have been completed, tested, adjusted, and balanced in its final operating condition and the preliminary test report shall have been submitted to and approved by the Architect.
- B. Personnel: A qualified person representing the Contractor must be present at this final construction review to demonstrate the system and prove the performance of the equipment.
- C. Building plumbing systems shall have been in operation for a minimum of 15 days and Test and Balance work shall be substantially complete prior to this review.
- D. Exceptions to the aforementioned requirements will be considered on a case-by-case basis dependent on the size and type of project, as well as construction schedule limitations.

1.23 CERTIFICATIONS

- A. Before receiving final payment, the Contractor shall certify that all equipment furnished and all work done is in compliance with all applicable codes mentioned in these Specifications.
- B. Provide copies of all applicable approved notices and inspection certifications from the various inspections conducted by the Local Code Enforcement Authorities.

1.24 GUARANTEE

- A. The guarantee provision of this specification requires prompt replacement of all defective workmanship and materials occurring within one year of final job acceptance, Substantial Completion, or as defined by Extended Warranty Contracts. This includes all work required to remove and replace the defective item and to make all necessary adjustments to restore the entire installation to its original specified operating condition and finish at the time of acceptance.
- B. The Contractor shall also guarantee that the performance of all equipment furnished and installed under this Division of the Specifications shall be at least equal to the performance as called for in the specifications and as stated in the equipment submittals. Should there be indication that the equipment and installation is not producing the intended conditions, the Contractor shall make further tests as the Owner's Representative may direct to demonstrate that the equipment installed meets the specifications and is delivering the capacity specified or called for on the Drawings.
- C. If there is any indication that the equipment does not meet the specified quantities, the Contractor shall, at his expense, institute a program to demonstrate the adequacy of the installation. This program shall include all necessary testing and testing equipment. Should the Contractor not have the equipment or technical skill to perform the tests, it shall be his responsibility to employ recognized experts to perform the tests and shall provide certified laboratory tests, certified factory reports and work sheets, or other certified data to support results of any tests required.

END OF SECTION

SECTION 22 07 00

PLUMBING INSULATION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- A. Comply with Division 1 - General Requirements and referenced documents.
- B. Comply with all other Division 22 Sections as applicable. Refer to other Divisions for coordination of work with other portions of work.

1.2 SYSTEM DESCRIPTION

- A. Provide the systems of insulation which are specified for the control of heat transfer, sound control, and prevention of condensation.
- B. Provide protective devices to prevent compression abrasion or puncture of the piping insulation systems installed to include inserts, pipe shields, PVC jacketing and aluminum jacketing as specified herein.
- C. Provide piping identification systems as specified in Section 22 05 53, Identification for Plumbing Piping and Equipment.
- D. Provide heat tracing as specified in Section 22 05 33, Heat Tracing for Piping.

1.3 QUALITY ASSURANCE

- A. The installation of all thermal insulation shall be performed by a single firm regularly engaged in the insulation business, using skilled insulation mechanics and using insulation materials which are the product of reputable manufacturers. The application of the materials by the insulator shall be in accordance with the published standards of the manufacturer of the materials, using any special materials as required by these specifications and by those published standards.
- B. Materials shall be manufactured by Schuller, Pittsburg Plate Glass, Owens-Corning, Foster, Certainteed, Mansville, or Knauf.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's descriptive literature and installation instructions to allow review of Materials and Methods to ensure complete compliance with specifications in accordance with Section 22 05 00.
- B. Shop Drawings: Submit materials to be used and method of application for each system in tabular form. General statements not specifically identifying means or methods to be used shall be cause for rejection. Include descriptive data and cut sheets on each type of insulation material, sealing method, adhesives used, insert types, shield sizes, and PVC or aluminum jacketing as specified.
- C. Submit sample of one inch (1") pipe, minimum 24 inches long, with tee fitting, one ball valve with insulated Tee handle, wye strainer with blow-off valve and one elbow insulated as specified for chilled water systems. Sample shall have one half covered with specified jacketing for exposed conditions and half of this shall be left without a jacket. The elbow and valve shall receive insulation as specified for fittings and valves. This sample shall set the minimum job standards.

1.5 PRODUCT HANDLING

- A. Cover and protect material in transit and at site. Material not properly protected and stored and which is damaged or defaced during construction shall and will be rejected.
- B. Promptly replace all damaged, deteriorated or wet insulation materials.
- C. Storage and protection of materials shall be in accordance with Section 22 05 00.

PART 2 - PRODUCTS

2.1 PIPING AND EQUIPMENT INSULATION MATERIALS

A. Domestic Cold and Hot Water Supply, Return, and Non-Potable Water Piping Insulation:

- 1. Insulation shall be approximately 4 lb. or heavier in density, molded sectional glass fiber pipe covering with factory applied, white FRG, fire resistant, vapor barrier jacket.
- 2. Insulate valves and fittings with pre-molded glass fiber fitting covers equal in thickness to the adjoining pipe covering. In lieu of pre-molded fitting covers, for welded pipe fittings only, insulate with field fabricated mitered segments of pipe covering equal in density and thickness to the adjoining pipe covering. Use loose low density glass fiber insulation compressed tightly and equal to thickness of adjoining straight pipe sections for screwed fittings; vapor sealed with one 1/8" thick wet coat of water based Foster 30-33, Childers CP-33 vapor barrier coating, or approved equivalent. Vapor barriers- coatings shall have a maximum permeance rating of 0.07 at 43 mils dry film thickness per ASTM E-96, or equivalent adhesive, and imbedded in a glass fabric tape which has an emulsion imbedded in it and a coating on it; apply a second 1/8" thick coat of Foster No. 30-33, Childers CP-33 vapor barrier coating, or equivalent adhesive and apply a PVC jacketing as specified elsewhere herein.
- 3. Finish entire installation with PVC sheet jacketing where exposed from the finished floor up to 12'-0" above the finished floor including all portions of horizontal piping that occurs at and extends above 12'-0". Jacketing shall be applied to all straight piping sections, as well as all elbows, tees, valves, and fittings. Use "smoke-safe" PVC fitting covers, similar to Speedline 1, Knauf "Proto" or John Manville "Zeston 2000". Suitably seal all jacketing seams with tape, or other approved means, along the entire length of seams.
- 4. Loose "Diaper" inserts at fittings shall not be allowed.
- 5. Insulation thickness shall be as follows:

PIPING SYSTEMS	INSULATION THICKNESS - INCHES PIPE SIZES				
	RUNOUTS 3/4" & SMALLER	LESS THAN 1"	1" TO 1- 1/4"	1-1/2" TO 3"	4" & OVER
Domestic Cold Water	1.00	1.00	1.00	1.00	1.00
Domestic Hot Water, Hot Water Return Water	1.00	1.00	1.00	1.50	1.50

B. Waste, Drain and Miscellaneous Lines:

- 1. Insulate the body of each floor and roof drain, where the body of the drain is out of the ground, or above a ceiling, with One-Coat of Insulating Cement, or equivalent, to a 1" thickness and coat with two 1/8" thick coats of Foster No. 30-80, Childers CP-33 vapor barrier coating, or equivalent adhesive, reinforced with an intermediate glass fabric tape saturated with lagging adhesive.
- 2. Waste lines for E.W.C.'s, floor drains receiving condensate from air handling equipment condensate pans to the point where they join the vertical stack or sanitary main.
- 3. Primary Roof Drainage System: All horizontal and vertical primary storm drainage piping to the point of penetration to the underfloor. Insulate as described for domestic water lines, except the

- insulation shall be minimum 1/2" thick (use 1" thick where 1/2" thick is unavailable in the pipe sizes needed). Complete vapor seal shall be required.
4. **Overflow Roof Drainage System:** The first vertical piece of the overflow drain pipe (below the drain body) and the first horizontal section of overflow drain piping to the first three feet (3') of vertical pipe beyond that section: Insulate as described for domestic water lines, except the insulation shall be minimum 1/2" thick (use 1" thick where 1/2" thick is unavailable in the pipe sizes needed). Complete vapor seal shall be required.
- C. **Expansion Tanks and Domestic Hot Water Storage Tanks:** Insulate with 2" thick, approximately 4 lb. density fiberglass, pipe or board insulation, rigid, or rigid-scored- for-curvature; carefully cut and/or mitered to fit contours and point up voids and dents with insulating cement. Protect ASME labels from physical damage and being covered with mastic and insulation. Completely expose ASME labels and bevel insulation around such labels and seal exposed cut insulation with mastic. For domestic water system labels provide an "Armaflex" Patch, removable, 1/2" thick. Finish with PVC sheet jacketing similar to piping systems.
- D. **Plenum Safe Jacketing:**
1. Where non-plenum rated piping (such as PVC, FRPP, PE, PP, etc.) is installed in return air plenums cover all exposed portions of this piping with a plenum safe jacketing, or wrap, system that is a factory manufactured and tested non-combustible barrier, to flame and smoke spread, designed to encapsulate non-rated or combustible items located in return air plenums, in accordance with the most recent additions of the International Building and Plumbing Codes.
 2. Plenum safe jacketing shall be covered with a light weight fiberglass reinforced foil scrim finished high temperature rated insulation with an approximate density of 6 pounds per cubic foot. Jacketing shall have a Flame Spread and Smoke Developed rating of 0 for the unfaced blanket and be under 25 and 50 respectively for these items as tested in accordance with U.L. 723 and ASTM E-84. Maximum Flame Spread in accordance with U.L.1887 shall be 0 feet. Maximum smoke/optical density and Average Smoke per U.L.1887 testing shall not exceed 01 and 0 respectively. U.L. 1887 test procedure is a modified tunnel test which provides test data for flame spread and smoke density using a single plastic pipe and a bundle of plastic pipes of various sizes subjected to a fire test.
 3. Thermal resistance of the barrier system shall be 4.2 as tested in accordance with ASTM C518. The Barrier System shall be able to withstand an operating temperature up to 2,300 Deg.F. and have a melting point of no lower than 3,100 Deg.F.
 4. Plenum safe jacketing shall be a minimum 1/2 inch thick and have at least one side covered with a foil skin which must face the outer, or exposed, side. All joints in each direction shall be overlapped a minimum of one inch (1"). Jacket shall be secured tightly around the piping with either stainless steel banding or stainless steel tie wire. Use stainless steel crimp clamps on banding fasteners. Tie wires shall be secured using twist tensioning. Seal all cut edges with aluminum foil tape to ensure there is no exposed fiber.
 5. Plenum safe jacketing shall be as manufactured by:
 - a. Great Lakes Textiles, Inc. or approved equals by;
 - b. 3M Corporation.
 - c. Thermal Ceramics.
 - d. FryeWrap by Unifrax.
- E. **Water Filled Drain, Domestic Water and any other Water Filled Lines Exposed to the Outdoors:**
1. Protect to -10 degrees F. By wrapping with heat trace wire with thermostata strapped to lines.
 2. Then insulate with 1" thick, 4 lb. Or heavier density molded glass fiber jacket covering with FRJ jacket. Insulate fittings same as described earlier herein for chilled and heating water piping.
 3. Finally cover with an 0.016" thick aluminum with locked seams and banded joints made watertight. Jacketing shall be equivalent to Childers Aluminum roll jacketing confirming to ASTM B-209, with smooth mil finish.
 4. Cover valves, mechanical couplings, and fittings with prefabricated aluminum jacketed fitting covers with factory applied moisture barriers to thickness to match that on piping and band in place. Fitting covers shall be equivalent to Childers ELL-JACS, Tee-Jacs, Flange-JACS, and Valve-JACS. Seal ends to prevent moisture penetration and to make completely weatherproof.

PART 3 - EXECUTION

3.1 GENERAL

- A. Apply insulation and pipe covering after all of the piping system to be insulated has been pressure tested, found to be completely tight (without leaks), and accepted as such. All insulated T-handles, blow-down valves, extended handles and caps should be installed prior to commencing with insulation. Verify that control, isolation, and balancing valves and any other piping specialty where a valve stem or test port extends beyond the normal pipe insulation thickness to be installed is installed pointed upward vertically. Thoroughly clean and dry all surfaces prior to being covered.
- B. For operational systems, perform work after operational hours and only during periods of scheduled equipment shutdown. During this period water flow to the piping segments to be insulated shall be stopped and the water and piping shall have equalized in temperature with the average ambient temperature of the space in which the piping is installed. If time does not permit this to occur then apply heat to the piping in a controlled, suitable manner, to warm the water and pipe sufficient to prevent any condensation from occurring during the insulation process. For any segments to be left uninsulated until the next system shutdown, mastic seal the ends and penetrations through of the installed insulation and allow sealant to dry prior to re-energizing the water system. Continue to insulate the piping system in small enough portions after-hours, or as required, to insure no insulation is applied over a wet surface.
- C. In the covering of surfaces subject to low temperatures (below 60 Deg. F.), take extreme precautions to secure a complete vapor seal and avoid air pockets of any kind within the insulation. All insulation shall be tightly fitted to the piping system and all systems shall have an equal thickness and density of insulation around all piping, valves, strainers, accessories, etc. Where fiberglass insulation is cut to contour insulation around valves or strainers add additional insulation to obtain the overall insulation thickness specified. Where vapor barrier jackets are lapped at seams and joints, paste such flaps carefully to assure no break in the vapor seal. Seal around butt joints with strips of vapor barrier jacket. Use self-sealing laps on all insulation for pipes carrying a medium below 60 Deg.F. Stapling will not be permitted where vapor barrier jackets are specified. Vapor barriers for these systems shall have a perm rating not to exceed 0.05.
- D. On glass fiber pipe covering with factory applied vapor barrier jacket, lap the jacket on the longitudinal seams and seal with vapor barrier lap adhesive equivalent to water based Foster 30-33, Childers CP-33 vapor barrier coating, or approved equivalent. Vapor barriers - coatings shall adhere to a maximum permeance rating of 0.07 at 43 mils dry film thickness per ASTM E-96. Tightly butt the ends and cover butt joints with a 4" wide band of vapor barrier jacket secured with the same adhesive. At all run-out piping to water equipment mastic seal the ends of the branch piping insulation where it meets the main piping insulation to prevent the migration of moisture should it ever become trapped in the insulation system. Generally, mastic seal the ends of butt joints in water piping systems every 50 feet for the entire system.
- E. Where jacketing systems are specified, use standard weight, PVC sheet rolls. Exercise care to locate seams in an inconspicuous place and apply all jacketing neatly, including that on valves and fittings. Unsightly work will be considered a justifiable basis for rejection. Adhere the jacketing in all cases with a lagging adhesive, Foster 30-36 A F (Anti-Fungal) or Childers CP-137 AF, or other approved methods. Lagging adhesives shall meet ASTM D 5590 with a "0" growth rating.
- F. All insulation shall be continuous through wall and ceiling openings and sleeves.
- G. All insulation and accessories shall have composite (insulation, jacket and adhesive used to adhere the jacket to the insulation) fire and smoke hazard ratings as tested under procedure ASTM E-84, NFPA 255, and UL 723 not exceeding:

Flame Spread	25
Smoke Developed	50
Fuel Contributed	50

- H. No insulation shall be applied to the bodies of unions and flanges on domestic hot water supply and circulating lines only. Terminate the insulation short of the unions or flanges at this equipment, and bevel off at a forty five degree angle to permit "breaking" the union or removal of the flange bolts without damaging the insulation. Bevel the insulation off also at caps on scale pockets, and blow-off connections on strainers, and at valve bonnets on these same systems.
- I. Unightly work shall be cause for rejection, including poor application of adhesives and coatings beyond the insulation which coats valves or other piping specialties.
- J. Damage or Modification to Insulation: Where new insulation is disturbed or damaged during the process of installing other new materials, making new connections, etc., it shall be repaired or replaced to return it to its original condition and appearance. Where lines are removed and connections to insulated lines are capped, insulate those caps as well as repairing damaged insulation. Materials shall match those presently installed in thickness, density, insulating value, jacketing, etc.
- K. Miscellaneous Lines: Piping connected to water lines through which there might be fluid flow on occasions such as the lines connected to air vents, lines running to compression tanks, etc. shall be insulated as described for other piping in those systems.
- L. Hanger and Support Locations: At the location of hangers or supports for pipes run above ground and finished with a vapor seal insulation, provide rigid sections of cork, Foamglas, calcium silicate or high density polyurethane, at least the same thickness as the adjacent insulating material to adequately support the pipe without compression of the insulating material and cover with a vapor seal that is bonded to the adjacent insulation as described for fittings in the lines. Where the insert has an insulating value less than the adjacent pipe insulation the thickness of the insert shall be increased to equal the insulating value of the adjacent pipe insulation. Wood inserts shall not be allowed. Hangers and supports for piping insulation to receive a vapor barrier shall be installed exterior to the insulation.
- M. Material Changes: Wherever there is a change in materials on lines that are vapor sealed, apply a suitable adhesive that is compatible with both materials, tapes, etc., as required to maintain the vapor barrier.
- N. The following describes materials, thickness and finishes for insulation on piping. In the following "exposed" shall mean any pipe exposed below the finished ceiling and structure where no ceiling is installed, in any room space, area, mechanical rooms, closets, and any pump run exterior to the building, including above the roof. "Concealed" shall mean any pipe located above ceilings, in furrings, in chases, in crawl spaces, and buried in direct contact with the soil.
- O. In all "exposed" areas, up to 12'-0" above the finished floor, insulation shall receive a PVC jacketing system. Neatly install all jacketing for finish painting.
- P. All insulation materials and jacketing shall exhibit the following characteristics:
 - 1. Water sorption, per ASTM C 1104, shall be less than 0.02%.
 - 2. Linear shrinkage, per ASTM C 356, shall be negligible.
 - 3. Stress corrosion, per ASTM C 795, shall not cause corrosion.
 - 4. Corrosiveness, per ASTM C 665, shall not be any greater than sterile cotton.
 - 5. Resistance to fungi, mold and mildew and bacteria, per ASTM C 665, shall be rated as not promoting growth of fungi and bacteria. Inhibitors shall be added to specified products to meet these requirements.

3.2 SHIELDS AND INSERTS

- A. Metal saddles, shields, shall be applied between hangers or supports and the pipe insulation. Saddles shall be formed to fit the insulation and shall extend up to the centerline of the pipe and the length specified for hanger inserts. Shields shall be made of galvanized sheet metal and shall be of sufficient size and length to prohibit the crushing of the insulation materials. Saddle shields shall be as follows:

Pipe Size	Metal Saddles	
	Metal Gauge	Length
3/4" to 3"	18	12"
4" to 6"	16	12" - 18"
8" to 10"	14	24"
12" & Larger	12	24"

- B. Provide inserts of calcium silicate on hot piping and cellular glass or 7#/Cu.Ft. fiber glass pipe insulation on cold piping at hangers except pipes 1-1/2" or smaller in size. Inserts between the pipe and pipe hangers shall consist of rigid pipe insulation of a thickness equal to the adjoining insulation and shall be provided with vapor barrier where required. Insulation inserts shall not be less than the following lengths:

Pipe Size	Insert Length
3/4" to 3"	12"
4" to 6"	12" - 18"
8" to 10"	24"
12" & Larger	24"

END OF SECTION

SECTION 22 11 16

DOMESTIC WATER PIPING SYSTEM

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- A. Comply with Division 01 - General Requirements and referenced documents.
- B. Comply with Division 22 Sections, as applicable. Refer to other Divisions for coordination of work with other trades, as required.

1.2 SYSTEM DESCRIPTION

- A. Provide a complete system of domestic hot and cold water supply as indicated herein and as illustrated on the contract drawings.
- B. Provide isolation of systems through valving as shown or indicated herein.
- C. Provide a system free of water hammer.
- D. Isolate all piping components to eliminate all audible vibration and noise.

1.3 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Division 01.
- B. Indicate on submittal piping material and joining method for each system and for the various sizes of piping systems to be installed. This shall be in tabular form in one location.
- C. Product Data:
 - 1. Pipe.
 - 2. Fittings.
 - 3. Joining methods.
 - 4. Shock arrestors.
 - 5. Hose bibbs.
 - 6. Hydrants.
 - 7. Backflow preventers.
 - 8. Trap Primer.
- D. Certification: Submit certification that completed system complies with sterilization procedures and test requirements of municipality, State, and other public authorities having jurisdiction over system sterilization.
- E. Submit copies of pressure test data of water systems to Owner prior to time of final completion of construction work.
- F. Provide closeout documents as required in Division 1, Section 01 17 00.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with requirements in following order of precedence:
 - 1. Codes, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction over installation, inspection, and testing.
 - 2. Provisions specified in this Section.
 - 3. Local Plumbing Code.

- B. Installer shall have been doing related work as described herein for a minimum of 5 years.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

A. Above ground:

1. 2 Inch and Smaller:

- a. Pipe: Hard drawn copper water tube, ASTM B88, Type "L".
- b. Fittings:
 - 1) 2 Inch and smaller, wrought copper solder joint fittings, ANSI B16.22.
- c. Joint solder:
 - 1) 95% tin - 5% antimony for pipe sizes 2" and less.
 - 2) Or 95.5% tin, 4% copper and 0.5% silver based for pipe sizes 2" and less.
 - 3) No lead containing solder is allowed.
- d. Alternative Joint method:
 - 1) Zero Lead Press Joints, copper & copper alloy press fitting shall conform to material requirements of ASME B16.18 and performance criteria of IAPMO PS 117. Sealing elements for press fittings shall be EPDM and shall be factory installed with a leakage path feature that will assure leakage of liquids from inside the engineered system past the sealing element of an unpressed connection. Acceptable manufactures: Viega, Nibco or Mueller

B. Unions:

1. 2 Inch and Smaller: ANSI B16.22 wrought copper; solder end fittings.

C. Valves and Supports: Provide lead-free bronze full-port ball valves with stainless steel trim for pipe sizes 2" and smaller. Provide flanged lead-free bronze or epoxy coated full port valves with stainless steel trim from pipe sizes 2-1/2" or larger. Butterfly valve are not allowed. Refer to Section 22 05 00 and 22 21 13, Basic Materials and Methods.

2.2 SPECIALTIES

A. Access Doors:

1. Milcor "Style K, M, or DW", stainless steel to suit surface application.
2. Panels to have cam locks and door sized 16 inches by 16 inches
3. All restroom/toilets and kitchen areas shall have stainless steel access doors.

B. Shock Arrestors:

1. Acceptable manufacturer: Sioux Chief Manufacturing Co., Precision Plumbing Products (PPP), Josam, Jay R. Smith.
2. One piece, seamless copper construction.
3. Piston type, triple "O" ring copper construction.
4. Factory charged.
5. Plumbing Drainage Institute (PDI) certified.
6. ASSE 1010 approved with lifetime warranty, not requiring access.
7. Size as shown on drawings or as recommended by manufacturer.
8. Acceptable product: "Hydra-Rester", Sioux Chief Manufacturing Co.

C. Air Chambers: Same material and size as pipe branch or riser; minimum of 18" long.

D. Vacuum Breakers:

1. Acceptable manufacturer:
 - a. Watts.
 - b. Febco.
 - c. Beeco.
 2. Atmospheric, check valve type.
 3. Bronze body construction with polished chrome finish.
- E. Reduced Pressure Type Backflow Preventer Assembly:
1. Acceptable manufacturers:
 - a. Watts.
 - b. Beeco.
 - c. Ames.
 2. Double check valve type with shutoff valves.
 - a. Quarter turn ball shut-off valves up to 2-1/2 Inches.
 - b. Outside stem and yoke gate shut-off valves 3 Inches and over.
 3. Differential pressure type relief valve with air gap fitting.
 4. Lead-Free bronze body construction up to 2-1/2 Inches.
 5. Cast iron body construction 3 Inches and over.
 6. Provide in-line upstream y-type strainer.
 - a. 20 mesh strainer 2 Inches and below.
 - b. 0.125 perforated screen mesh 2-1/2 Inches and over.
 7. Acceptable Product: Watts No. 909S (FDA)-QT.
- F. Double Check Backflow Preventer Assembly:
1. Acceptable manufacturers:
 - a. Watts.
 - b. Beeco.
 - c. Ames.
 2. Double check valve type with shutoff valves.
 - a. Quarter turn ball shut-off valves up to 2-1/2 Inches.
 - b. Outside stem and yoke gate shut-off valves 3 Inches and over.
 3. Lead-Free bronze body construction up to 2-1/2 Inches.
 4. Cast iron body construction 3 Inches and over with stainless steel internal ports and FDA approved fused epoxy coating.
 5. Provide in-line upstream y-type strainer.
 - a. 20 mesh strainer 2 Inches and below.
 - b. 0.125 perforated screen mesh 2-1/2 Inches and over.
 6. Acceptable Product: Watts No. 709S (FDA)-QT.
- G. Hose Bibbs Within Mechanical Rooms or Unfinished Building Space: 3/4" chrome plated brass compressed cocks; hose connection; key handle, lock shield, vacuum breaker; Chicago No. 998 or No. 952, as required; or equivalent by T&S Brass or Woodford.
- H. Interior Wall Hydrants - Finished Areas: 3/4" hose bibb with anti-siphon vacuum breaker in wall box with polished chrome locking cover, lose key handle equal to Woodford Model B-74.
- I. Wall Hydrants - Exposed Non-Freeze Wall Hydrant with Integral Vacuum Breaker: Josam #71300-54-95 cast bronze hydrant with satin nickaloy scoriated with cylinder vandalproof lock face, integral backflow preventer. "T" handle key, and bronze casing with 3/4" universal inlet connection.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install equipment in accordance with manufacturer's recommendations.
- B. All piping shall be properly cleaned and reamed to the full inside diameter of the pipe size prior to joining.
- C. Connections to Equipment:
 - 1. Install necessary pipe connections and fittings required to connect equipment.
 - 2. No rough-in shall be done before drawings of equipment are received.
 - 3. Make all final connections to include unions or flanges to facilitate future removal.
 - 4. Install cutoff valves on equipment connections.
- D. Install shock arrestor ahead of each quick closing valve, at top of each riser and on pipe run to water closets as recommended by manufacturer. Shock arrestors shall be accessible as required by Local Codes.
- E. Install backflow preventers at connections to closed mechanical water system makeup such as chilled water and hot water systems and beverage dispenser connections as required by Local Codes.
- F. Pressure reducing valve assembly shall be installed as required when city water supply pressure exceeds 80 psig at the building domestic water header.
- G. Trap Primer Lines cast in concrete floor or below slab shall be continuous Type "K" copper tubing. No joints shall be allowed below floor. Insulate copper tubing with 1/2" insulation below slab, polywrap copper tubing, or provide approved coating to prevent contact between copper and concrete when cast in floor or structure. Slope trap primer line continuously. No piping shall be cast in structural members unless noted on plans and approved by Structural Engineer.
- H. Strictly coordinate locations of wall clean out cover plates and access doors. Submit locations to the Architect prior to installation for final approval.

3.2 FIELD QUALITY CONTROL

- A. Testing:
 - 1. Furnish instruments, equipment, and labor necessary to conduct tests.
 - 2. Methods of sampling, inspecting, and testing shall conform to local codes.
 - 3. Tests of plumbing systems:
 - a. Plumbing piping systems shall be pressure tested.
 - b. Underground piping shall be tested and successfully repaired prior to backfilling.
 - 4. Water Systems:
 - a. When rough-in is completed and before fixtures are set, entire hot and cold water and piping systems shall be tested at hydrostatic pressure of not less than 100 psig, and approved tight at this pressure for not less than 30 minutes.
 - b. Where portion of water piping system is to be concealed before completion, portion shall be tested separately as specified for entire system.
 - 5. Domestic hot water circulating system: Balance and check prior to final inspection and provided with sufficient thermometers installed at time of final construction review to prove that water is circulating in all piping loops to fixtures.
 - 6. Defective work:
 - a. If inspection or test shows defects, defective work or material shall be replaced or repaired as necessary and inspection and tests shall be repeated.
 - b. Repairs to piping shall be made with new materials.

c. No caulking of screwed joints or holes will be acceptable.

B. Disinfection:

1. After pressure tests have been made and leaks repaired, flush entire domestic water distribution system with water until entrained dirt and mud have been removed.
2. On the building side of each water meter assembly, provide a minimum 3/4 inch connection for injection of sterilizing fluid to disinfect the piping system chlorinating materials utilizing liquid chlorine or calcium hypochlorite shall be used.
3. Provide dosage of not less than 50 parts per million.
4. Retain treated water in pipe long enough to destroy all non-spore forming bacteria.
5. Retention time shall be at least 24 hrs. and shall produce not less than 10 ppm of chlorine at extreme end of system at end of retention period.
6. Open and close valves in system being disinfected several times during contact period.
7. Flush system with clean water until residual chlorine is reduced to less than 1.0 ppm versus 0.2 at the most remote fixture.
8. During flushing period, open and close valves and faucets several times at several locations.
9. From several points in system, take samples of water in properly disinfected containers for bacterial examination.
10. Repeat disinfecting until satisfactory bacteriological results have been obtained and City Health Dept. has made final approval of test.

3.3 ADJUSTING AND CLEANING

- A. Equipment, pipes, and valves shall be cleaned of grease, metal cuttings, and sludge that may have accumulated from operation of system during test.
- B. Stoppage, discoloration, or other damage to finish, furnishing, or parts of building, due to failure to properly clean piping system, shall be repaired.
- C. When work is complete, adjust hot water systems for uniform circulation.
- D. Adjust flush valves and automatic control devices for proper operation

END OF SECTION

SECTION 22 13 16

SANITARY WASTE AND VENT SYSTEM

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- A. Comply with Division 01 - General Requirements and referenced documents.
- B. Comply with Division 22 Sections, as applicable. Refer to other Divisions for coordination of work with other trades, as required.

1.2 SYSTEM DESCRIPTION

- A. Provide a complete sanitary waste and vent system as indicated herein and as illustrated on the contract drawings.
- B. Make connections to grease traps, oil interceptors, sewage ejectors, sump pumps or other devices as specified here or as shown on the drawings.
- C. Provide trap primer connections on floor drains or other devices as indicated and as required by the local authorities having jurisdiction.

1.3 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 30 00.
- B. Indicate on submittal piping material and joining method for each system and for the various sizes of piping systems to be installed. This shall be in tabular form in one location.
- C. Product Data:
 - 1. Pipe.
 - 2. Fittings.
 - 3. Joining methods.
 - 4. Floor drains.
 - 5. Clean outs.
- D. Certification: Submit certification that completed system complies with test requirements of municipality, State, and other public authorities having jurisdiction over system.
- E. Provide closeout documents as required in Division 1, Section 01 70 00.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with requirements in following order of precedence:
 - 1. Codes, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction over installation, inspection, and testing, including local codes.
 - 2. Provisions specified in this Section.
 - 3. Local Plumbing Code.
- B. Installer shall have been doing related work as described herein for a minimum of 5 years.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

A. Above ground:

1. Cast Iron Piping:
 - a. Pipe 1-1/2 Inches through 6 Inches: CISPI 301, or ASTM A888, service weight, no hub cast iron pipe, coated with coal tar pitch.
 - b. Fittings 1-1/2 Inches through 6 Inches: CISPI 301, or ASTM A888, service weight, no hub cast iron fittings with coal tar pitch coating.
 - c. All cast iron soil pipe and fittings shall be marked with the collective trademark of Cast Iron Soil Pipe Institute (CISPI) and be NSF Internationally listed.
2. Cast Iron Soil Pipe Joints:
 - a. Pipes with hubs: Provide neoprene compression gasket seals ASTM C564.
 - b. Hubless pipe: Provide 28 gauge stainless steel shield and clamp assembly over one piece neoprene sealing sleeve, Clamp-All "HI-TORQ 80", or Husky SD-2000.
3. Schedule 40 PVC Piping Above Grade:
 - a. Pipe 1-1/2 - 6 inches: Poly Vinyl Chloride (PVC) schedule 40, drain waste vent (DWV) pipe, ASTM D2466, ASTM D 2321, ASTM D2665 and ASTM 1785, NSF stamped and approved. System shall be rated for 200 psi minimum pressure.
 - b. Fittings 1-1/2 - 6 inches: Poly Vinyl Chloride (PVC) schedule 40, DWV patterned fittings, ASTM D2466 and ASTM 1784, NSF stamped and approved.
 - c. Solvent Cement: Shall comply with pipe and fitting manufacturer's recommendations and shall be a two (2) step process with Primer manufactured for thermoplastic piping systems and solvent cement per manufacturer and shall conform to ASTM D2564 and ASTM F656.
 - d. Anywhere non-plenum rated pipe is installed in return air plenums, all exposed portions of this pipe shall be covered with a plenum safe jacketing, or wrap, system per Insulation Specification 22 07 00 or use cast iron piping as specified above.
 - e. PVC pipe material shall not be allowed to serve fixtures, drains, or equipment subject to receiving fluids with temperatures of 140 Deg.F. or higher. Provide cast iron service weight pipe and fittings as specified above and extend a minimum of 20' (twenty feet) or to main waste line to assure high temperature cools in cast iron pipe before entering PVC piping material.

B. Schedule 40 PVC Piping Below Grade:

1. Pipe 1-1/2 - 6 inches: Poly Vinyl Chloride (PVC) schedule 40, drain waste vent (DWV) pipe, ASTM D2466, ASTM D 2321, ASTM D2665 and ASTM 1785, NSF stamped and approved. System shall be rated for 200 psi minimum pressure.
2. Fittings 1-1/2 - 6 inches: Poly Vinyl Chloride (PVC) schedule 40, DWV patterned fittings, ASTM D2466 and ASTM 1784, NSF stamped and approved.
3. Solvent Cement: Shall comply with pipe and fitting manufacturer's recommendations and shall be a two (2) step process with Primer manufactured for thermoplastic piping systems and solvent cement per manufacturer and shall conform to ASTM D2564 and ASTM F656.
4. Anywhere non-plenum rated pipe is installed in return air plenums, all exposed portions of this pipe shall be covered with a plenum safe jacketing, or wrap, system per Insulation Specification 22 07 00 or use cast iron piping as specified above.
5. PVC pipe material shall not be allowed to serve fixtures, drains, or equipment subject to receiving fluids with temperatures of 140 Deg.F. or higher. Provide cast iron service weight pipe and fittings as specified above and extend a minimum of 20' (twenty feet) or to main waste line to assure high temperature cools in cast iron pipe before entering PVC piping material.

2.2 CLEANOUTS

- A. Acceptable Manufacturers:
1. Model numbers specified are products of Jay R. Smith, unless otherwise specified.
 2. Other acceptable manufacturers:
 - a. Josam.
 - b. Wade.
 - c. Zurn.
 - d. Watts.
 - e. MIFAB.
- B. Size: Same size as pipe up to 4 Inches; 4 Inch for 4 Inch and larger pipe.
- C. Cleanouts for Cast Iron Pipe: Tapped extra heavy cast iron ferrule, caulked into cast iron fittings.
- D. Cleanout Plugs:
1. Meet requirements of Plumbing Code, with American Standard pipe threads.
 2. Taper thread bronze plug.
 3. Or neoprene gasket seal ABS plug.
- E. Cleanouts do not require special covers on lines in completely accessible pipe chases or in equipment rooms where piping is exposed.
- F. Pipe Fittings at Cleanouts: Make cleanouts turning out through walls and up through floor by long sweep ells or "Y" and 1/8 bends.
- G. Cleanout Cover Plates:
1. Provide face or deck plates for concealed cleanouts to conform to architectural finish in room.
 2. Where no definite finish is indicated, wall plates shall be stainless steel and floor plates Nickel Bronze.
 3. Provide vandalproof screws.
- H. Acceptable Products:
1. In floor with Linoleum tile or vinyl tile finish:
 - a. Round Nickel Bronze top.
 - b. Scoriated top.
 - c. Smith No. 4051L-NB-U.
 2. In floor with ceramic tile finish:
 - a. Square Nickel Bronze top.
 - b. Scoriated top.
 - c. Smith No. 4051L-NB-U,
 3. In finished rooms flush with wall:
 - a. Vandal Proof Stainless Steel Center screw.
 - b. Cleanout tee with Stainless Steel Round Cover.
 - c. Smith No. 4530Y-SS-U.
 4. In fan or mechanical room floors with concrete finish and/or with floating floors:
 - a. Round Nickel Bronze Extra Heavy Duty top.
 - b. Secured Scoriated top.
 - c. Smith No. 4111L-NB-U.
 5. In floors with carpet:
 - a. Continuous Carpet: Round Nickel Bronze top with Nickel Bronze Carpet Clamping Device (-X).

- b. Carpet Squares: Round Nickel Bronze Scoriated top below carpet with screwed Stainless Steel Carpet Cleanout marker (-Y).
 - c. Smith No. 4031L-Y-NB-U or 4031L-X-NB-U.
6. For terrazzo floor finish:
- a. Round Nickel Bronze top.
 - b. Scoriated top.
 - c. Smith No. 4051L-NB-U.

2.3 DRAINS

A. Acceptable Manufacturers:

- 1. Josam.
- 2. Jay R. Smith.
- 3. Wade.
- 4. Zurn.
- 5. Watts.
- 6. MIFAB.

B. P-traps:

- 1. Provide floor and equipment drains with cast iron P-traps.
- 2. Provide deep seal traps where indicated, or as required.

C. Trap Primer Connections: Where indicated or shown on the drawings provide a trap primer connection on the body on the P-trap of each drain of the size indicated.

D. Clamping Collars: When installed with waterproofing membrane, or shower pans, provide floor drains with clamping collar.

E. Floor Drains/Sinks:

- 1. Floor Drain "FD-1" - For Finished Areas: Smith No. 2005-A06NB-U, cast iron body with cast iron collar, adjustable six inch (6") round secured satin finish bronze strainer, vandalproof screws, and bottom outlet. Provide Smith No. 3510-F1107NB cast iron body and cast iron collar, adjustable seven inch (7") round nickel bronze strainer, and four inch (4") round nickel funnel for drains that receive indirect waste piping from equipment or fixtures. Provide six inch (6") square top strainer size for Square Ceramic Tile Floors. Smith No. 2005-B06NB.
- 2. Hub Drain (H.D.): Set cast iron bell flush with finished surface, unless otherwise noted.

F. Provide deep seal cast iron traps with trap primer connections for all floor drains and hub drains that are served by T.P. lines routed below the slab or floor and cannot connect to T.P. connection on drain body.

G. Trap Guards: Acceptable Manufacturer: ProSet Systems, Inc., or Jay R. Smith

1. Description:

- a. Material: Smooth, soft, flexible, elastomeric PVC molded material molded into shape of duck's bill, open on top with curl closure at bottom.
- b. Allows wastewater to open and adequately discharge floor drain through its interior.
- c. Closes and returns to original molded shape after wastewater discharge is complete.

2. Compliance:

- a. ASME A112.6.3.
- b. NSF/ANSI 14.
- c. CSA B 79.

2.4 VENT PIPE ROOF PENETRATION FLASHING

- A. Flash each vent pipe roof penetration as recommended by the roofing system manufacturer as specified under other sections of the specifications.
- B. Where vent pipes pass through the roof and no indication is made elsewhere in other sections of the specifications as to flashing requirements, use 4 lb. per Sq. Ft. minimum; seamless sheet lead rolled over the vent pipe to counter flash pipe.
- C. When lead flashing is required under the conditions noted in the above paragraph comply with the following:
 - 1. 24 Inches square minimum size at base of lead flashing.
 - 2. 8 Inches minimum clear on all sides of pipe.
- D. Install vandalproof vent caps similar to Smith No. 1748 to be the same size as vent pipes passing through the roof.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
 - 1. Each plumbing fixture shall be individually trapped and vented with vent and waste stacks full size throughout.
 - 2. Install reducers, increasers, special flanges and fittings between piping and fixtures for complete installation, ready for use.
 - 3. Make offsets necessary to avoid construction interferences.
 - 4. Connect plumbing fixtures, drains, appurtenances, and appliances to receive or discharge liquid waste or sewage to sanitary waste system in accordance with requirements of local codes.
 - 5. Protect seal of fixture trap in plumbing system with properly installed vent.
 - 6. Coordinate floor drain locations with Drawings and other trades.
 - 7. Manhole covers shall be sealed gas tight. Provide gasketed seal as recommended by manufacturer.
- B. Slope:
 - 1. Slope horizontal drainage lines 2 inches and smaller 1/4 In per foot toward main sewer.
 - 2. Slope 3 inch and larger drainage lines 1/8 inch per foot
 - 3. Horizontal drain lines shall be run in straight lines uniformly sloped.
 - 4. Make changes in direction of flow of horizontal lines with wye and 1/8 bends.
- C. Vents:
 - 1. Extend vents above roof without reduction in size and terminate not less than 25 feet away from shaft, windows, or ventilating air intake openings.
 - 2. All vent and branch vent pipes shall be graded and connected to drip back to sanitary waste pipe by gravity.
 - 3. Extend vent lines at least 6 inches above flood level rim of vented fixture before offsetting.
 - 4. Extend all vents minimum of 18 inches above roof.
 - 5. Offset vents in outside walls to penetrate roof at least 18 inches from outside walls.
 - 6. Extend roof vent flashing onto roof surface minimum of 8 inches on all sides in accordance with the roofing system manufacturer's recommendations.
 - 7. Coat metal sheet flashing with bituminous mastic where in contact with mortar or concrete to prevent direct contact with masonry materials.
- D. Traps:
 - 1. Equip each fixture, floor drain or piece of equipment connected to sanitary waste system with a trap.
 - 2. Plumbing fixtures, except those having integral traps, shall be separately trapped by water seal P-traps placed as close to the fixture outlet as possible.

3. Provide trap with cleanout.
4. No fixture shall be double trapped.

E. Cleanouts:

1. Cleanouts shall be installed per plumbing code in addition to those locations identified below.
2. Install in each change of direction greater than 90 degrees, at end of lines, base of risers, and other points necessary to permit cleaning of pipe sections.
3. Wall cleanout shall be provide on individual sinks, lavatories, and electric water coolers.
4. Cleanouts shall be readily accessible.
5. Extend cleanouts on concealed piping through and terminate flush with wall, floor, or grade. Strictly coordinate cleanout cover plate location with the Architect for approved locations prior to pipe installation.
6. Wall cleanouts shall be provided at restrooms, at a minimum, at the beginning and end of the chase wall. Cleanouts located at water closets shall be set 12" above the flood rim of the water closet. Cleanouts located at urinals shall be set 6" above the flood rim of the urinal.
7. Provide additional cleanout as indicated in the documents and/or as required by owner and local AHJ.
8. Space cleanouts not more than 50 feet apart for 3 inch pipe or less and not more than 100 feet apart for 4 inch and larger pipe.
9. If local requirements are more stringent than those indicated herein then those shall govern.
10. Cleanouts located at restroom batteries and/or at water closets shall be installed 12 inches above the flood rim of the water closet.

F. Drains:

1. Install floor, area, and equipment drains flush in the floor or basin to be drained unless indicated otherwise.
2. Locate drains in mechanical equipment spaces to conform with drain locations of equipment furnished.
3. Coordinate drain locations for Food Service equipment with rough-in drawings for such.
4. Coordinate with other trades to insure floors are sloped toward floor or area drains to provide positive drainage.

G. Coordinate installation of vent flashing for all roof penetrations with other sections of the specifications.

3.2 FIELD QUALITY CONTROL

- A. Furnish instruments, equipment, and labor necessary to conduct tests.
- B. Test underground soil and waste piping before backfilling.
- C. Test drainage, waste, and venting piping with water before fixtures are installed.
- D. After plumbing fixtures have been set and traps filled with water, submit entire drainage, waste, and venting system to final test with smoke.
- E. Water Test:
 1. Apply water test to drainage, waste, and venting system either in its entirety or in sections.
 2. If entire system is tested, tightly close openings in pipes except highest opening.
 3. Fill system with water to point of overflow.
 4. If system is tested in sections, each opening except highest opening of section under test shall be tightly plugged.
 5. Fill each section with water and test with at least 10 foot head of water.
 6. In testing successive sections, at least upper 10 feet of next preceding section shall be tested so that each joint of pipe in building except uppermost 10 feet of system has been subjected to test of at least 10 foot head of water.
 7. Keep water in system or in portion under test for at least 60 minutes before inspection starts.
 8. Repair any leaks discovered during test.
 9. Repeat test until system holds water for six (6) hours without drop in water level.

F. Video Scoping:

1. Prior to start of construction, Contractor shall video scope the sanitary sewer mains. Any breaks, separations, bellies, or abnormality to sewer main shall be reported to the Birdville Independent School District Project Manager.
2. At the completion of construction, the Contractor shall video scope the sanitary sewer mains and provide copies of video scope to the Plano Independent School District Project Manager.

G. Final Smoke Test: At the completion of project where new sanitary sewer piping is installed and/or existing sanitary sewer piping is modified, the entire sanitary sewer system for the facility shall be tested as indicated below. BIRD construction manager shall be notified (2) days in advance of when the test shall occur. Contractor shall document testing procedures, start time and time of completion. This information shall be included into the O & M manuals as part of the final close out documents.

1. Produce smoke by smoke machine.
2. Maintain pressure equal to 1 inch water column for 15 minutes before inspection starts.
3. Repair leaks discovered during test.
4. Repeat test until system holds smoke for ten (10) minutes without showing leaks.

END OF SECTION

SECTION 22 21 13

PLUMBING PIPING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Comply with Division 1 - General Requirements and referenced documents.
- B. Comply with all other Division 22 Sections, as applicable. Refer to other divisions for coordination of work with other portions of Work.

1.2 SYSTEM DESCRIPTION

- A. Furnish and install all piping of every kind required, specified, or shown on the Drawings for the installation of the work specified in Division 22. The location, direction, and size of the various lines are indicated on the Drawings. Lines for pilot and controls and instrumentation are not shown but shall be installed as required and as specified.
- B. Piping systems shall include all appurtenances shown on the drawings and specified herein.
- C. Valves or cocks shall be installed to control the flow of water to each of the various systems, to segregate individual items of equipment and parts of fluid circulating or supply systems, and to permit draining of systems or portions thereof, to blow-off strainers, etc., as directed on the Drawings and specified.
- D. The work shall include the furnishing and installing of all supporting structures and members for pipes, ducts, and equipment.
- E. Support devices and members shall include vibration and noise isolating devices and assemblies. Penetrations of walls to structure shall be sealed off to limit noise transmission through sleeves.
- F. **All material shall be manufactured in the United States and/or shall comply with the North America Free Trade Agreement, NAFTA.**

1.3 QUALITY ASSURANCE

- A. All equipment and materials shall be new and of the best quality.
- B. All equipment and materials shall be installed by experienced mechanics certified and trained for the work performed.

1.4 SUBMITTALS

- A. Product Data: Submit complete manufacturer's descriptive literature and installation instructions in accordance with Section 01 33 00 for all piping materials to be used for each system, valves and plumbing specialties as specified herein.
- B. Shop Drawings:
 - 1. Submit in accordance with Sections 01 33 00 and 22 05 00.
 - 2. Submit 1/4" = 1'-0" Plumbing Piping Shop Drawings.
 - 3. Overlay piping Shop Drawings over other Shop Drawings of other trades to include electrical and sheet metal Shop Drawings.
 - 4. Plan views of congested areas and sections thereof shall be drawn at a scale of 3/8" = 1'-0".

5. There is a minimum \$150.00 fee, payable to the engineer to obtain Auto Cadd files for this purpose. A "Release of Liability" form must be signed after which a single CD will be produced when payment is received.

C. Fully coordinate all piping shop drawings with sheet metal shop drawings and other trades. Failure to submit shop drawings in a timely manner, as required to keep pace with the construction and work of all other trades, will result in delays, and possible stoppage, of payment to the Contractor. Additionally, no work may proceed until such shop drawings are submitted, reviewed, and found to be acceptable by the Engineer.

1.5 PRODUCT HANDLING

- A. Cover and protect material in transit and at site. Material not properly protected and stored and which is damaged or defaced during construction shall and will be rejected.
- B. Storage and protection of materials shall be in accordance with Section 22 05 00.
- C. Take special precautions to protect control valve internals from construction dirt and debris. If valves are stored on site cover valve openings until just prior to installation but in no case shall valves be unprotected for more than 48 hours.
- D. Openings in piping system, boilers, pumps, valves and other heat exchangers shall be covered during the construction period to protect the interior accumulation of dirt and debris in these systems until immediately prior to connection to these components to similarly protected systems.

PART 2 - PRODUCTS

2.1 FLANGES

- A. Flanges in welded lines for water systems shall be 150 pound forged steel, welding neck flanges, except where cast iron fittings are used as specified elsewhere in these specifications, and except as otherwise shown.
- B. Flanges in screwed ferrous lines shall be 125 pound cast iron or 150 pound forged steel screwed flanges.
- C. Where ferrous flanges connect to flat faced flanges on valves, items of equipment, etc., the companion flange shall be flush faced and where the flanges on items of equipment are raised face flanges, the companion flanges shall have raised faces.
- D. Flanges in copper lines shall be solder joint type cast brass flanges.
- E. Flange bolts and nuts shall conform to the applicable requirements of the latest edition of the Code for Pressure Piping.
- F. Slip-on welding neck flanges are prohibited.
- G. Flanges shall be Weldbend, Tube Turn, Hackney, or approved equals.

2.2 GASKETS

- A. Install gaskets between flanges of all flanged joints. Where used with brass or bronze flanges or with flat face ferrous flanges, they shall be full face type. For all other flanges they shall be ring gaskets properly cut to fit within the inside edges of the bolts.
- B. Gaskets in water lines shall be Garlock No. 24 Wire Insertion Red Rubber Sheet Packing, 1/16" thick and for any other systems use special materials suitable for the duty as recommended by their manufacturer.

2.3 INSULATING FITTINGS

- A. Except that no dielectric fitting shall be installed in connections between copper or brass and sanitary cast iron waste, drain and vent lines, wherever an interconnection is made between ferrous pipes or vessel and copper tubing or brass pipe, or vice versa, install a dielectric fitting.
- B. In lines assembled with screwed or soldered joints, use insulating couplings (unions) suitable for the intended service and where flanged connections are required, use insulating gasket material between flange faces, insulating grommets between bolts and holes in flanges and insulating washers under both bolt heads and nuts.
- C. PVC couplings of any kind shall not be acceptable for insulating couplings.
- D. Insulating fittings shall be suitable for the service medium, operating pressure and temperature. Fittings shall be rated for 1.5 times the normal system operating temperature and pressure in which installed.
- E. Insulating fittings shall be as manufactured by EPCO, Maloney, or Crane.

2.4 VALVES

- A. All valves of any one type shall be of the same make throughout and insofar as practicable all valves in a given category shall be of the same make.
- B. All valves shall be so located as to be readily accessible for operation and maintenance.
- C. Furnish and install all valves indicated on the Drawings, specified herein, and required to control the flow of water to and from various parts of the systems and to isolate various pieces of machinery and equipment and to isolate various parts of the systems.
- D. Each valve for installation in a line to be insulated shall have sufficient clearance between the valve body and the operating handle or device to accommodate the insulation.
- E. All valves shall be designed for re-packing under pressure when fully opened and shall be equipped with packing suitable for the service.
- F. Valves shall generally be installed with stems up; but, in no case, less than horizontal and whenever possible shall be grouped together in a uniform manner.
- G. Except where special valves are specified elsewhere herein or as required by special conditions or class of work, valves shall be equivalent to the following Nibco Co. valve numbers listed herein.
- H. All valves used for domestic water service shall be Lead-Free per the "Safe Drinking Water Act". U.S. Senate Bill S. 3874.
- I. Where cocks are required, they shall generally be brass, screwed pattern up to 2" and cast iron flanged pattern 2-1/2" and larger plug cocks suitable for the system pressure. Also provide and install all special cocks required such as pet cocks, gauge cocks, etc.
- J. Provide Lead Free plug valves where indicated, at "all water balance stations" and at all pump discharges.
 - 1. In no case shall butterfly or ball valves be substituted for plug valves where plug valves are indicated on the Drawings.
 - 2. Valves shall be flanged-type, 2-1/2" and larger, and threaded 2" and smaller.
 - 3. Plug valves 4" and smaller shall be equal to DeZurik Series 400 eccentric plug valves with cast iron bodies.
 - 4. Plug valves over 4" in size shall be equal to DeZurik Series 100 eccentric plug valves with cast iron bodies.
 - 5. Valves 4" or smaller shall have cast iron bodies with bronze plugs on sizes 2" and smaller and electroless nickel plated cast iron plugs on 2-1/2" to 4" valves.

Controlled Entry at 15 Campuses
Birdville ISD
North Richland Hills, Haltom City, Hurst and Watauga, Texas

6. Valves over 4" shall have cast iron bodies with stainless steel plugs and bearings.
 7. All plugs shall have resilient faces rated for water temperatures up to 250 Deg.F. and stem seals meeting the same temperature rating. For general chilled and heating water applications, elastomeric coating shall be EPDM.
 8. Furnish lever operator for all valves except at water coils of terminal units where snap-on plastic caps shall be furnished.
 9. All valves shall have adjustable memory stops with plastic drip caps.
 10. Plug valves shall be furnished with drilled and tapped 1/8" openings for pressure gauge connections at both upstream and downstream sides.
 11. Plug valves shall be bubble tight with 150 pound differential pressure across the seat.
 12. An indicator shall be included to show valve position.
 13. All flanged plug valves shall have bolted bonnets.
 14. All valve seats shall be welded in nickel for plug valves over 4" in size.
 15. Plug valves shall be as manufactured by:
 - a. SMG.
 - b. McDonald.
 - c. Rockwell-Nordstrom.
 - d. Milliken.
- K. Lead Free Check valves in pump discharge lines shall be flanged non-slam type silent check valves. Valves shall have a bronze body and be bronze fitted with stainless steel springs. Valves shall be rated for 125 PSIG WOG and be one of the following products:
1. Nibco - 480 Series, or equal by
 2. Apollo 61LF-100.
 3. Hammond UP943 or UP947.
- L. Lead Free Swing Check Valves 2" and smaller shall be the Y-pattern swing-type manufactured in accordance with MSS-SP 80, and be Class 125 rated to 200 degrees F or below, have bronze ASTM B-62 bodies with bronze discs. Swing check valves 2" and smaller shall be of the following:
1. Nibco - T/S-413-B.
 2. Apollo 161 T/S-LF.
 3. Milwaukee UP509 or UP1509.
 4. Hammond - UP904 or UP912.
- M. Lead Free Swing Check valves 2-1/2" and larger shall be the swing-type manufactured in accordance with MSS-SP71, be Class 150 rated for 200 degrees F. or below, be flanged, have ASTM A126, Class B, cast iron bodies with bronze trim, and have non-asbestos gaskets. Swing Check valves 2-1/2" and larger shall be one of the following:
1. Nibco - S-433-B, or equal by
 2. Apollo.
 3. Milwaukee.
 4. Hammond.
- N. Bronze Lead-Free Ball valves: 2" and Smaller:
1. Ball valves shall be on the following products:
 - a. Nibco T-585-66-LF or S-585-66-LF.
 - b. Apollo 77CLF-140 Series.
 - c. Hammond UP8301A or 8311A.
 2. Ball valves may also be used in lieu of plug valves for balancing purposes for lines 2" and smaller and only when provided with memory stops.
 3. Ball valves shall be full port design with stainless steel ball and stem.
 4. All ball valves shall be manufactured from a dezincification resistant material with less than 15% zinc.

5. Provide memory stops where used for balancing or as shown and where detailed.
 6. Provide extended lever handles for all valves installed in insulated lines.
 7. Ball valves installed on water piping shall be provided with an extended "T" handle with insulation insert and collar that creates a vapor seal to prevent condensation while allowing adjustment of memory stops and valve packing maintenance without disturbing the insulation. Insulated "T" handles shall be equal to Nib-Seal as manufactured by NIBCO. No extended metal handles are allowed.
- O. Flanged FDA Approved Lead-Free Ball valves: 2½" and Larger:
1. Ball valves shall be on the following products:
 - a. Watts G4000M1.
 - b. Apollo 70LF-140 Series (2 ½"-4").
 - c. Apollo 6PLF
 2. Ball valves shall be full port design with stainless steel ball and stem.
 3. Ball valves shall be manufactured with FDA approved epoxy coating.
- P. Lead Free Manual Balancing Valves
1. Valves shall be cast bronze body with stainless steel ball construction with glass and carbon filled TFE seat rings tapped purge port, memory stops, calibrated name plate, with positive shut-off, provide Bell & Gossett "Circuit Setter Plus" or equal by ARMSTRONG, NIBCO & DANFOSS shall have differential pressure read-out ports across the valve seat. Read-out ports shall be fitted with internal EPT check valves.
- Q. Lead Free Automatic Balancing Valves
1. ThermOmegaTech – "Circuit Solver Assembly" CSUA or CSUA-PP with integral spring check valve. Stainless steel self-contained fully automatic thermal flow control device. Assembly shall be provided with lead-free full port bronze ball valves, integrated union and internal spring check valve.
- R. All valves, valve packing material, gaskets, pipe threading compound, etc., shall be compatible with ethylene glycol, without exception. Typically, use EPDM valve packing materials. No teflon materials are allowed. Indicate compliance on submittals.
- ## 2.5 PIPE HANGERS
- A. Pipe hangers, except for fire protection types, shall be as manufactured by Anvil International, Inc. and be of a type suitable for each use. Approved equals by Mason Industries, Inc., B-Line, Grinnell, and PHD Manufacturing, Inc. will be considered.
 - B. For cast-iron pipes up to three inches (3") in size, use Anvil Fig. 104 malleable iron, adjustable, split ring, swivel hanger, or Anvil Fig. 590 steel clevis hanger. For cast iron plumbing piping four inches (4") and larger, use only Anvil Fig. 590 steel clevis hanger.
 - C. For PVC, CPVC, PVDF, Polypropylene pipe sizes up to three inches (3") in size, use Anvil FIG. 104 malleable iron, adjustable, split ring, swivel hanger, or Anvil FIG. 590 Steel Clevis hanger. For sizes four inches (4") and larger, use only Anvil FIG. 590 Steel Clevis hanger.
 - D. Domestic cold and hot water piping ¾" in size up to and including twelve inches (12"), shall be Anvil Fig. 260, adjustable clevis hangers. Hangers shall be sized to be on the outside of the insulation.
 - E. Where several pipes are routed parallel to each other and at the same elevation, trapeze hangers may be used. Where trapeze hangers are used, the pipes shall be supported on rollers where rollers are called for elsewhere by these specifications.
 - F. For bare copper pipes (uninsulated only) up to and including three inches (3") in size, use Anvil Fig. CT-109 malleable iron, copper plated, split ring, hangers or Anvil Fig. CT-65 copper plated clevis hangers.

For uninsulated copper pipes larger than three inches (3"), use Anvil Fig. CT-65 copper-plated clevis hanger.

- G. Hanger rod sizes shall conform to the following schedule:

Pipe up to, and including 2"	3/8" rods
Pipe 2-1/2", 3", and 3-1/2"	1/2" rods
Pipe 4" and 5"	5/8" rods
Pipe 6"	3/4" rods
Pipe 8", 10" and 12"	7/8" rods
Pipe 14", 16" and 18"	1" rods
Pipe 20" up to 30"	1-1/2" rods

- H. Unless shown otherwise on the Drawings, all horizontal runs of steel piping shall be suspended from the floor or roof construction, as the case may be, by means of hangers with the following maximum spacing:

Pipe up to, and including 1-1/4"	8 feet
Pipe 1-1/2" and 2"	10 feet
Pipe 2-1/2" and 3"	12 feet
Pipe 3-1/2" and 4"	12 feet
Pipe 5" and 6"	*8 feet
Pipe 8" and larger	*8 feet
* Maximum 8 foot spacing for pipe supports for pipes 5" and larger due to structural considerations.	

- I. Unless shown otherwise on the Drawings, all horizontal runs of cast-iron piping shall be suspended from the floor or roof construction, as the case may be, by means of hangers with the following maximum spacing:

Pipe up to, and including 1-1/4"	5 feet
Pipe 1-1/2" and 2"	*5 feet
Pipe 2-1/2" and 3"	*5 feet
Pipe 3-1/2" and 4"	*5 feet
Pipe 5" and 6"	*5 feet
Pipe 8" and larger	*5 feet
* Maximum horizontal spacing of cast-iron pipe hangers shall be increased to 10 feet where 10-foot lengths of pipe are installed.	

- J. Unless shown otherwise on the Drawings, all horizontal runs of "Poly" thermoplastic type piping shall be suspended from the floor or roof construction, as the case may be, by means of hangers with the following maximum spacing:

Pipe up to, and including 1-1/4"	4 feet
Pipe 1-1/2" and 2"	4 feet
Pipe 2-1/2" and 3"	4 feet
Pipe 3-1/2" and 4"	4 feet
Pipe 5" and 6"	4 feet
Pipe 8" and larger	4 feet

- K. Unless shown otherwise on the Drawings, all horizontal runs of copper piping shall be suspended from the floor or roof construction, as the case may be, by means of hangers with the following maximum spacing:

Pipe up to 3/4" in size	6 feet
Pipe 1" and 1-1/4"	8 feet
Pipe 1-1/2" and 2"	10 feet
Pipe 2-1/2" and larger	12 feet

- L. There shall be a hanger within two feet (2') for any ferrous or copper piping and eighteen inches (18") for any "poly" thermoplastic type pipe of each elbow or tee. Additional supports shall be provided for valves, strainers, etc. Cast iron pipe shall have not less than one hanger per length of pipe. Vertical risers shall be supported by approved riser clamps. Vertical pipes within a space shall have not less than two (2) supports. Where the vertical run of pipe in a space exceeds 14 feet then three (3) supports shall be required.
- M. Supports and hangers shall be installed to permit free expansion and contraction in the piping systems. Hangers shall permit vertical adjustment to maintain proper pitch. Where necessary to control expansion and contraction, the piping shall be guided and firmly anchored. No piping shall be self-supporting; nor shall it be supported from equipment connections.
- N. Inserts shall be used where piping or equipment is to be hung from concrete construction. Inserts shall be Anvil Fig. 281, wedge type, concrete inserts. All inserts shall be pre-treated to prevent rusting. After the forms are removed, clip off all nails flush with the exposed surface of the inserts.
- O. Expansion bolts shall be Ackerman-Johnson.
- P. Beam clamps suitable for the use with the type of steel construction involved shall be an Anvil product or an approved equal as indicated elsewhere herein.
- Q. No perforated straps shall be used to support any mechanical equipment item or piping of any kind.
- R. Potable and non-potable domestic cold water, domestic hot water (includes recirculated lines), horizontal and vertical storm drain downspouts and soil piping receiving cold condensate piping hangers shall be

sized to go around the insulation with shields being provided to protect the insulation. Shields shall be Anvil Fig. 167.

- S. All steel hangers, base plates, supports, nuts, bolts, and all thread rod located outdoors, in crawl spaces, and exposed to the weather, shall be made of galvanized steel or equally suitable corrosion resistant steel alloy or aluminum. Where steel components are allowed and used under these conditions they shall be painted with an equivalent protective coating similar to a two-part epoxy. Refer to Section 09 90 00.
- T. For pipe sizes 8" and under use Anvil Fig. #93 and 94 beam clamps. For pipe sizes 10" through 18" use Anvil Fig. #66 in the "U" position.

2.6 SLEEVES AND ESCUTCHEONS

- A. Generally where pipes pass through interior building walls or floors above the first floor (out of the ground), 22 gauge galvanized sheet metal sleeves shall be used. Sleeves shall extend a minimum one inch (1") above a floor or beyond the wall, as applicable.
- B. All pipes penetrating grade beams, exterior walls, concrete structural members, or concrete slabs of mechanical equipment rooms on the first floor shall generally use standard weight galvanized steel pipe as the sleeving material.
- C. For concrete or masonry walls, sleeves shall be inserted into the masonry, decking or form work prior to the pouring or placement of concrete or masonry units to create a leave out.
- D. The sizes of all sleeves shall be such as to permit the subsequent insertion of the intended pipe of the proper size with adequate clearance for movement due to expansion and contraction. In the case of insulated lines, the diameter of the sleeves shall be at least 1/2" greater than the outside walls of the pipe with specified thickness of insulation. This will require that the inside diameter of galvanized steel pipe sleeves be at least 1/2" greater than the outside diameter of the service pipe with insulation. Galvanized steel pipe sleeves set in floors shall project two inches (2") above the floor.
- E. After the pipes are installed, fill the annular space between the pipe, and insulation as required, and its sleeve with an approved mastic or caulk. Use loose fibrous insulation packing as required to accomplish this. In all cases the annular spaces around the pipes within the sleeved openings shall be filled with loose fibrous insulation and then sealed with an approved caulking or expanded foam insulation.
- F. Escutcheons, except as specifically noted or specified, shall be installed on all pipes passing exposed through floors, walls, or ceilings. Escutcheons shall be equal to the Crane No. 10, chrome plated sectional floor and ceiling plates, and shall fit snugly and neatly around pipe or pipe insulation or insulated lines. Solid chrome plates with set screws shall be used if sectional plates do not fit properly or stay in place. Where multiple pipes penetrate floors or walls in close proximity in concealed areas, shop made sheet metal escutcheons may be used.
- G. Pipes sleeved through grade beams open to basements, crawl spaces or void spaces below grade shall additionally receive "Link Seal" or equal closures made of interlocking synthetic rubber links. Seals shall provide for absolute water tightness. Seal shall be constructed to insulate electrically pipe from wall. Install as recommended by manufacturer. Provide Century-Line sleeves with water stop and anchor collar for pipes penetrating grade beams designated to be anchored.
- H. Where PVC pipes, 3 inches and smaller, and small copper water piping under 2 inches in size, penetrated a horizontal floor slab a metal sleeve will not be required. For these piping systems, completely wrap the piping with a polyethylene tape, or wrapping. This tape shall be minimum 4 mils thick and shall be wrapped at least two times around the pipe and secured sufficiently to hold the wrap in place during the pouring of the slab. This wrap shall be in sufficient length or height to insure that no concrete will be in contact with the pipe. All other piping shall be sleeved as indicated elsewhere herein.

- I. Refer to Section 22 05 00 for additional requirements of penetrations through fire-rated assemblies.

2.7 ACCESS DOORS

- A. Wherever access is required above inaccessible ceilings, in walls, furrings, chases or soffits to physically reach concealed piping, or equipment installed under Division 22, provide access doors of sufficient size to maintain, repair, replace or suitably access devices intended to be adjusted as indicated herein.
- B. Provide an access door or panel for each of any valves, group of valves, damper pull rods, splitter dampers, manual volume dampers, actuators or other controlling mechanism installed under Division 22 which would otherwise be concealed in the building construction with no access.
- C. All access doors in toilet rooms, locker rooms, showers, kitchens, or other similar wet areas shall be the flush mounted type and be made of brush or satin finish stainless steel as manufactured by Milcor or ELMDOR.
- D. All access doors shall be minimum 18" x 18", unless noted otherwise, in size unless otherwise approved in writing in advance by the Engineer. Doors shall be increased in size as required to allow for a person to reasonably access, adjust, maintain, service, inspect or replace the largest single component concealed. Provide special sizes of access doors as required.
- E. Coordinate the final location of all concealed equipment and devices requiring access with the final location of the required access panels or doors. Allow ample space for the removal of all parts and equipment that require replacement or servicing.
- F. Where mounting heights are not detailed or dimensioned, install mechanical piping and overhead equipment to provide the maximum headroom possible while maintaining reasonable access and service to those items being accessed.
- G. All serviceable equipment shall be within immediate reach (maximum of 12") from the access door.
- H. Install all access doors in locations to suit the intended purpose but have each location reviewed and approved by the Architect. In no case shall access doors be located such that the intended purpose is rendered useless.
- I. Access doors shall all have spring concealed hinges, screwdriver operated cam latches, be the flush mounted type, open up to, but not more than, 175 degrees, be made of steel, or stainless steel to suit the application, be fire rated (U.L. rated) to match the rating of the surface where the door is placed, and have a powder coated electrostatic primer paint on all steel doors. Furnish the following access door types as described below:
 - 1. Milcor Style DW - Flush drywall type with frame made of 16 gauge steel, panel door made of 14 gauge steel, galvanized steel drywall bead on frame, and removable hinge pins for removal of panel door. Provide minimum of two hinges (12" x 12" and larger) up to 24" x 24" in size and three hinges on access doors above this size. Provide one cam for access doors 14" x 14" and smaller and a minimum of three cams on larger sizes.
 - 2. Milcor Style K - Flush plaster wall or ceiling type made similar to Style DW except with a 22 gauge expansion casing bead, one hinge on 12" x 12" access doors, two hinges on larger doors with either side no larger than 24", three hinges on doors with any dimension of 24" or larger, minimum one cam on doors with no dimension larger than 18" and two or more cams on larger access doors.
 - 3. Milcor Style M or MS - Flush drywall, masonry or tile type made similar to Style DW except with 14 gauge steel frame and doors (16 gauge when made of stainless steel-satin finish), one hinge on access doors up to 18" x 18" in size, two hinges on sizes 20" x 24" and 22" x 22", three or more hinges on sizes 24" x 24" and larger, and the number of cams as standard with the manufacturer.
 - 4. Provide other types of access doors suitable for the application to include surface mount, double leaf for access doors exceeding 36" in any dimension, louvered where indicated on the Drawings, fire rated, recessed or security/detention types as required and compatible with the surface penetrated.
 - 5. Acceptable manufacturers: ELMDOR or Milcor.

2.8 STRAINERS

- A. Strainers shall be of the FDA approved, heat fused epoxy coated (interior and exterior) "Y" pattern type bodies, unless shown or specified otherwise. Body ends shall be screwed or flanged to match the type of joints in the piping in which the strainers are installed. Strainers shall have a 200 psi non-shock, ANSI B16.1 pressure rating. Watts 77F-DI-FDA-125, or Engineer approved equal.
- B. Each strainer, screen, or mesh shall be of Type 304 Stainless steel, brass, or monel construction. Screen or mesh sizes shall be as scheduled below:

Pipe Size	Screen/Mesh Size
1/2" - 2"	20 Mesh
2-1/2" - 3"	0.045 Perforations
4" - 12"	0.125 Perforations

- C. Where vertical space does not permit the installation of the "Y" strainer, install an equivalent basket strainer.
- D. Strainers shall be of the FDA approved, heat fused epoxy coated (interior and exterior) "Y" pattern type bodies, unless shown or specified otherwise. Body ends shall be screwed or flanged to match the type joints in the piping in which the strainers are installed. Strainers shall have a 200 psi non-shock. ANSI B16.1 pressure rating. Watts 77F-DI-FDA-125, or Engineer approved equal.
- E. Lead Free Bronze Strainers for screwed piping shall be Watts LF777 Series (cast bronze body) with bronze plug stainless steel mesh strainer for copper piping; piping shall be Watts CI-125 or F-125 and CI-250 or F-250 (cast iron bodies). Equivalent as manufactured by the following will be considered:
 - 1. Nibco.
 - 2. Hammond.
 - 3. Apollo.
 - 4. Milwaukee.

2.9 GAUGES AND GAUGE COCKS OR NEEDLE VALVES

- A. Provide the following pressure gauge cock or needle valve connections:
 - 1. At the suction and discharge of each pump.
 - 2. At the domestic water riser, downstream of main isolation valve.
 - 3. Downstream of the building main backflow preventor.
 - 4. At the inlet and outlet of pressure reducing stations.
 - 5. At circuit setter balance stations and any other points indicated or detailed on diagrams on the Drawings.
 - 6. At the inlet and outlet of circulation pumps.
- B. Where gauge connections are installed in insulated lines, install gauge cocks or needle valves on a nipple of sufficient length that the gauge cock or needle valve handle will be free of the pipe insulation. Position each gauge cock in relation to surrounding piping and equipment so that the gauge may be easily read and so that a gauge having a 4" diameter dial can be screwed into and out of the piping nipple where the gauge cock or needle valve is installed. All gauge cocks shall be of the tee-handle type. Needle valves shall be a Weksler AV32, AV34, or BBV4.
- C. Install gauge cocks or needle valves at pumps at the pump suction and discharge flange connections at the pre-drilled and tapped gauge connections as provided by pump manufacturer.

- D. Furnish and install a pressure gauge suitably calibrated at each of the following locations:
1. At the suction and discharge of each pump.
 2. At the domestic water riser, downstream of main isolation valve.
 3. Downstream of the building main backflow preventor.
 4. At the inlet and outlet of pressure reducing stations.
 5. At circuit setter balance stations and any other points indicated or detailed on diagrams on the Drawings.
 6. At the inlet and outlet of circulation pumps.
- E. Gauges shall be of the bourdon tube type, glycerin filled, and shall be selected to operate at about the midpoint of their full range, i.e., for a 50 PSI operation, select a gauge of 0 to 100 psi. Each gauge shall be provided with a brass lever handle union cock or brass handle needle valve. Cases shall be Stainless Steel, not less than four inches (4") in diameter.
- F. Pressure gauges shall be equal to Weksler Model 401L-4-PD with type ASD case, phosphor bronze with phosphor bronze brushed rotary movement and link; 4" dial, nickel plated ring, free standing stainless steel case; equipped with micrometer adjustment pointer. Provide each gauge with scale range suitable for the duty.
- G. Provide pulsation dampeners, adjustable snubbers, or piston type pressure snubbers in line with all pump gauges.
- H. Cocks and gauges shall be manufactured by:
1. Crosby.
 2. Weksler.
 3. Marsh.
 4. Terrice.
 5. Miljoco.
 6. Weiss.

2.10 THERMOMETERS AND THERMOMETER WELLS

- A. Furnish and install brass or stainless steel closed separable thermometer wells for all thermometer and controller bulbs which are designed for liquid measurements. Whenever a thermometer or controller bulb is inserted in a pipe for either remote or local temperature indication or control, locate the thermometer well so that it will be completely surrounded by flowing fluid. Such thermometer locations as are shown on the Drawings are diagrammatic only. Install thermometer wells for maximum effectiveness and in the case of locally indicating instruments, for easy readability.
- B. Supply each brass test well for use with the stem thermometers, a threaded brass plug and keeper chain. Install these test wells in the following locations such that they can be filled with oil to facilitate temperature measurements:
1. At the inlet and outlet of each water coil.
 2. At the inlet and outlet of each heat exchanger, evaporator and condenser.
 3. At the discharge of each modulating 3-way control valve.
 4. At other locations as specified herein or shown on the Drawings.
- C. Where thermometer wells are called for, furnish and install brass wells with the tip of the well extending into the water stream. The well shall have a plug attached to it with a short length of chain. The wells shall be installed in the vertical or at 45 degree angle up.
- D. Thermometers shall be of the industrial type with red spirit filled liquid (no mercury allowed), bronze enameled aluminum cases, glass fronts, 9" scales, separable sockets; straight or angle pattern so selected that they can be read from the floor. Straight type equal to Weksler Type 105 and angle type equal to Weksler Type 115, Type 125, or Type 135, depending upon the angle and aspect. Furnish thermometers with 2-1/2" stem extensions where they are installed in insulated lines. Select scale ranges for maximum readability at the design temperature of the medium being measured.

- E. Thermometers shall be installed in the following locations:
 - 1. At the discharge of each pump or Blending Station valve.
 - 2. At the inlet and outlet of each heat exchanger, evaporator and condenser.
 - 3. At other locations as specified herein or shown on the Drawings.
- F. In lieu of the industrial stem type thermometers 5" dial silicon filled bi-metal thermometers with vari-angle feature or "solar only" self-powered digital thermometers (no batteries allowed) with sealed sensor technology, minimum 1/ 2" tall LCD digit size display, 1% accuracy, and variable angle stem assembly shall be allowed.
- G. Thermometers and thermometer wells shall be as manufactured by:
 - 1. Weksler.
 - 2. Trerice.
 - 3. Marsh.
 - 4. Taylor.
 - 5. Miljoco.
 - 6. Weiss.

2.11 TEMPERATURE AND PRESSURE TEST PORTS

- A. Temperature and Pressure Test Ports, or Pete's plugs, shall be dual valve type with valve pocket between valves, retaining cap with gasket and cap "saver" connector.
- B. These ports may be used at water coil connections in lieu of gauge cocks or needle valves and thermometer test wells.
- C. Pete's plugs shall have the pipe nipple extended to beyond the insulation thickness to make the plug fully accessible and a minimum of one inch (1") above the pipe insulation.
- D. Ports shall be as manufactured by:
 - 1. Pete.
 - 2. Autoflow.
 - 3. Flowset.

2.12 RELIEF VALVES

- A. All closed water systems shall be protected with a relief valve. Valves shall be spring operated, all brass, and shall meet A.S.M.E. requirements for discharge capacities. Discharge lines shall be piped to the nearest floor drain.
- B. Relief valves shall be as manufactured by Watts, Klipfel, McAlear, or McDonnell and Miller.
- C. Provide atmospheric relief piping routed to the outdoors as required by local code for all steam and natural gas systems.

2.13 AIR VENTS

- A. Provide and install air vents, air eliminators, where shown and at any high points or traps in water circulating lines where air might collect.
- B. Each such air vent shall be installed with a valve at its inlet and shall discharge through an integral check valve. The waste lines from the discharge from air vents shall be collected and piped to the nearest floor drain in each case.
- C. All automatic air vents shall have cast or ductile iron bodies with corrosion resistant bolts, Buna-N or EPDM seating materials to meet system pressure and temperature requirements, and all stainless steel internal control components.

- D. Provide manual air vent cocks, or needle valve, for all water coils where not integral or supplied with coil by manufacturer.
- E. Automatic air vents shall be rated for a maximum working pressure of 150 psig and 250 Deg.F.
- F. Automatic air vents shall be as manufactured by:
 - 1. Hoffman No. 792.
 - 2. Armstrong No. AAE-750.
 - 3. Bell & Gossett No. 107A.
 - 4. Or equivalent by Amtrol.

2.14 VACUUM RELIEF VALVE

- A. All bottom feed domestic water heating equipment shall be protected by a vacuum relief installed on the cold water inlet pipe. Valve shall be compliant with ANSI Z21.22.
- B. Acceptable Product: Watts N36-M1 or Apollo VR12.

PART 3 - EXECUTION

3.1 PIPING - GENERAL

- A. Where special classes of piping are involved and are not listed, the Contractor shall request instructions from the Owner's Representative as to the class of material involved and the method of fabricating it before ordering any material. All steel lines 2-1/2" and larger shall be assembled by welding. All steel lines 2" and smaller may be assembled either by welding or by screwed fittings as specified.
- B. Welding shall be done by mechanics who satisfy qualification requirements of the American Welding Society. The pipe ends to be welded shall be machine beveled wherever possible. Gas cuts shall be true and free from all burned metal. Before welding, surfaces shall be thoroughly cleaned. The piping shall be carefully aligned and no metal shall project within the pipe. Fully ream, to the full inside pipe diameter dimensions, the inside of all piping to be welded. Miter joints will not be allowed in any case. All headers, connections, elbows, reducers, flanges, and special flanges and special fittings shall be made using forged steel welding fittings of the same weight as the pipe to which they are attached. All unions and connections to valves 2-1/2" and larger shall be made by the use of welded flanges.
- C. Branches in lines where the branch side is equal to 2/3 of the size of the main or smaller may be connected by using Weldolets or Threadolets; where the sizes are greater than 2/3 of the main, standard weight seamless tees as manufactured by Tube-Turns or Grinnell, A.S.T.M. Standard A-234 shall be used.
- D. The location, direction, and size of all lines are generally indicated on the drawings. Branch connections in general are indicated and shall be so installed as to provide proper grades.
- E. All lines shall be made up straight and true at proper grades. All water filled and condensate drain lines shall grade down to drains.
- F. Piping shall follow as closely as possible the routes shown on the plans and take into consideration conditions to be met at the site. Should any unforeseen conditions arise, lines shall be changed or rerouted as required after proper approval has been obtained.
- G. All piping shall be installed with due regard to expansion and contraction and so as to prevent excessive strain and stress in the piping, in connections, and in equipment to which the lines are connected.
- H. All headers shall be assembled as indicated using welding fittings throughout.
- I. All screw joints shall be made with taper threads, properly cut. Joints shall be made tight with graphite and oil applied to the pipe threads only and not to the fittings.

- J. Dielectric couplings shall be installed where ferrous pipe joins copper lines and shall be rated for the intended medium pressure and temperature or service.
- K. Provide and install unions at proper points to permit removal of pipe and various equipment and machinery items without injury to other parts of systems. No unions will be required in welded lines or lines assembled with solder joint fittings except at equipment items or coils, machinery items and other special pieces of apparatus. Unions in 2" and smaller lines shall be ground joint and unions 2-1/2" and larger shall be flanged unions. Unions shall be the same material and strength as other fittings in the lines. Companion flanges on lines at various items of equipment, machines, and pieces of apparatus shall serve as unions to permit removal of the particular item.
- L. All piping shall be supported by hangers independently of equipment connections. The weight of the piping and it's contents shall not be imposed on the equipment in any way.
- M. Mitering of pipe to form elbows, notching of straight runs to form tees, or any similar construction will not be permitted.
- N. Swing joints or expansion loops shall be provided wherever shown on the Drawings or wherever else necessary to allow for the expansion and contraction of piping. This shall be accomplished in an approved manner and this Contractor shall be responsible for any damage which may occur as a result of expansion and contraction of his piping.
- O. Nipples shall be of the same size and material as the piping in the system in which the nipples are installed, except that "close", or "all thread" nipples shall not be used.
- P. Keep all open ends of piping in each system plugged or capped to prevent dirt or other debris from entering the pipe at any and all times during construction and before fixtures or equipment is connected. All piping shall be flushed clear prior to connection to the central building systems.
- Q. The ends of all piping furnished and installed in all systems shall be thoroughly reamed to the full inside diameter of the respective pipe.
- R. Exposed and concealed lines shall be run parallel with, and perpendicular to building lines and wherever possible shall be grouped together for easy service and identification. Whenever possible, horizontal and vertical runs shall be held as close as possible to the walls, ceilings, struts, members, etc., so as to occupy the minimum space consistent with the proper installation requirements for insulation, conduit, ductwork, lighting fixtures, etc., and the expansion requirements of each of these items and the building proper or the removal of the respective or adjacent pipes, conduits, and ductwork, and to allow for necessary access to valves, other pipes, conduits, dampers, etc.
- S. Valves required for control or isolation of any part of the various systems shall be provided and shall be located in approved or accessible positions or made accessible through removable panels, etc., and where several valves are related as to function, they shall be grouped in a battery. Request approval from Owner's Representative for proper location of all access panels required for valves, etc.
- T. All automatic control valves shall be installed such that the valve stem is pointed upwards, vertical, and in no case shall it be mounted at less than a 45 degree angle from the vertical position unless specifically approved by the Engineer prior to installation.
- U. All shut-off and isolation valves shall generally be installed with valve stems pointed vertically upwards. In no case shall valve stems be pointed downwards or less than in a horizontal position.
- V. Where new lines are indicated to connect into existing lines, careful coordination shall be exercised to determine exact elevations and locations of existing lines, to establish grades of interconnecting new lines, to establish procedures to interconnect lines, and to establish other details.

3.2 CROSS CONNECTION AND INTERCONNECTIONS

- A. No plumbing fixtures, device, or piping shall be installed which will provide a cross connection or interconnection between a distributing water supply for drinking or domestic purposes and a polluted supply such as drainage system, or a soil or waste pipe which will permit or make possible the backflow of sewage, polluted water, or waste into the water supply system.

3.3 EXCAVATION AND BACKFILLING

- A. Provide necessary excavating and backfilling for the installation of work specified in this Division as specified in Section 22 05 00 and 31 23 00. Shall comply with ASTM 2321.

3.4 FLASHINGS

- A. Flash around all pipes passing through the roof with sheet lead, as specified in Section 07525, built a minimum of 10" into the roofing, in all directions from the outside of the pipe running up the pipe a minimum of 10" and more where vent terminals must be higher to conform to the requirements of the local Plumbing Code in effect, and then turned over one inch (1") into the pipe cavity. All seams and joints shall be completely soldered closed and the entire flashing shall be completely waterproof.
- B. Make all roof penetrations in accordance with the roofing system manufacturers approved methods and as specified in Section 07 52 50.

3.5 PIPE INSULATION INSERTS AND SHIELDS

- A. Provide a section of Foamglas insulation, calcium silicate, or urethane of thickness specified at hanger support locations and provide No. 16 gauge galvanized steel protection shield minimum 12" long. Shield shall be full half cylinders equal to Grinnell Fig. 167.
- B. Refer to Section 22 07 00, Insulation.

3.6 SAFETY GUARDS

- A. Furnish and install all safety guards required in order to obtain certificates of inspection from all authorities having jurisdiction.
- B. All belt driven equipment, projecting shafts and other rotating parts shall be enclosed or adequately guarded.

3.7 TESTING AND REPAIRING

- A. During the progress of each portion of the work or upon its completion, make such tests of this work as herein specified, or as required by the Architect, or by State or Municipal Bureaus having jurisdiction and under their supervision.
- B. Provide all apparatus, temporary piping connections, or any other requirements necessary for such tests. Take all due precautions to prevent damage to the building and its contents incurred by such tests as will be required to repair and make good, at no cost to the Owner, any damage so caused. Testing of piping to be insulated shall be done before insulation is applied.
- C. Perform any other tests as may be required by the Owner's Representative to indicate the fulfillment of specification requirements.

- D. Pressure piping systems shall be tested with either water or air to a pressure of 150 psig or to 1-1/2 times the operating pressure, whichever is the greatest, for six (6) hours.
- E. Domestic hot and cold water piping shall be tested at 1.5 times the operating pressure or 150 PSIG, whichever is greater, for six (6) hours. Any leaks developed shall be made tight and the test repeated. Test pressure shall not be applied to specialties, but joint shall be tested for leaks at operating pressure when complete.
- F. Waste and vent piping shall be tested at completion of the rough work and before fixtures and traps are connected. Openings, except tops of bends, are to be plugged and the system completely filled with water. System shall stand without leak or loss of water for a period of not less than four (4) hours.
- G. Systems shall be tested in portions as required by the construction schedule and the portions being tested shall be effectively isolated and sealed off. When previously tested sections are connected into other sections, tests shall be rerun to include the new connections.
- H. Partial systems shall be tested prior to connecting into existing lines.
- I. Leaks in screwed joints shall be repaired by tightening the joint until the leak has stopped, or by remaking the joint if tightening fails to stop the leak. Leaks in welded joints shall be repaired by chipping out the weld around the leak and rewelding until it is stopped. Leaks in caulked joints shall be completely stopped by additional caulking of the joint, but, if that fails, the joint shall be re-made. A leak in a compression joint shall be repaired by remaking the joint using a new seal, compression ring, coupling, etc., as required. Leaks in soldered joints shall be repaired by remaking the joint and no soldering or brazing over existing joints will be permitted. Any defective piping shall be replaced.
- J. Additional testing shall be as specified in the individual Sections of these Specifications.
- K. During testing and cleaning of piping systems, use a fine mesh, 20 mesh or smaller, start-up strainer screen for all strainer pipe sizes. After piping system is cleaned each strainer shall be taken apart, cleaned, and final strainer mesh shall be placed back in strainer for normal operating conditions.

3.8 SEALING PENETRATIONS

- A. Seal all pipe penetrations through walls run to structure, ceilings, floors and roofs. Fill the annular space between the insulation on the pipe, or the pipe only where uninsulated, and its sleeve, with neoprene or non-hardening sealant.
- B. No pipe or duct shall be allowed to contact its surrounding sleeve or the wall, floor, or ceiling. Effective isolation shall be provided as described in Section 23 05 48 to the end that no vibration or direct noise transmission shall be transmitted. Vibration transmission limits shall be as established in Section 23 05 48. Use special materials as may be required to comply.
- C. Firestop pipe and duct floor and wall penetrations as specified in Section 07 84 00 and 22 05 00.

3.9 PAINTING

- A. All equipment specified in Division 22 shall be delivered to the site with suitable factory finishes as specified elsewhere herein.
- B. Items with factory applied finishes shall be protected during installation and other construction work. Damaged factory applied finishes shall be refinished to match the original finish appearance.
- C. Field painting of items specified and installed in Division 22 shall be as specified in Section 09 90 00.

- D. All ferrous metals that are not galvanized or made of a corrosion resistant alloy shall be painted. This shall include steel pipe hangars, trapeze supports, pipe stands, all thread hangar rods and other miscellaneous systems.

END OF SECTION

SECTION 22 30 00

DOMESTIC WATER HEATING EQUIPMENT AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- A. Comply with Division 01 - General Requirements and referenced documents.
- B. Comply with Division 22 Sections, as applicable. Refer to other Divisions for coordination of work with other sections of the specifications, as required.

1.2 SYSTEM DESCRIPTION

- A. Provide a complete and operational system of Domestic Water Heating Equipment and Accessories as indicated herein and as indicated on the Drawings.
- B. Completely coordinate specified herein work of all other sections of these specifications.
- C. Furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a complete and satisfactory operating installation, whether such work is specifically indicated or not.

1.3 QUALITY ASSURANCE

- A. Factory Testing: Subject each tank to a factory hydrostatic test pressure of 150 percent of the expected maximum system working pressure and certify that components are free of leaks prior to shipment to the project site. Tank shall have a minimum pressure rating of 150 psig.
- B. Manufacturing Standard: Tank shall comply with the ASME Pressure Vessel Code, Section IV.
- C. Each water heater (and/or heat exchanger and storage tank) shall have a written unconditional one (1) year cost free service policy, and a written full three (3) year parts and labor warranty against tank failure due to rust, corrosion, or electrolytic action.
- D. Each heater shall be UL Listed and Labeled.
- E. Each water heater tank shall have fiberglass insulation to meet ASHRAE Standard 90-1b for heat loss and protected by epoxy coated metal jacket.

1.4 SUBMITTALS

- A. Project Data:
 - 1. Operating and Maintenance Data, three (3) copies.
 - 2. Furnish factory obtained State Inspection Report and Stamp.
 - 3. Manufacturer's approved Startup Report completed by factory trained and authorized technicians to be furnished to Engineer.
 - 4. Written Equipment Warranties, complete and filled out.
- B. Product Data:
 - 1. Electric Tankless Heaters
 - 2. Thermostatic Mixing Valves.

PART 2 - PRODUCTS

2.1 ELECTRIC TANKLESS TYPE WATER HEATERS

- A. Provide in each location shown on the Drawings, a copper sheathed heating elements housed in a copper cylinder. Heating elements shall be suitable for electrical current having the characteristics indicated on the drawings. Each heater shall be U.L. Listed and Labeled.
- B. Provide factory installed with dial thermostat. The heating elements shall be equipped with a dedicated single pole bimetal type high limit shut-off with manual reset.
- C. The heating elements shall be controlled by power transistors cooled by the incoming water. The unit shall be equipped with a flow sensor with a turbine that feeds the controlled water flow rated into the main circuit board. The output temperature shall be based upon the size of the heating element and the temperature of the incoming water supply. The housing shall be a high impact polycarbonate
- D. All unit shall be conform to ANSI/UL 499.
- E. Each unit shall be equipped with necessary operating controls.
- F. Acceptable manufactures:
 - 1. Stiebel Eltron

2.2 THERMOSTAT MIXING VALVE

- A. TM-1: Leonard Model LF-170, thermostatic point of use mixing valve shall be allowed for single fixture use only and shall be ASSE 1016 listed. Valve shall be bronze body, stainless steel dire and spring, adjustable with locking feature. Copper thermostat assembly. Provide straight check stops, IPS connection. Equal by RADA-215D or Powers LFLM-495.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install water heaters in accordance with manufacturer's recommendations. Install the relief valves so that the bulbs will be immersed in the tanks. Pipe relief valve outlet full size to the nearest floor drain, hub drain, or outside as required by Governing Authorities and Codes.
- B. Coordinate with other trades to provide equipment housekeeping pads as shown on the drawings and per Section 22 05 00.
- C. Coordinate with Structural Engineer for approved wall mounted or suspended platforms to support electric water heaters located above the floor. Submit equipment weights and proposed supports, brackets and platform framing to the Structural Engineer for review and approval prior to purchasing or fabricating platform.
- D. Furnish Operations and Maintenance Manuals, and written warranty, for each domestic water heating equipment and accessories as required in Division 01 specifications and Section 22 0500.
- E. Provide thermal expansion protection for all heating equipment as specified and required by heating equipment manufacturer's written warranty.
- F. All thermostatic mixing valves or other "anti-scalding" devices shall be concealed in walls and fully accessible for service, repair, or replacement through an adequately sized access door panel with a loose key lock.

- G. Domestic water heaters in excess of 119 gallons storage and/or heat input in excess of 200,000 BTU/Hr shall be installed to meet all location and clearance requirements as set forth in the Texas State Boiler Law, which includes, but is not limited to; a minimum horizontal clearance of two feet on all sides of the heater and a minimum vertical clearance of four feet from the top of the heater to the bottom of the roof joist or above floor structure.
- H. Coordinate with the Electrical Contractor for available voltage, phase and circuit breaker size required for the heater. Electrical requirements shall be verified prior to ordering equipment.
- I. Furnish and install heat traps on the supply and discharge piping for all domestic heating water systems not provided with recirculation system and/or water heating equipment with integral heat traps.
- J. Furnish and install relief valves on cold water inlet piping for all bottom feed water heaters. Valve shall comply with ANSI Z21.22.

END OF SECTION

SECTION 22 42 00
PLUMBING FIXTURES

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- A. Comply with Division 01 - General Requirements and referenced documents.
- B. Comply with Division 22 Sections, as applicable. Refer to other Divisions for coordination of work with other portions of the work.

1.2 SYSTEM DESCRIPTION

- A. Provide items of plumbing related equipment and accessories as indicated herein and as illustrated on the Drawings.

1.3 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 70 00.
- B. Indicate on submittal construction materials, finishes, sizes, quantities and related hardware.
- C. Product Data:
 - 1. Plumbing fixtures.
 - 2. Carriers.
 - 3. Fixture trim.
- D. Certification: Submit certification that completed system complies with test requirements of municipality, State, and other public authorities having jurisdiction over system.
- E. Provide closeout documents as required in Division 1, Section 01 70 00.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with requirements in following order of precedence:
 - 1. Codes, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction over installation, inspection, and testing, including local codes.
 - 2. Provisions specified in this Section.
 - 3. Local Plumbing Code.

1.5 HANDLING

- A. Deliver fixtures crated and in undamaged condition.
- B. Replace damaged fixtures with new fixtures.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

NOTE: The following manufacturers are considered acceptable, however, products submitted in lieu of specified item shall be equivalent to specified item as determined by the Architect and Engineer.

A. Standard Plumbing Fixtures:

1. American Standard.
2. Kohler.
3. Sloan
4. Elkay.
5. Just.
6. Bradley.
7. Acorn.
8. Crane.

B. Faucets:

1. Chicago.
2. T&S Brass.
3. Zurn Aqua Spec.

C. Lead-Free Stop Valve in Hot and Cold Supply Lines to Each Fixture:

1. Chicago.
2. McGuire.
3. T&S Brass.
4. Engineered Brass Company.

2.2 MATERIALS

- A. Fittings: Chrome plated heavy cast brass.
- B. Nipples: Extra heavy. Provide brass nipples or stainless steel nipples for domestic water systems including nipples at water heater & storage tank connection (no black steel nipples shall be allowed in domestic water systems).
- C. Plumbing Fixture Trim: Solid brass, including nuts and washers, handles, hold-down screws, valve bodies, swivel spouts, ferrules, sleeves, locknuts, and bushings.
- D. Piping Connections from Shutoff or Stop Valve to Fixture: Chrome plated brass pipe or chrome plated copper tubing.
- E. Floor and Wall Escutcheons: Chromium plated with set screws.
- F. Exposed Fixture Trimmings and Fittings: Chromium plated brass with polished, bright surfaces.
- G. Flush Valves: Non-hold open type, without seat bumpers.
- H. Traps: Chrome cast brass adjustable P-traps with cleanout.

2.3 DESIGN AND FABRICATION

- A. Plumbing fixture trims shall allow renewable operating units to be removed without detaching supply fitting or faucet.
- B. Fixtures, except water closets and urinals, shall have water supply above rim.
- C. Equip fixtures with supply discharge below rims with backflow preventers.

- D. Furnish angle stops, straight lock shield, loose-key pattern stops for supplies' and install with fixtures. Supplies shall be rigid, unless noted otherwise.
- E. Exposed traps and supply pipes for fixtures shall be connected to rough piping systems at wall.
- F. All plumbing trim and fixtures indicated on Drawings as handicap shall meet the current requirements of the Americans with Disabilities Act (ADA) and the Texas Accessibility Standards (TAS).
- G. Faucets, bubblers, & supply stops shall be National Sanitation Foundation (NSF) Standard 61, Section 9, compliant and listed for residential/drinking water use as required by the Federal Clean Water act effective January 1, 1997 in addition shall be Lead-Free per "Safe Drinking Water Act" U.S. Senate Bill S.3874.

2.4 PLUMBING FIXTURE SCHEDULE

L-1 - LAVATORY - COUNTERTOP - HOT AND COLD WATER - HANDICAP:

- 1. Sloan 3802, 20" x 17", oval shaped, self-rimming, vitreous china, 8" faucet centers.
- 2. Faucet/Strainer: T & S Brass B-2990-WH4-QT (B-0199-08-F10), cast brass valve body, 8" centers, metal lever vandal-resistant color coded chrome handles, quarter turn operating cartridge, ADA Compliant, vandalproof aerator with integral 1.0 GPM flow restrictor. Provide Chicago 327-XCP perforated grid drain and wheelchair offset tailpiece for ADA front approach access.
- 3. Supplies: McGuire chrome riser supplies with loose key angle stops and chrome escutcheon plate with set screw.
- 4. Trap: McGuire 1-1/4" x 1-1/2", 17 gauge, chrome cast brass P-trap with cleanout plug and chrome escutcheon plate with set screw.
- 5. Insulate exposed water supplies and drain piping with ADA approved insulation kit, equal to Truebro "Lav-Guard" Kit No. 102 and 105.

S-1 - DOUBLE COMPARTMENT CLINIC SINK – ADA/TAS

- 1. Sink: Elkay LRAD-3321, 33 inch by 21-1/4 inch by 6-1/2" deep, double compartment, self-rimming, 18 gauge Type 302 stainless steel sink with underside undercoated. Drill for three (e) faucet holes, 3-1/2" drain opening off-centered front-to-back, ADA compliant.
- 2. Faucet: T&S Brass B-2852-01-VRS-QT (B-0199-07-F10), bottom mount, cast brass valve body, rigid copper, 8" centers, gooseneck rigid spout, #317, 4" wrist blade lever vandal-resistant color coded chrome handles, quarter turn operating ceramic cartridge, ADA compliant, with 1.0 gpm vandalproof aerator.
- 3. Strainer: One (1) Elkay #LK-35-B stainless steel duo strainer with neoprene stopper, one (1) McGuire #151-A chrome plated basket strainer with 1-1/2 inch tailpieces.
- 4. Continuous Waste: McGuire 1-1/2 inch 17 ga. chrome plated brass tubing for double compartment sink.
- 5. P-Trap: McGuire 1-1/2 inch, 17 gauge, adjustable, chrome plated, cast brass tubing drain to wall, cleanout, and chrome escutcheon plate with set screw.
- 6. Supplies: McGuire 167 LK supply assembly with loose key angle valve, chrome escutcheon plate with set screw.
- 7. Insulate exposed water supplies and drain piping with ADA approved insulation kit, equal to Truebro "Lav-Guard" Kit No. 102 and 105.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install equipment in accordance with manufacturer's printed instructions and drawings.
- B. Fasten fixtures secured to masonry walls or stud partitions with 1/4" brass toggle or through-bolts.
- C. Anchor inserts flush with finished wall and conceal when fixtures are mounted.
- D. Fixture Connections:

1. Make connections between earthenware fixtures and flanges on soil pipe gas tight and watertight with closet-setting compound or with neoprene gasket and seal.
 2. Do not use natural rubber gaskets or putty for these connections.
 3. Bolts shall be not less than 1/4" diameter and shall be equipped with chromium plated nuts and washers.
 4. Set fixtures with outlet flanges required distance from floor or wall to make first class joint with gasket and fixture used.
- E. Refer to Architectural Drawings for all mounting heights and exact locations. Coordinate with General Contractor prior to starting any work, provide any additional supports, hangers, openings, etc. as required for a complete installation. Coordinate all clearances and locations with other trades as required.
- F. Provide stop valve in each hot and cold water supply line to each fixture.

3.2 MILLWORK AND CASEWORK FIXTURES

- A. Furnish and install all sinks and other plumbing items shown on furniture, unless shown otherwise. Provide detailed information to the supplier of such furniture as to required cut-outs and drillings, so as to permit proper coordination during fabrication. Provide local shut-off valves in all supplied to such furniture. Provide all waste connections, including drains, p-traps and other materials, using sanitary materials corresponding to piping system material in each case.

3.3 FIXTURES FURNISHED UNDER THIS DIVISION

- A. Plumbing fixtures and equipment shall be set in place, leveled and connected as indicated on the drawings. Use china caps to conceal mounting bolts, and grout between all vitreous china fixtures and finished wall and floor surfaces with plaster of paris or portland cement.
- B. Install wall hung water closets, lavatories, urinals, sinks and electric water coolers on carriers.
- C. Do not install metal fittings until adjoining tile work has been acid- cleaned. The Mechanical Contractor shall be responsible for the proper protection of fixtures after installation.
- D. Connections to exposed plumbing fixtures shall be complete with chrome plated brass nipples, tubing, wall escutcheons, etc.

3.4 ADJUSTING AND CLEANING

- A. Prior to final acceptance of the work, Mechanical Contractor shall inspect all faucets, flush valves, stop valves, etc., to determine whether they operate properly and discharge proper quantities of water. Connect any deficiencies to satisfaction of Architect's representative.
- B. Thoroughly clean all plumbing fixtures, trim and accessories of all tape, adhesives and other foreign materials prior to final acceptance.

END OF SECTION

SECTION 23 00 00

HEATING, VENTILATING, AND AIR CONDITIONING (HVAC) WORK

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. The work in this Division covers all HVAC work specified in all Division 23 Specification Sections and as illustrated on the HVAC Drawings. Comply with other Division 23 Specification Sections as applicable. Refer to other Divisions for coordination of work with other trades.
- B. Provide all labor, materials, equipment, transportation, tools and services, and perform all operations required for, and reasonably incidental to, the providing of mechanical system work described in this Division.
- C. Contractor shall include providing instructions and demonstrations of the operation of each installed system in its totality to the Owner. Refer to Division 23 specifications for specific Owner training requirements. As a minimum include training of the Owner's Operating Personnel on:
 - 1. Safety Shut-Down of HVAC Equipment.
 - 2. Sequence of HVAC Equipment Operation.
- D. Operation and Maintenance of all HVAC Equipment.
- E. The Conditions of the Contract, including the General Conditions and Supplementary Conditions, and Division 1 - General Requirements, apply to work covered by this section.
- F. Refer to Specification Section 01 32 16 for "Construction Progress Documentation".

1.2 RELATED DOCUMENTATION

- A. Section 01 62 00: Product Requirements.
- B. Section 01 78 03: Execution and Closeout Requirements.
- C. Section 01 78 39: Closeout Submittals.

1.3 DESCRIPTION OF HVAC DEMOLITION WORK

- A. Contractor shall remove several items of materials and equipment under this Section of the Specifications. Equipment and materials to be removed shall be as indicated and noted on the Drawings and as required to facilitate the new installations.
- B. Generally, modifications to, replacing of, or making new connections into existing service lines shall be accomplished only during the times directed by the Owner's Representative.

PART 2 - NOT USED

PART 3 - EXECUTION

3.1 INSTRUCTION OF OWNER'S PERSONNEL

- A. Prior to Substantial Completion, fully instruct the Owner in the operation, adjustment, and maintenance of products, equipment, and systems; including, but not limited to all HVAC equipment, related accessories and components, temperature controls and the energy management system. Owner shall operate all

systems in cooperation with Contractor for a period of at least five (5) working days prior to, or shortly after, Substantial Completion.

- B. Arrange for services of qualified manufacturer's representatives to fully instruct Owner on specialized portions of installations, such as air handling units and auxiliaries; VAV terminal units, automatic temperature controls, and water treatment systems.
- C. Arrange for each installer of equipment that requires regular maintenance to meet with Owner to provide instruction in proper operation and maintenance. If installers are not experienced in procedures, provide instruction by trained manufacturer's representatives. Include detailed review of the following items:
 - 1. Operating and Maintenance Manuals.
 - 2. Record Documents.
 - 3. Spare Parts and Materials.
 - 4. Lubricants.
 - 5. Cleaning.
 - 6. Standard and Extended Warranties.
 - 7. Maintenance Requirements, Agreements, and similar continuing commitments.
- D. As a part of these instructions for operating equipment, demonstrate the following procedures:
 - 1. Start-Up.
 - 2. Shut-Down.
 - 3. General System Operating Instructions.
 - 4. Emergency Operating Conditions.
 - 5. Noise and Vibration Adjustments, where applicable.
 - 6. Safety Procedures.
 - 7. Economy and Efficiency Adjustments.
 - 8. Effective Energy Utilization.
- E. Return at first change of season for changeover from air conditioning to heating, or from heating to air conditioning, to demonstrate system operation in the opposite season.
- F. Submit a complete record of instructions as a part of maintenance instructions and the data book (Operations and Maintenance Manual) given to Owner. For each instructional period, supply the following data:
 - 1. Date of Instruction.
 - 2. System or Equipment Involved.
 - 3. Names of Persons Giving Instructions.
 - 4. Other Persons Present.
 - 5. Time Period (in hours/minutes) Instruction Provided.
- G. Amount of time to be devoted to instructional sessions shall be reasonable and consistent with the size and complexity of equipment and systems installed and as specified in other sections of these specifications.

3.2 TEMPORARY WORKING ACCESS

- A. Each respective trade shall remove existing piping, equipment, fixtures, and other items to provide access for work in existing facilities and on the site. Contractor shall seek Owner's Representative approval prior to removal of any equipment and mechanical appurtenances.
- B. Reinstall and refinish items removed, or otherwise damaged, to match existing adjacent surfaces, or new finishes where applicable, upon completion of the work.

3.3 DISRUPTION OF EXISTING FUNCTIONS

- A. Access: Access to and use of the existing facilities and site will be restricted, and shall be under the direction and control of the Owner.

- B. Disruptions: Maintain existing mechanical, and other existing systems, and maintain all existing functions in service except for those specific portions scheduled for disruption. Where existing functions to remain in use are disrupted, they shall be fully restored after disruption, in full compliance with this Division of the Specifications for new work, as quickly and as reasonably possible.
- C. Scheduling of Disruptions: Seek and obtain approval by the Owner two (2) weeks in advance of each event. Failure to schedule such disruptions in advance will result in the Contractor being stopped or rescheduled by the Owner without added cost to the Owner.
- D. Notice of Disruption: Date, time and duration of each disruption shall be subject to the Owner's prior written approval and shall include the following information in the form of a memorandum submitted by the Contractor to the Owner's Representative for approval by the Owner:

Facility/System	Date	Starting Time	Duration
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- E. Emergency Disruptions: When circumstances preclude obtaining advance approval as specified above; make request immediately on knowledge of the requirement, and perform the work so as to cause the minimum amount of disruption, for the minimum duration.
- F. Notification: Notify the Owner's Representative and the Owner immediately, by telephone and then in writing, as changes and additions to the scheduled disruption requirements become known.
- G. Duration:
 - 1. Complete as large a portion of the work as possible before initiating disruption.
 - 2. Maintain adequate personnel, supplies, materials, equipment, tools, and other resources at job site to avoid unnecessary delay in resumption of normal services.
 - 3. Keep duration of disruption as short as possible.
 - 4. During the disruption, perform only the amount of work that requires the disruption, so as to minimize duration of disruption.

3.4 MODIFICATIONS AND RELOCATIONS

- A. Modify, remove, or relocate materials and items indicated on the Drawings or required by the installation of new facilities.
- B. Relocations:
 - 1. Repair and restore to good functional condition, equipment, materials and items scheduled for relocation, which are damaged during dismantling or reassembly operations.
 - 2. Remove carefully, in reverse order to original assembly or placement, items which are to be relocated.
 - 3. Protect items until relocation is complete.
 - 4. Clean and repair items to be relocated, and provide new materials, fittings, and appurtenances required to complete the relocations as required to restore them to good operating order.
- C. Perform the relocation work in accordance with applicable Sections of these Specifications, utilizing skilled workers.

3.5 SCHEDULE OF WORK

- A. Reference Division 1 for Additional Scheduling Information.
- B. Contractor and all system installers for each Section of these Specifications shall realize that the present building houses a completely functioning facility that must continue in full operation 16 hours per day during the construction period. Outages of any kind cannot occur, except only when and as the Owner's Representative or Owner may direct otherwise. Under no conditions shall any work be done in the present building that would interfere with its natural or intended use unless special permission is granted by the Owner.

- C. Work under the various specification sections must be expedited and close coordination will be required in executing this work. Various system installers shall perform their portion of the work at such times as directed so as to insure meeting scheduled dates, and to avoid delaying the work of other trades. Owner's Representative will verify scheduled times of work in the various areas involved, each system installer shall cooperate in establishing these times and locations and the system installers shall process their work so as to insure proper execution and completion.
- D. Under no conditions shall any work be done in the present building that would interfere with its natural or intended use, unless special permission is granted by the Owner. This is particularly applicable where new connections are to be made to existing lines, services, or items of equipment in the present building or where existing equipment items or services in that building are to be replaced or modified in any way.
- E. Generally, modifications to, replacing of, or making new connections into existing service lines shall be accomplished only during the times directed by the Owner. New lines shall be installed and tested before connections are made into existing lines, meters, or services.
- F. All other modifications to existing piping systems and appurtenances, including necessary interconnections between old and new portions of the various systems, shall be accomplished at times scheduled so as not to interfere with the normal use of the building and the existing systems to which connection is to be made.
- G. The use of any type of fastening or hanging device which requires the use of shots or explosives of any nature shall not be used. Explosives shall also not be used for any excavation inside an existing building.
- H. Where required by conditions at the site, Contractor shall perform portions of work at night or at other such times as may be required to insure completion of work on schedule. No additional compensation to the Contractor will be paid for such work or required utilities.
- I. Contractor shall be available, as deemed necessary for job progress by the Owner, for weekly progress and coordination meetings with the Architect, Engineer, and other Owner's Representatives, when required. These meetings shall be used to monitor progress of submittals, receipt of materials, construction progress, cooperation of trades, field coordination by the Contractor, and to resolve unforeseen conditions in an expeditious manner. Failure to attend meetings, to respond in a timely manner to requests for information, or to progress at an acceptable pace to maintain the construction schedule shall constitute a delay by the Contractor and may be cause for assessment of fees to the Contractor as outlined in Division 1.
- J. Provide all temporary connections as necessary to facilitate the phasing of construction, even where not specifically shown. Where temporary work is required it may be required that the Contractor produce a Shop Drawing or field sketch to illustrate the intended methods which shall be submitted for approval by the Architect.

3.6 SALVAGE, DEMOLITION, AND RELOCATION

- A. It shall be the responsibility of the Contractor to remove and store those items of existing equipment as indicated on the Drawings to be removed. All items of equipment or fixtures removed shall be protected from damage insofar as is practical.
- B. Mechanical items to be removed, salvaged, or relocated shall be removed by the respective trade who would normally be responsible to install new work similar to that to be removed. This shall include whatever selective demolition is necessary to avoid damaging other work of other trades. Each trade shall be responsible for their respective demolition. However, all trades shall keep informed as to the project schedule as it relates to the Demolition Scope of Work.
- C. These items shall be stored on site for a minimum of two (2) weeks unless indicated otherwise by the Owner's representative to allow for inspection by the Owner. Deliver, all items tagged to be retained by the Owner to a designated storage location on site or to the Owner's designated Service Center or

Warehouse. All items not retained by the Owner shall be removed from the site by the Contractor at no additional cost to the Owner.

- D. The attendant piping, ductwork, hangers, foundations, etc., of those items of existing equipment to be removed, shall also be removed in their entirety. No piping, hangers, etc., shall be abandoned in place. Where branch lines are removed, the branch shall be capped as close to the main as possible.
- E. Relocations:
 - 1. Repair and restore to good functional condition materials and items scheduled for relocation and/or reuse and which are damaged during dismantling or reassembly operations.
 - 2. New materials and items of like design and quality may be substituted for materials and items indicated to be relocated, in lieu of relocation, upon approval of shop drawings, product data and samples.
 - 3. Remove carefully, in reverse to original assembly or placement, items which are to be relocated.
 - 4. Protect items until relocation is complete.
 - 5. Clean and repair and provide new materials, fittings, and appurtenances required to complete the relocation and to restore to good operative order.
 - 6. Perform the relocation work in accordance with pertinent sections of the specifications, utilizing skilled workers.
 - 7. Refer to Drawings for specific requirements of temporary services and relocated equipment and fixtures.

3.7 CLEAN UP

- A. Remove all debris, rubbish, and materials resulting from cutting, demolition, or patching operations from the work area on a daily basis.
- B. Where such work generates dust and debris take all precautions necessary to prevent dust and debris from accumulating in or on other mechanical and electrical equipment. This may require adding temporary filter media over ventilation air openings of certain types of equipment.
- C. At the conclusion of this work clean all building materials, mechanical equipment and electrical equipment so that all items are dust free and operating properly. Where dust causes damage to equipment the Contractor shall make repairs to this equipment at no cost to the Owner.
- D. Transport all demolished materials and equipment indicated above in approved containers and legally dispose of all debris off site in a manner approved by the Architect and Owner.

END OF SECTION

SECTION 23 05 00

COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Conditions of the Contract including the General Conditions, Supplementary Conditions, and Division One, shall apply to work of this Division, whether attached or not.
- B. The requirements specified in this Section shall be applicable to work specified in other Sections within this Division.

1.2 SCOPE OF WORK

- A. All Division 23 sections of these specifications shall include all labor and material to complete the entire mechanical systems as specified and shown on the Drawings.
- B. All work shown and specified shall be completely installed and connected by mechanics properly qualified to perform the work required. All work shall be left in a satisfactory operating condition as determined by the Owner and Owner's Representative.
- C. Provide all services and perform all operations required in connection with, or properly incidental to, the construction of complete and fully operating systems with all accessories as herein specified and shown on the Drawings.
- D. Refer to "Conditions of Work" in Division 1.

1.3 GENERAL

- A. The accompanying Drawings show diagrammatically the sizes and location of the various equipment items and the sizes of the major interconnecting piping and ductwork, without showing exact details as to elevations, offsets, control lines, and other installation details. The Contractor shall carefully lay out his work to conform to the site conditions, to avoid obstructions and provide proper grading of lines. Exact locations of outlets, apparatus, and connections thereto shall be determined by reference to the Drawings, reviewed Shop Drawings, including equipment drawings, and rough-in drawings, by measurements at the building, and in cooperation with work specified in other sections of these specifications. Minor relocations necessitated by the conditions at the site or directed by the Architect shall be made without any additional cost to the Owner.
- B. These specifications and the accompanying Drawings are intended to describe and illustrate systems which will not interfere with the structures, which will fit into available spaces, and which will insure complete and satisfactorily operating installations. Contractor shall coordinate the proper fitting of all material and apparatus into the building and shall prepare larger scale installation drawings for all critical areas, areas with limited working clearances, and areas of significant congestion requiring a higher level of coordination illustrating the installation of work specified in Division 23 in relation to all other portions of work specified in other Sections of these Specifications. Interferences with other portions of work, or the building structure, shall be corrected before any work proceeds. Should changes become necessary on account of the failure of the Contractor to comply with these stipulations, Contractor shall make all necessary changes at no expense to the Owner.
- C. All work shall be run parallel or perpendicular to the lines of the building unless otherwise noted on the Drawings.

- D. It is the intent of the Contract Documents to provide an installation complete and operational in every respect. In the event that additional details or special construction may be required for work indicated or specified in this section, or work specified in other sections, it shall be the responsibility of the Contractor to provide same as well as to provide material and equipment usually furnished with such systems and required to complete the installation.
- E. Contractor sets forth that all personnel have the necessary technical training and ability; and that all work specified in this Division will be installed to the best standard of each trade, and will be complete and in good working order. If any of the requirements of the Drawings and specifications are impossible to perform, or if the installation when made in accordance with such requirements will not perform satisfactorily, report same to the Architect promptly after discovery of the discrepancy.
- F. No extra compensation will be allowed for extra work or changes caused by failure to comply with the above requirements.

1.4 EXAMINATION OF THE SITE

- A. Contractor shall visit the site, verify all items indicated on the Drawings or specified, and familiarize himself with the work conditions, hazards, grades, actual formations, soil conditions, points of connection, utility locations, and local requirements.
- B. Contractor shall take these conditions into consideration, and the lack of specific information on the Drawings shall not relieve the Contractor of any responsibility.
- C. All site visits shall be coordinated and scheduled with the Owner.

1.5 CUTTING AND PATCHING

- A. Excessive cutting of the building structure, walls, floors, ceilings, roof, etc., will not be permitted. No structural member shall be notched or cut unless specifically shown on the Drawings, or unless such cutting is authorized by the Architect.
- B. Provide for all holes or openings of proper size and shape as may be necessary for the proper installation of work specified in Division 23, consulting with the Architect regarding proper locations and sizes.
- C. Where deemed necessary, and after consulting with the Architect, perform all cutting and patching required for the installation of piping, ductwork, etc. This shall include the cutting of concrete floors, concrete and tile floors, walls, ceilings, roofs, etc. It shall also include patching them as required to restore work to match existing finishes, following installation, testing, backfilling, insulation, etc.
- D. Holes through concrete shall be drilled with "Mole", "Core-It", or other diamond point hole saw.
- E. Refer to Section 01 73 29, Cutting and Patching.

1.6 CODE REQUIREMENTS

- A. Contractor is required to comply with the requirements of all National, State, and local codes and utility companies having jurisdiction. In no case does this relieve the Contractor of the responsibility of complying with the requirements of these specifications and Drawings where specified conditions are of higher quality than the requirements of the above specified offices. Where requirements of the specifications and Drawings are below the requirements of the above offices having jurisdiction, the Contractor shall make installations in compliance with the requirements of the above offices and shall notify the Architect promptly.
- B. Contractor shall comply with the requirements and standards set forth by, but not limited to, the following:
 - 1. (NFPA) National Fire Protection Association.

2. (OSHA) Occupational Safety and Health Administration.
3. (NEC) National Electric Code.
4. (IECC) International Energy Conservation Code.
5. Local Plumbing Code.
6. Local Building Code.
7. Local Mechanical Code.
8. Local Fire Code.
9. Local Energy Code.

- C. Contractor shall obtain all permits, inspections, and approvals as required by all authorities having jurisdiction. Fees and costs incidental to these permits, inspections, and approvals must be assumed and paid by the Contractor.

1.7 RECORD DRAWINGS

- A. Contractor shall, during the execution of work, maintain a complete set of "Record Drawings" upon which all locations of equipment, ductwork, piping, and all deviations and changes in the work shall be neatly recorded for use in producing "As Built" at Project Close- Out. This shall include the incorporation of all Supplemental Drawings issued during the Construction Period.
- B. All "Record Drawings" shall be reviewed monthly during the Construction Period, along with the monthly Pay Application Request.
- C. Refer to Section 01 78 39, Project Record Documents.

1.8 RECORDS AND INSTRUCTIONS FOR OWNER

- A. Accumulate during the job's progress the following sets, in triplicate, in accordance with the provisions of Section 01 78 23 & 01 78 39:
1. Warranties and guarantees and manufacturer's directions on equipment and material covered by the Contractor.
 2. Equipment and fixture brochures, wiring diagrams, and control diagrams.
 3. Copies of reviewed Shop Drawings, and material and equipment submittals. Copies of rejected submittals and Shop Drawings are not to be provided.
 4. Operating instructions for heating and cooling and other mechanical systems. Operating instructions shall include recommended maintenance and seasonal change-over procedures.
 5. Other data and drawings required during construction.
 6. Repair parts lists of all major items and equipment including name, address, and telephone number of local supplier or agent.
 7. Valve tag charts and diagrams specified elsewhere herein.
 8. "As-Built" Record Drawings shall be provided in electronic format on a CD (provide two (2) copies) in a PDF or DWG format as determined by the Owner.
 9. Provide copies of all City Inspection Certificates of Approval.
 10. Provide Contractor's Certification Statement that all equipment furnished and all work performed is in compliance with all applicable codes referenced in these specifications, or those which are currently in effect.
- B. Provide not less than one (1) days of operating instructions, during the adjustment and testing period, to the Owner's operating personnel in order to familiarize them with the proper care and operation of all equipment.
- C. All of the above data should be submitted to the Architect for approval at such time as the Contractor asks for his last payment request, just prior to his final payment request. In no case will any portion of retainage be released until these documents are submitted and accepted.
- D. Refer to related portions of Division 1 for Project Close-Out requirements, Operation and Maintenance Data, Warranties, and other related certificates.

1.9 SHOP DRAWINGS AND SUBMITTALS

- A. Contractor shall submit to the Architect shop drawings, product submittals, and catalog data on all ductwork, equipment, and materials designated on the Drawings and specified herein. A minimum of four (4) hard copies or one (1) electronic copy of each shall be submitted or submittal shall be transmitted electronically. Additional copies will be required when indicated by the Architect and as required for project coordination.
- B. Each submittal will be reviewed for compliance with general requirements of design and arrangement only; it is not a contract document and acknowledgement of compliance does not relieve the Contractor from responsibilities for performance of the work in compliance with all provisions and requirements of the Contract Documents. Job measurements and the coordination of all dimensions for proper fit of all parts of the work and performance of all equipment supplied to meet specification requirements are, and remain, specific responsibilities of the Contractor.
- C. Shop Drawings shall be furnished by the Contractor for the work involved after receiving approval on the make and type of material and in sufficient time so that no delay or changes will be caused. This is done in order to facilitate progress on the job, and failure on the part of the Contractor to comply shall render him liable to stand the expense of any and all delays, changes in construction, etc., occasioned by his failure to provide the necessary detailed drawings. Also, if the Contractor fails to comply with this provision, the Architect reserves the right to go directly to the manufacturer he selects and secure any details he might deem necessary; and, should there be any charges in connection with this, they shall be borne by the Contractor.
- D. Shop Drawings submitted shall not consist of manufacturers' catalogues or tear sheets therefrom that contain no indication of the exact item offered. Rather, the submission on individual items shall designate the exact item offered and accessories as specified.
- E. Shop Drawings are not intended to cover detailed quantitative lists of heating specialties, valves, air distribution devices, fixtures, and similar items, as the Drawings and specifications illustrate those items; and it is the Contractor's responsibility to procure the proper quantities required to comply with the established requirements.
- F. Shop Drawings prepared to illustrate how equipment, piping, ducts, etc., can be fitted into available spaces will be examined under the assumption that the Contractor has verified the conditions shown. Review by the Architect shall not relieve the Contractor of responsibility in the event the material cannot be installed as shown on those Shop Drawings.
- G. Various material submissions of such items as air devices, plumbing fixtures, drains, and other related items or accessories shall be assembled in brochures or in other suitable package form and shall not be submitted in a multiplicity of loose sheets. Cover sheets for each item submitted shall have sufficient bare space to allow for shop drawing review stamps.
- H. Contractor shall process his submitted data to insure that it conforms to the requirements of the Drawings and specifications, and there are no omissions and/or duplications.
- I. Shop Drawings and Submittals shall be accompanied by certification from the Contractor, and firm preparing such, that Shop Drawings have been checked for, and are in compliance with, the Contract Documents.
- J. All Submittals and Shop Drawings shall have been submitted for review by the Architect and Engineer within 90 days after Contract Award Date.

1.10 PENETRATIONS THROUGH FIRE-RATED ASSEMBLIES

- A. Seal voids around ducts and pipes penetrating fire-rated assemblies and partitions using fire-stopping materials and methods in accordance with provisions in Section 07 84 00, Fire-Stopping.

1.11 DRAWINGS

- A. Drawings show diagrammatically the locations of the various pipes, ductwork, fixtures, and equipment, and the method of connecting and controlling them. It is not intended to show every connection in detail and all fittings required for a complete system. The systems shall include, but are not limited to, the items shown on the drawings. Exact locations of these items shall be determined by reference to the general plans and measurements at the building, and in full cooperation with work specified in other Divisions of these specifications; and, in all cases, shall be subject to the approval of the Architect. The Architect reserves the right to make any reasonable change in the location of any of this work without additional cost to the Owner.
- B. Should any changes be deemed necessary in items shown on the Contract Drawings, the shop drawings, descriptions, and the reason for the proposed changes shall be submitted to the Architect for approval.
- C. Exceptions and inconsistencies in plans and specifications shall be brought to the Architect's attention prior to bids being submitted; otherwise, the Contractor shall be responsible for the cost of any and all changes and additions that may be necessary to accommodate the installation of any particular apparatus.
- D. Lay out all work maintaining all lines, grades, and dimensions according to these Drawings with due consideration for the work of others. Verify all dimensions at the site prior to any fabrication or installation. Should any conflict develop or installation be found impractical, the Architect shall be notified before any installation or fabrication, and the existing conditions shall be investigated and proper changes effected without any additional cost.
- E. Titles of Sections and Paragraphs in these specifications are introduced merely for convenience and are not to be construed as a correct or complete segregation or tabulation of the various units of materials and work. The Architect does not assume any responsibility, either direct or implied, for omissions or duplications by the Contractor due to real or alleged error in the arrangement of matter in the Contract Documents.

1.12 CONNECTION OF EQUIPMENT FURNISHED BY OTHERS

- A. Equipment supplied as portions of work specified under other Divisions of these specifications shall be furnished with proper roughing-in diagrams and shall be installed as a part of Division 23.
- B. Furnish materials and labor required for the connection of this equipment.
- C. Contractor shall ascertain that all equipment so specified is included as part of this work.

1.13 COOPERATION

- A. Coordinate all work indicated in Division 23 with work specified in other Divisions to assure proper and adequate interface with other portions of the work.
- B. Maintain contact and be familiar with the progress of the general construction and the timely installation of sleeves and inserts, etc., before concrete is placed. Install the required systems in their several stages, at the proper time to expedite the work and avoid unnecessary delays in the progress of other portions of the work.
- C. Should any questions arise between work specified in Division 23 with respect to other portions of work specified in other Divisions of the Specifications, reference shall be made to the Architect for instructions.

1.14 MATERIALS AND EQUIPMENT

- A. All materials and equipment purchased shall be new. No used or reconditioned equipment will be allowed.

- B. Substitutions: Products of same functions, performance and design will only be considered if in full accordance with the requirements of Section 01 62 00, Product Options. The products of other manufacturers will be acceptable; only if, in the opinion of the Architect, the substitute material is of a quality as good or better than the material specified, and will serve with equal efficiency, maintainability, and dependability, the purpose for which the items specified were intended.
- C. Listed Manufacturers:
1. Manufacturers listed in a product or system specification are those manufacturers considered capable of manufacturing products conforming to the specification requirements, and are listed therein to establish a standard.
 2. The "listing" of a manufacturer does not imply "acceptance" or "approval" of any standard product of that manufacturer.
 3. Products offered by listed manufacturers shall be equal to, or superior in all respects to, that specified by named products; and shall meet or exceed specification requirements.
 4. The description of specific qualities takes precedence over the reference standards and the description of qualities and reference standards together take precedence over the named product of listed manufacturers.
- D. Product Options:
1. Products specified only by Reference Standards or by Description only means that any product meeting those standards or descriptions, by any manufacturer, will be considered.
 2. Products specified by naming several products or manufacturers means that only the manufacturers named will be considered.
 3. Products specified by naming only one product and manufacturer means that no option exists unless a substitution is accepted. Submit a request for substitution for any product or manufacturer not specifically named.
 4. Products specified by Description, Reference Standard, and naming several products or manufacturers means that any product and manufacturer named meeting those descriptions and standards will be considered. Submit a request for substitution for any product or manufacturer not specifically named.
- E. Limitations or Substitutions:
1. During Bidding Period, Instructions to Bidders, in Division 1, will govern times for submitting requests for substitutions under requirements specified in this Section.
 2. No later than ten (10) days prior to the bid date, Contractor shall notify the Architect in writing of any desired substitutions of products in place of those specified. These requests will be considered; and, if a favorable response is determined, this will be documented in the form of an Addenda.
 3. Substitutions will not be considered when indicated or implied on Shop Drawings or product data submittals without separate formal request, when requested directly by subcontractor or supplier, or when acceptance will require substantial revision of Contract Documents.
 4. Substitute products shall not be ordered or installed without written acceptance.
 5. Only one request for substitution for each product will be considered. If substitution is not accepted, Contractor shall provide specified product.
 6. Architect will determine acceptability of any and all substitutions.
- F. It is fully the Contractor's responsibility to assemble and submit sufficient technical information to fully illustrate that the material or equipment proposed for substitution is equal or superior, as the Architect is under no obligation to perform the service for the Contractor. The proposal shall be accompanied by manufacturer's engineering data, specification sheet, and a sample, if practical or if requested or specified. In no event shall a proposal for substitution be cause for delay of work. This shall include a detailed comparison to each product specification paragraph.
- G. Should a substitution be accepted under the above provisions, and should the substitution prove defective or otherwise unsatisfactory for the intended service, within the warranty period, the Contractor shall replace the substitution with the equipment or material specified, and on which the specifications required him to base his proposal.

- H. No substitutions will be considered contingent upon pending certification and rating agency approvals. Such certifications and ratings shall be in effect at the time of bidding.

1.15 EQUIPMENT SIZES AND REQUIREMENTS

- A. Space allocations in machinery and mechanical equipment spaces are based on equipment scheduled in each case. Should the Contractor request a substitution for equipment of another make that requires more space in any critical dimension, the Contractor shall submit, together with other submittal data on the equipment, prints of drawings indicating how the equipment may be installed, indicating room for servicing and revisions in piping or ducting and any other details necessary for the Architect to form a judgement as to the suitability of the substitute material, as to performance, suitability for the space and other variables.
- B. Duties of certain equipment items, horsepowers of driving motors and electrical characteristics are scheduled for equipment items of a particular make in each case. Should requests for a substitute material be accepted which has other requirements that would involve allied equipment or other portions of work, the Contractor shall be responsible for all modifications required at no change in contract price. As examples:
 - 1. If an accepted A/C Unit has a brake horsepower requirement above the motor horsepower scheduled, the Contractor shall be responsible for providing a larger motor and heavier drive and any change in size of the protective device, conduit run and conductors serving that motor. The latter shall be extended through an individual branch protective device and branch circuit on through the panel, feeder, feeder protective device, etc.
 - 2. If accepted, heat exchangers, coils, etc., having greater pressure drops than those on which pumping heads were based, the Contractor shall be responsible for selecting proper pumps and drives and adjusting electrical service work accordingly.
- C. Structural steel members are indicated to provide supports for certain specific sizes and weights of equipment. Should a substitution request involve other equipment, the spacing of the supports shall be varied to suite the equipment. Should the weight or size of a proposed substituted item of equipment require additional supporting steel members, the Contractor shall include documentation of the additional supports in the request for substitution and install them at no change in contract price if the substitution is accepted.
- D. Various large apparatus to be installed may require that the apparatus be installed prior to the installation of portions of structural, walls, or door frames. Coordinate the installation of these items to insure that no demolition of general construction is necessary for equipment installation or that the apparatus does not have to be disassembled for installation.

1.16 STORAGE AND PROTECTION OF MATERIALS

- A. Store and protect materials and equipment as specified in Section 01 66 00, Product Storage and Handling Requirements.
- B. Contractor shall provide storage space for protection and storage of his materials and assume complete responsibility for all losses due to any cause whatsoever. All storage shall be within the property lines of the building site, and as directed by the Architect. In no case, shall storage interfere with traffic conditions in any public or project thoroughfare.
- C. All work and material shall be protected at all times. Contractor shall make good any damage caused, either directly or indirectly, by his workmen. He shall be responsible for safe handling of all mechanical equipment and shall replace, without charge, all items damaged prior to acceptance by the Owner.
- D. On site storage shall not be inside the building during construction progress, but shall be in approved trailers or as specifically approved otherwise by the Architect. Storage inside the building shall only be allowed when so allowed by the Architect.

1.17 FOUNDATIONS

- A. Provide equipment foundations associated with the work specified in Division 23.
- B. All top corners and edges of all foundations shall be neatly chambered at a one inch (1") high 45 degree angle.
- C. Foundation bolts shall be placed in the forms when the concrete is poured. Allow one inch (1") below the equipment bases for alignment, leveling, and grouting with non-shrinking grout. Grouting shall be done after the equipment is leveled in place. After the grout has hardened, the foundation bolts shall be pulled up tight and the equipment shimmed, if necessary.
- D. After removal of the forms, the surface of the foundation shall be rubbed until smooth.
- E. Unless otherwise noted, foundations shall be four inches (4") thick elsewhere for low pressure rated air handling units and other mechanical equipment, unless specifically noted otherwise on the Drawings.
- F. All concrete work shall conform to the requirements of Section 03 30 00, Cast-in-Place Concrete.
- G. Provide housekeeping pads and foundations for every item of floor mounted equipment specified in Division 23 specifications. Pads shall be a minimum of 4 inches thick extend a minimum of two inches (2") in each direction beyond the equipment size.

1.18 EXCAVATION AND BACKFILLING

- A. Contractor shall do all necessary excavating and backfilling for the installation of his work. Trenches for underground conduits shall be excavated to required depths with bell holes provided as necessary to insure uniform bearing. Care shall be taken not to excavate below depth, and any excavation below depth shall be refilled with sand or gravel firmly compacted. Where rock or hard objects are encountered, they shall be excavated to a grade six inches (6") below the lowermost part of the piping and refilled to grade as specified. After the piping has been installed and reviewed by Architect and local building authorities, trenches shall be backfilled to grade with approved materials, well tamped or puddled compactly in place. Where streets, sidewalks, etc., are disturbed, cut, or damaged by this work, the expense of repairing same in a manner approved by Architect shall be a part of this contract.
- B. Contractor shall bear sole responsibility for design and execution of acceptable trenching and shoring procedures, in accordance with State of Texas Regulations. On trench excavations in excess of five feet (5') in depth, Contractor shall pay a qualified engineer to prepare detailed Drawings and specifications directing Contractor in the safe execution of trenching and shoring. It is understood that trench safety systems constitute a means and method of construction for which the Architect, Engineer, and Owner are not responsible. Accordingly, such documents when prepared, shall be separately issued by Contractor's Consultant, independent of project contract Documents.

1.19 WIRING

- A. Unless otherwise noted, all wiring for motors, starters, and equipment is specified in Division 26.
- B. Wiring of temperature controls shall be performed in accordance with the requirements of Division 26 but shall be performed as outlined in other sections of these specifications.
- C. All power for control circuits required for the Temperature Control System shall be provided and installed where indicated on the Division 26 Drawings, but shall otherwise be provided as indicated in other sections of these specifications.
- D. Each supplier of equipment requiring control shall have wiring diagrams furnished with submittals. This shall be used to determine conduit layouts required to complete the electrical portions of the instrumentation and control systems.

- E. All motors furnished as a portion of work specified in Division 23 shall be wired as specified in Division 26.
- F. Except where combination starter-disconnects are specified elsewhere herein or in Division 16, all motors shall be provided with safety disconnect switches in accordance with the National Electrical Code as specified in Division 26.
- G. Furnish all necessary wiring diagrams for equipment specified in Division 23, as a part of equipment submittals, for installation under other sections of these specifications.

1.20 EQUIPMENT STANDARDS

- A. All basic materials and equipment shall be standard catalog products of a reputable manufacturer and shall essentially duplicate equipment which has been in satisfactory service for at least one (1) year.
- B. First of a kind new technology devices will not be considered.
- C. Accessory equipment that is required to make a complete and functioning system that is not of the same manufacturer furnishing the basic materials or equipment shall carry the guarantee of the basic material or equipment manufacturer and repair and replacement parts shall be available through normal trade channels locally.

1.21 DEHUMIDIFICATION OF BUILDING

- A. It shall be the Contractor's responsibility to properly and thoroughly dry out all building materials used for construction of the building, as well as to dry out the building and dehumidify the spaces prior to activating the HVAC System. Extra precautions should be taken by the Contractor not to allow excessive humidity to develop in the building prior to final connection and activation of the HVAC System. Should it become necessary, the Contractor shall procure the required equipment (multiple portable dehumidifiers, as required to include temporary power thereto) to properly dry and dehumidify the building materials and spaces so as not to force the HVAC System to perform beyond its intended abilities.
- B. Contractor shall be responsible for all costs in connection with repair and/or activation to the building and its HVAC Systems should excess moisture cause damage thereto.
- C. Contractor shall provide proof of dehumidification by furnishing temperature and humidity readings for each section of the building as measured and recorded by an independent agent approved by the Owner/Architect. Provide these readings to the Owner's representative prior to the building HVAC system being activated and also furnish with the Project Close-Out documents.
- D. The inside building Dew Point shall not exceed 55 Deg.F. for a period of 24 consecutive hours or for a total of 24 hours in a 7 day time period.

1.22 CLEAN UP

- A. Contractor shall be responsible for cleaning up after and during all work performed under this Division of the Specifications.
- B. Contractor shall, on a daily basis, remove construction trash and debris accumulation to minimize the entrance of dust, dirt, and debris in piping, ductwork, and mechanical equipment.
- C. At the completion of construction, just prior to Substantial Completion and sustained operation of equipment, thoroughly clean the inside of piping, ductwork, and equipment.
- D. Refer to Division 1.

1.23 FINAL CONSTRUCTION REVIEW

- A. Schedule: Upon completion of the work specified in Division 23, there shall be a final construction review of the completed mechanical systems installations. Prior to this walk-thru, all work specified in this Division shall have been completed, tested, adjusted, and balanced in its final operating condition and the preliminary test report shall have been submitted to and approved by the Architect.
- B. Personnel: A qualified person representing the Contractor must be present at this final construction review to demonstrate the system and prove the performance of the equipment.
- C. Building mechanical systems shall have been in operation for a minimum of 15 days and Test and Balance work shall be substantially complete prior to this review.
- D. Exceptions to the aforementioned requirements will be considered on a case-by-case basis dependent on the size and type of project, as well as construction schedule limitations.

1.24 CERTIFICATIONS

- A. Before receiving final payment, the Contractor shall certify that all equipment furnished and all work done is in compliance with all applicable codes mentioned in these Specifications.
- B. Provide copies of all applicable approved notices and inspection certifications from the various inspections conducted by the Local Code Enforcement Authorities.

1.25 GUARANTEE

- A. The guarantee provision of this specification requires prompt replacement of all defective workmanship and materials occurring within one year of final job acceptance, Substantial Completion, or as defined by Extended Warranty Contracts. This includes all work required to remove and replace the defective item and to make all necessary adjustments to restore the entire installation to its original specified operating condition and finish at the time of acceptance.
- B. The Contractor shall also guarantee that the performance of all equipment furnished and installed under this Division of the Specifications shall be at least equal to the performance as called for in the specifications and as stated in the equipment submittals. Should there be indication that the equipment and installation is not producing the intended conditions, the Contractor shall make further tests as the Owner's Representative may direct to demonstrate that the equipment installed meets the specifications and is delivering the capacity specified or called for on the Drawings.
- C. If there is any indication that the equipment does not meet the specified quantities, the Contractor shall, at his expense, institute a program to demonstrate the adequacy of the installation. This program shall include all necessary testing and testing equipment. Should the Contractor not have the equipment or technical skill to perform the tests, it shall be his responsibility to employ recognized experts to perform the tests and shall provide certified laboratory tests, certified factory reports and work sheets, or other certified data to support results of any tests required.

END OF SECTION

SECTION 23 05 13

COMMON MOTOR REQUIREMENTS FOR HVAC

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- A. Comply with Division 1 - General Requirements and referenced documents.
- B. Comply with Division 23 Sections, as applicable. Refer to other Divisions for coordination of work with other trades, as required.

1.2 SYSTEM DESCRIPTION

- A. Provide motors for all mechanical equipment furnished under Division 23, as indicated herein and as illustrated on the Contract Drawings.
- B. All motors shall be of the same manufacture for like pieces of equipment; i.e., air handling units shall have motors of the same manufacturer. Pumps shall have motors of the same manufacturer, but both types of equipment are not required to have the same motor manufacturer.
- C. The following equipment with 3 phase 1 horsepower motors or larger shall be provided with NEMA Premium efficiency motors as specified herein:
 - 1. None for this project scope.
- D. Three phase, horizontal, NEMA frame induction motors served by AC Adjustable Frequency Motor Controllers shall be designed to meet the intent of NEMA MG1, Part 31, Section 31.40.4.2 regarding voltage spikes without exception.

1.3 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 33 23 and 23 05 00.
- B. Indicate on submittal the motors proposed for each system of equipment to be installed. This shall be in tabular form in one location for each type of equipment submitted. The lack of this information will be grounds for rejection of equipment submittals.
- C. Product Data shall be furnished which shall include:
 - 1. Motor Manufacturer.
 - 2. Motor Type; Open Drip Proof, Totally Enclosed (Fan Cooled or Air Over).
 - 3. Model of Manufacturer.
 - 4. Motor Horsepower.
 - 5. Motor RPM.
 - 6. NEMA Motor Efficiency at 25%, 50%, 75%, and 100% of Full Load Rating for motors served by variable frequency drives; 100% only for constant speed motors 1 HP and larger.
 - 7. Power Factor at 25%, 50%, 75%, and 100% of Full Load Rating for motors served by variable frequency drives; 100% only for constant speed motors 1 HP and larger.
 - 8. Service Factor.
- D. Certification: Provide manufacturer's literature indicating NEMA premium motor efficiency as tested in accordance with IEEE Standard 112, Test Method B. Provide documentation to verify motors served by variable frequency drives meet NEMA MG1, Part 30 for 6-step drives and Part 31 for PWM drives.
- E. Provide closeout documents as required in Division 1.

1.4 QUALITY ASSURANCE

- A. Comply with all regulatory requirements in the following order of precedence:
 - 1. Codes, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction over installation, inspection, and testing, including local codes.
 - 2. Provisions specified in this Section of Specifications.
 - 3. Applicable provisions of standards of National Electric Code (NEC).
- B. Manufacturer shall have been manufacturing the motors as described herein for a minimum of ten (10) years.

PART 2 - PRODUCTS

2.1 ELECTRICAL MOTORS, GENERAL

- A. All motors furnished under any of the several sections of these specifications shall be of a recognized manufacturer, be of adequate capacity for the loads involved, and wound for the electrical characteristics indicated on the Drawings and specified herein. Verify all job site voltages and power source available before submitting, ordering and installing any motor or related controls.
- B. Motors shall conform to the standards of manufacture and performance of the National Electrical Manufacturer's Association (NEMA) as shown in their latest publication.
- C. Motors shall be furnished with an open-frame, unless otherwise noted, or required by the NEC for the service conditions encountered. Motors exposed to weather shall be the totally enclosed type suitable for installation in ambient conditions for exposure to the sun, heat, and rain. Provide explosion proof motors where indicated and as required for the hazard in which to be installed.
- D. Unless otherwise noted, fractional motors rated at 1/2 horsepower and less shall be single phase, the motors rated at larger than 1/2 horsepower shall be three phase. Single phase motors shall be arranged for across-the-line starting.
- E. Single phase motors shall be capacitor start, induction run type, and shall be furnished with motor controller with pilot light where scheduled or indicated. Refer to Section 23 05 14.
- F. All motors shall be of the same manufacturer on similar equipment furnished by the same manufacturer, unless they are an integral part of the piece of equipment to which they are attached, such as a chiller. Air Handling Units shall have motors of the same manufacture and pumps shall have motors of the same manufacture; but, pumps and air handling units are not required to have motors of the same manufacturer.
- G. Three phase motors shall generally have the following characteristics:
 - 1. All copper windings.
 - 2. Type K, NEMA Design "B".
 - 3. Normal Starting Torque.
 - 4. Class B insulation.
 - 5. Continuous Duty Rated.
 - 6. 40 Deg.C. ambient rated.
 - 7. Minimum 1.15 Service factor on motors 1 horsepower and larger; 1.25 service factor on motors 3/4 horsepower and smaller.
 - 8. 1800 RPM unless scheduled otherwise.
 - 9. Oversize steel conduit boxes.
 - 10. Greasable bearings.
 - 11. Stainless steel or aluminum motor nameplates for standard motor information.
 - 12. Cold rolled steel 1045 shaft.
 - 13. Steel frame and splash cover.

- H. Where other sections of specifications do not call for premium efficiency motors this section shall apply to motor requirements. Where premium efficiency motors are required in the other Sections of these Specifications refer to Article 2.2 herein.
- I. Motor manufacturers shall be Reliance, Baldor, General Electric, A.O. Smith or U.S. Motors. Other manufacturers will not be considered.

2.2 PREMIUM EFFICIENCY ELECTRICAL MOTORS

- A. All premium efficiency electrical motors furnished under any of the several sections of these specifications shall be of a recognized manufacturer, be of adequate capacity for the loads involved, and wound for the electrical characteristics indicated on the Drawings and specified herein. Verify all job site voltages and power source available before submitting, ordering and installing any motor or related controls.
- B. Motors shall conform to the standards of manufacture and performance of the National Electrical Manufacturer's Association (NEMA) as shown in their latest publication.
- C. Motors shall be furnished with an open-frame, unless otherwise noted, or required by the NEC for the service conditions encountered. Motors exposed to weather shall be the totally enclosed type suitable for installation in ambient conditions for exposure to the sun, heat, and rain. Provide explosion proof motors where indicated and as required for the hazard in which to be installed.
- D. All NEMA Premium efficiency motors shall be three phase.
- E. Except as otherwise specified NEMA Premium efficiency motors shall be drip-proof, squirrel cage, premium efficiency type as manufactured by A. O. Smith (E Plus III), Baldor (Super E), Reliance (Duty Master XE), General Electric (Energy Saver), or U.S. Motors Premium Efficiency NEMA Design B, induction type rated for constant duty with 40 Deg.C. ambient temperature rise. The motors shall have the following characteristics:
 - 1. 1800 RPM unless scheduled otherwise.
 - 2. 1.15 Service Factor.
 - 3. Rigid base.
 - 4. Serialized and certified.
 - 5. Stainless steel nameplate.
 - 6. Class B insulated.
 - 7. 60 Hertz.
 - 8. High power factor.
 - 9. Ball Bearings.
- F. Totally enclosed motors and motors served by variable frequency drives shall be Class F insulated.
- G. Minimum Nominal motor efficiencies at 1800 RPM, 460V or 208V, 4 pole (as noted on drawings), full-load, per IEEE Standard 112, test method B, as defined by NEMA MG1-12.53, a and b, shall be as follows, along with minimum power factor:

MOTOR HP	NOMINAL EFFICIENCY		POWER FACTOR	
	TEFC	ODP	TEFC	ODP
1	85.5	85.5	84.0	84.0
1.5	86.5	86.5	85.7	85.7
2	86.5	86.5	85.7	85.7
3	89.5	89.5	85.5	85.5
5	90.2	89.5	88.0	88.0
7.5	91.0	91.0	82.0	82.0
10	91.7	91.7	82.0	82.0
15	92.4	93.0	86.0	83.5
20	93.0	93.0	86.5	84.5
25	93.0	93.6	87.5	87.0
30	93.6	94.1	88.5	87.0
40	94.1	94.1	89.0	87.0

- H. Furnish submittal data on all NEMA Premium efficiency motors furnished to include motor efficiencies as rated in accordance with IEEE Standard 112, Test Method B.
- I. All motors shall be of the same manufacturer on similar equipment furnished by the same manufacturer, unless they are an integral part of the piece of equipment to which they are attached, such as a chiller. Air Handling Units shall have motors of the same manufacture' and pumps shall have motors of the same manufacture; but, pumps and air handling units are not required to have motors of the same manufacturer.
- J. Each premium efficiency motor shall be warranted for a minimum of three (3) years.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Motors shall typically be furnished by the manufacturer of the equipment which the motor will serve.
- B. Motors shall be factory installed in the equipment and be mounted on equipment bases, wired to a terminal box, connected to the mechanical device to be rotated, and factory run tested.
- C. When project schedules will not allow the above due to excessive lead time requirements, the Contractor shall do one of the following all at no additional cost:
 - 1. Locally procure the specified motors, while meeting all of the above requirements, and field install the motors on the equipment in accordance with the manufacturer's installation instructions.
 - 2. Accept factory installed standard efficiency motors and replace with high efficiency motors as noted above.
- D. Motors disconnects will be furnished and installed under Division 26, unless integral with, or specified to be a part of, the equipment as indicated elsewhere in other sections of these Specifications. The wiring to the motor and installation of the motor controller, if not specified to be integral with the equipment, as furnished under other sections of these specifications, shall also be installed under Division 26.
- E. Interlock and control voltage wiring shall be installed as outlined in other Sections of these Specifications.

END OF SECTION

SECTION 23 05 14

COMMON MOTOR STARTER REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- A. Comply with Division 1 - General Requirements and referenced documents.
- B. Comply with Division 23 Sections, as applicable. Refer to other Divisions for coordination of work with other trades, as required.

1.2 SYSTEM DESCRIPTION

- A. Provide a complete system of motor starters as indicated herein and as illustrated on the contract Drawings.
- B. Provide other devices as indicated for control of motors and interface with automation or control systems, and as further required by the local authorities having jurisdiction.

1.3 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 23 05 00.
- B. Indicate on submittal the starter type proposed to be used for each system and for the various sizes of motors required to be installed. This shall be in tabular form with attached cut sheets.
- C. Product Data:
 - 1. Snap Action Manual Motor Starters.
 - 2. Magnetic Across-the-Line Motor Starters.
 - 3. Control Transformers.
 - 4. Hand-Off-Automatic Switches.
 - 5. Pilot Lights.
 - 6. Number and Type of Auxiliary Contacts.
 - 7. NEMA Enclosure Type.
 - 8. Power and Control Wiring Diagrams.
- D. Provide closeout documents as required in Division 1 at Substantial Completion.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with requirements in following order of precedence:
 - 1. Codes, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction over installation, inspection, and testing, including local codes.
 - 2. Provisions specified in this Section.
 - 3. Applicable provisions and standards of the National Electric Code (NEC).
- B. Manufacturer shall have been manufacturing the product proposed to be used as described herein for a minimum of ten (10) years; or it shall essentially duplicate a product line that has been manufactured for that length of time.
- C. Source Quality Control:
 - 1. Manufacturer's tests to meet applicable Underwriters' Laboratories, Inc., Standards.
 - 2. Equipment designed and manufactured to meet applicable ANSI, NEMA, and IEEE Standards.

PART 2 - PRODUCTS

2.1 MOTOR STARTERS

- A. Except as specified otherwise, a starter providing overload protection shall be furnished with each motor provided in Division 23, under this section of the specifications, unless:
 - 1. Starters are provided in Division 26 as part of a motor control center, or
 - 2. Starters are furnished under Division 26 as a combination motor starter-disconnect.
 - 3. Disconnects on fractional horsepower motors are not substitutes for a motor controller (starter). However, a motor controller on these size motors may substitute for a disconnect only where the required location for both is in the same location.
 - 4. Unit heater and ceiling fan fractional horsepower, motors, 1/8 HP or smaller, with inherent thermal overload protection are not required to have motor starters.
- B. Each starter furnished herein shall have a NEMA horsepower capacity rating within the required limits of the motor which it serves.
- C. Unless otherwise indicated, starters mounted indoors shall be furnished with NEMA Type 1 enclosures, and those exposed to the weather shall be furnished with NEMA Type 3 enclosures.
- D. Each three phase starter shall be provided with three thermal overload protection relays, one in each phase, be of the full voltage, across-the-line, non-reversing, single or two-speed, magnetic controller type. Overload relays shall be reset from outside the starter enclosure by means of an insulated bar or button.
- E. Starters shall have auxiliary contacts as required to comply with provision for electrical interlocks as defined hereinafter. Provide a minimum of one (1) normally open (N.O.) and one (1) normally closed (N.C.) auxiliary contacts with each three (3) phase starter. Where used, the secondary side of the control transformer shall be grounded and the other side shall be fused. Where starters are interlocked, the starter holding coils shall be of one voltage. Where starter line voltages are different and above 120 volts to ground, provide control voltage transformers in the starters that are interlocked. The control systems installer shall supply all electrical power supply and transformers as needed to serve control circuit requirements for temperature controls. Control voltage in each starter shall be not more than 120 volts to ground, with an individual control transformer provided in each interlocked starter. Control safety circuits shall de-energize the respective motors served via holding coils in the respective starter.
- F. Manual starters for fractional horsepower single phase motors shall be on-off, or snap action switch type combined with thermal overload device. The switch shall be so constructed that it cannot be held closed under a sustained motor overload. This shall be equal to an Allen Bradley No. 600-TAX216, toggle switch with neon pilot light and NEMA 1 enclosure unless indicated otherwise for severe duty.
- G. Provide starter covers with Hand-Off-Auto Switch and pilot light where equipment is interlocked or remotely controlled. Provide starter covers with Start-Stop buttons and neon pilot lights where equipment is locally controlled.
- H. The Hand-Off-Auto Switches shall be so wired that, when in automatic position, the control of their motors is transferred to the control system as outlined elsewhere herein; and, when in hand position, they themselves assume control of their motors irrespective of the remainder of the equipment, although the temperature control sequences shall operate the same while in either the "Hand" or "Auto" position. Safety devices will not be bypassed when in "Hand" position.
- I. Coordinate the purchase of all starting equipment, insofar as practical, such that all starting equipment on the project shall be of the same manufacturer.
- J. Starters shall be a regularly manufactured product to meet the intent of all requirements specified herein.
- K. Acceptable starters and controllers shall be manufactured by
 - 1. Allen-Bradley.
 - 2. General Electric.

3. Cutler-Hammer.
4. Square D.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All starters furnished under this section of the Specifications shall be installed under Division 26 of the specifications.
- B. Securely mount all starters level against walls where shown to be fully accessible and convenient for use. Where not specifically shown locate in a convenient and fully accessible location in a Mechanical Room, Electrical Room, Janitor Closet, Storage Room or above accessible lay-in ceiling when no higher than six inches (6") above the finished ceiling height and mounted to a wall or physically secure and stable surface.
- C. Where no wall exists for installation, furnish a unistrut fabricated stand secured to the floor, or other suitable structure. Use corrosion resistant fasteners.
- D. Where motor starters are ganged together, mount, insofar as is practical, all at the same distance from the floor, or other referenced point, to the bottom of the starters.
- E. Refer to manufacturer's wiring diagrams for proper wiring procedures.
- F. Wire all safety devices in series to be active in both the "Hand" and "Auto" position.
- G. Coordinate starter type and size with motor manufacturer's data for equipment actually installed.
- H. Field verify correct sizes of replaceable thermal overload elements for each motor actually installed. Do not over or under size elements.

END OF SECTION

SECTION 23 05 48

VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- A. Comply with Division 1 - General Requirements and referenced documents.
- B. Comply with all other Division 23 Sections, as applicable. Refer to other Divisions for coordination of work with other portions of work.

1.2 SYSTEM DESCRIPTION

- A. A complete system of vibration isolation for all mechanical equipment subject to the transmission of noise and vibration to the building.

1.3 QUALITY ASSURANCE

- A. All equipment and materials shall be new and of the best quality and have been manufactured by a firm with a minimum of five (5) years of experience in this field.
- B. All equipment and materials shall be installed in a workmanlike manner by experienced mechanics and as recommended by the equipment and vibration isolation manufacturers.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's descriptive literature and installation instructions for all vibration isolation equipment.
- B. Shop Drawings: Submit in accordance with Section 23 05 00.

1.5 PRODUCT HANDLING

- A. Cover and protect material in transit and at site. Material not properly protected and stored and which is damaged or defaced during construction shall be rejected.
- B. Storage and protection of materials shall be in accordance with Section 23 05 00.
- C. Install materials and equipment at the proper time to keep pace with the general construction and the work of other trades involved so as not to delay the project completion schedule.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Objectionable vibration or noise created in any part of the building by the operation of any equipment furnished and/or installed under Division 23 will not be permissible.
- B. Contractor shall take all precautions against the same by isolating the various items of equipment, pipes, and ducts from the building structure and by such other means as may be necessary to eliminate the transmission of excessive vibration and objectionable noise produced by any equipment installed thereby.
- C. Design all foundations, supports, etc., for equipment, piping and ductwork with this end in view.

- D. Contractor shall supervise and instruct the construction of all foundations and supports, in order that they may be constructed in such manner as to prevent the transmission of noise and vibration.

2.2 APPLICATIONS

- A. Isolating material shall be selected in each case in accordance with the manufacturer's recommendations and the latter shall be prepared to demonstrate, upon request of the Architect, the isolation effectiveness of the material which has been installed upon his recommendation.
- B. Isolators shall be so selected that when all the items in each of the mechanical rooms are in simultaneous operation, the vibration transmission to the building at the lowest disturbing frequency shall be limited to a maximum of 10% for a mechanical equipment room floor that is on the ground and 5% for all other building surfaces, including those in fan rooms, from all the equipment when the various items are in harmony.
- C. Isolators for supporting Fans suspended from the construction above on rod hangers, not internally isolated, shall be of the open spring type with housings and noise washers, lock washers, nuts, etc. Isolators shall be similar to Amber Booth type BSW-1 or 2 or KDXW-1 or 2 with a minimum 1 inch deflection for fans and 2 inch deflection for air handling units. For fans and A/C units less than 1000 CFM in capacity they may be isolated with rubber-in-shear isolating grommets in lieu of spring isolators.
- D. For all curb mounted fans and condensing units use two inch (2") wide x 3/8" thick neoprene isolation strips to be in continuous contact at all curb to equipment contact areas.

2.3 MANUFACTURER

- A. Isolating material used shall be equivalent to Amber-Booth, Peabody, Korfund Vibration Mountings, or Mason.

PART 3 - EXECUTION

3.1 PERFORMANCE OF ISOLATORS

- A. Comply with recommendations set forth by the American Society of Heating, Refrigerating and Air Conditioning Engineers for the selection and application of vibration isolation materials and units.
- B. Comply with manufacturer's recommendations for selection and application of vibration isolation materials and units.
- C. Place isolators where indicated and where specified herein. Coordinate all isolator selections with approved equipment and other pertinent shop drawings of exact equipment to be isolated. Verify to ensure accuracy of load points and take into account any accessory devices adding to equipment loads to be supported by isolators.

END OF SECTION

SECTION 23 05 53

IDENTIFICATION FOR HVAC EQUIPMENT AND PIPING

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- A. Comply with Division 1 - General Requirements and referenced documents.
- B. Comply with all other Division 23 Sections as applicable. Refer to other Divisions for coordination of work with other portions of the work.

1.2 SYSTEM DESCRIPTION

- A. Provide a complete system of Piping Identification as specified herein for each of the systems as described herein.
- B. Provide a complete system of equipment identification tags as described herein.

1.3 QUALITY ASSURANCE

- A. The installation of all mechanical system identification devices shall be performed under this Section of the Specifications using materials which are the product of reputable manufacturers. The application of the materials shall be in strict accordance with the published standards of the manufacturer of the materials, using any special materials as required by these specifications and by those published standards.
- B. Manufactured Piping Identification markers, equipment name plates and valve tags shall be a product of Seton Name Plate Corporation, EMED Company, Inc., or Craftmark Identification to meet all ANSI Standards pertaining thereto.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's descriptive literature and installation instructions in accordance with Section 23 05 00.
- B. Shop Drawings:
 - 1. Submit a list of all piping systems to be identified, color of background to be used, legend or wording to be displayed for each system, and the intended location of all markers to be displayed.
 - 2. Submit a list of equipment to receive identification tags, cut sheets and proof copies of tags which indicate location of tag and wording to be engraved thereon.

1.5 PRODUCT HANDLING

- A. Cover and protect material in transit and at site. Material not properly protected and stored and which is damaged or defaced during construction shall and will be rejected.
- B. Storage and protection of materials shall be in accordance with Section 23 05 00.

PART 2 - PRODUCTS

2.1 PIPING IDENTIFICATION SYSTEM

- A. Furnish piping identification markers for all insulated and uninsulated piping systems in sizes and colors in accordance with ANSI Standard A13.1. Markers shall be as manufactured by Seton Name Plate

IDENTIFICATION FOR HVAC EQUIPMENT AND PIPING

Corporation similar to their vinyl plastic "Setmark" pipe markers with flow arrows. For systems with overall outside diameters under 6" use the snap-around markers. For systems with overall diameters 6" and over use strap-around markers attached with nylon ties.

- B. Markers shall be provided as a minimum for the following systems:
 - 1. Condensate Drains (Green or yellow background), for all insulated drains not contained in one space or roof; i.e., an A/C condensate drain in a fan room shall not require identification, whereas, as drain extending to another space would. Provide separate markers for condensate and auxiliary drain lines.
 - 2. Refrigerant Liquid (Yellow background).
 - 3. Refrigerant Suction (Yellow background).
- C. Refer to Section 09 91 23 for color code paint requirements for all exposed mechanical equipment and piping.

2.2 EQUIPMENT IDENTIFICATION

- A. This Contractor shall provide identification plates similar and equal to Seton Name Plates, Style 2060.
- B. Name plates shall be a minimum of 1/16" thick and 1" X 3" in size with beveled edges. The surface shall be a black satin with a white core for lettering. Each plate shall be drilled with two mounting holes sized for 3/8" No. 3 round head nickel plated steel screws. Lettering shall be a minimum of 3/16" high. Lettering shall be cut through the black surface to the white core. Only name plates equal to those specified will be considered. No punched plastic tape or engraved aluminum plates are acceptable. Stick-on only plates are not acceptable.
- C. Provide and install identification plates on the cover of all starters or disconnects or combination starter-disconnects, where not mounted directly on the equipment, delivered by the mechanical system installer to the electrical systems installer and on each piece of Mechanical Equipment to include but not necessarily limited to:
 - 1. Exhaust Air Fans.
 - 2. Split DX A/C Units.
 - 3. Condensing Units.
- D. Name plates shall have complete words describing equipment type, use and service. As an example, air handlers shall be designated "AHU-S-X MEP Shop" to designate the equipment as an air handler, number of air handler and area served. Use multiple or larger name plates as required to fulfill this requirement.

PART 3 - EXECUTION

3.1 PIPE MARKER INSTALLATION

- A. Provide flow arrows at each marker location.
- B. Markers shall be spaced not more than 30 feet on center and at each change of direction but not more than 4 feet in each direction from each elbow and tee.
- C. Identification markers shall be installed on all new piping; indoors, outdoors and in the crawl space except for drain and waste lines 3/4" and smaller.
- D. Install markers on exposed piping systems only after jacketing systems and finish paint coats are complete. Refer to Sections 09 91 23 and 23 07 00.

3.2 IDENTIFICATION TAG INSTALLATION

- A. Secure tags level and in a conspicuous location with adhesive on equipment starters or combination starter disconnects and on the equipment where starters are not immediately adjacent to the equipment served.
- B. Additionally, secure all tags with screw fasteners after secured with adhesive.
- C. Provide and install an additional identification plate mounted on the ceiling grid (lay-in Clg) or on access door (Hard Clgs.) for all above ceiling mounted equipment.

END OF SECTION

SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING (TAB) FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section shall be related to the General Provisions of the contract, including General and supplementary conditions.
- B. Refer to Section 23 0500 for General Provisions.

1.2 SCOPE OF WORK

- A. The work included in this Section consists of the furnishing of all labor, instruments, tools and services required in connection with the Testing, Adjusting and Balancing (TAB) of the Heating, Ventilating and Air Conditioning (HVAC) systems as described in the mechanical specifications and shown on the mechanical Drawings, or reasonably implied therefrom, to include the overall commissioning of systems and subsystems such as verification of operation of each control device and all equipment sequences of operation.
- B. TAB of the HVAC systems will be performed by an impartial Technical Firm who is a member of the Associated Air Balance Council (AABC) and whose operations are limited only to the field of professional TAB work. TAB services shall be paid by allowance in general Contractor's scope. District shall select the TAB firm at an early stage of the project and notify the Contractor if TAB firm that shall be employed. TAB scope shall be limited to the following campuses:
 - 1. Academy at Carrie Francis Thomas
 - 2. JD Spicer Elementary School.
 - 3. North Ridge Elementary School.
 - 4. Green Valley Elementary School.
 - 5. Smithfield Middle School.
- C. TAB Firm is responsible to and shall submit all reports directly to the Architect/Engineer and as requested to the Owner.
- D. TAB services shall result in the optimum temperature, humidity, airflow, ventilation rates, and noise levels in the conditioned spaces of the building.
- E. The following basic components of the HVAC systems shall be tested, adjusted and balanced:
 - 1. Air distribution systems.
 - 2. Air moving equipment.
 - 3. Cooling systems.
 - 4. Heating systems.
 - 5. Control systems verification to include end devices, control sequences of operation and energy management system control and monitoring point verification.
- F. Document Review
 - 1. The TAB Firm shall be responsible for reviewing the HVAC Drawings and specifications relating to the TAB services for proper arrangement and adequate provisions of devices for testing, adjusting and balancing.
 - 2. TAB Firm shall review HVAC manufacturer's submittal data relative to balanceability.
 - 3. TAB Firm shall review submitted HVAC automatic temperature control sequences for conformity to the specifications.
- G. Three (3) hard bound copies and three (3) .PDF file copies saved onto Compact Disks of final report shall be submitted to the owner, or representative thereof, indicating a summary of actual operating data and

any abnormal operating conditions. The report will contain all required information as described within this specification.

1.3 SERVICES OF CONTRACTOR

- A. Contractor shall start up and test all materials and equipment which normally require testing. All piping, ductwork, etc., shall be tested to meet code requirements or the specification requirements, whichever is the more stringent. All equipment shall operate a sufficient length of time at the Contractor's expense to prove to the Engineer, and Owner that the equipment is free from mechanical defects, runs smoothly and quietly and performs satisfactorily to meet the requirements set forth in the Mechanical Drawings and Specifications.
- B. In order that all HVAC systems can be properly tested, adjusted and balanced, the Contractor shall operate the HVAC systems at his expense for the length of time necessary to properly verify their completion and readiness for TAB, and shall further operate and pay all costs of operation during the TAB period. Operating expenses to be paid for by the Contractor (not TAB firm) will include, but not necessarily be limited to, the following:
 - 1. Utility costs; electrical, gas, etc., as applicable.
 - 2. Personnel costs to start, operate and stop all HVAC equipment.
 - 3. All start-up labor and materials costs.
 - 4. All maintenance costs.
- C. The drawings and specifications have indicated valves, dampers and miscellaneous adjustment devices for the purpose of testing, adjusting and balancing the HVAC systems to obtain optimum operating conditions. It will be the responsibility of the Contractor to install these devices in a manner that will leave them fully accessible and readily adjustable to include access to allow recording of all motor and fan nameplate data. The TAB firm shall be consulted if there is a questionable arrangement of a control or adjustable device. Should any such device not be readily accessible, the Contractor shall provide access as required by the TAB firm.
- D. Contractor shall provide and coordinate the services of qualified, responsible sub-contractors, suppliers, and personnel as required to correct, repair or replace any and all deficient items or conditions found before and during the TAB period.
- E. As a part of this Project Contract, the Contractor shall make any changes in the sheaves, belts, motors, and dampers, or the addition of dampers as required, to correctly balance the HVAC systems as required by the TAB firm at no additional cost.
- F. Provide sufficient time in Project Contract completion schedule to permit the completion of TAB services prior to Owner occupancy of the project.
- G. Contractor shall furnish without charge to the TAB Firm:
 - 1. One set of mechanical specifications.
 - 2. All pertinent change orders and Addenda.
 - 3. Two complete sets of mechanical plans with latest revisions.
 - 4. "As-installed" drawings.
 - 5. Approved control diagrams.
 - 6. Approved manufacturer's submittals for all HVAC equipment.
- H. Have all HVAC systems complete and in operational readiness prior to notifying the TAB Firm that the project is ready for TAB services. So certify in writing to the Engineer, and Owner that such a condition exists. Complete operational readiness prior to commencement of TAB Services shall include the following:
 - 1. Construction status of building shall permit the closing of doors and windows, ceilings installed, etc., to permit the obtaining of projected actual operating conditions.

2. Air Distribution Systems:

- a. Verify installation for conformity to design of all supply, return and exhaust ducts. Document and certify that all duct leakage tests as required by the mechanical specifications have been performed and the test results are within specified limits (provide copies of leakage test results). TAB firm shall be notified of the time when all leakage tests are to be conducted to allow them to witness as needed.
- b. Verify that all volume dampers, smoke dampers and fire dampers are properly located, functional and open; verify that properly located, sized, and labeled access doors are installed in ducts and in general construction (ceilings, walls, furrings, etc.).
 - 1) Contractor shall manually release the fire, smoke or fire-smoke damper which shall be witnessed by the TAB firm or local municipality representative; to observe the full opening and closing of the dampers. Document these witness tests in writing.
 - 2) Contractor shall open or reset fusible links on these dampers, as required.
 - 3) Contractor shall furnish tags at each damper for recording the date, time and individual who last verified the operation of each damper.
- c. Verify that minimum outside air, maximum outside air, return air and relief air dampers provide tight closure, open fully and operate smoothly and freely.
- d. Verify that all supply, return, exhaust and transfer air diffusers, grilles and registers are installed as indicated on the mechanical Drawings.
- e. Install clean filters at each air handling unit and maintain these filters for the complete period that the subject system is being tested, adjusted, and balanced. Refer to Section 23 3000.
- f. Verify that all (supply, return, relief and exhaust) fans are operational including proper fan rotation, operates free from vibrations, belts are properly aligned, and belt tension is proper.
- g. Verify that all motor starter overload heater elements are of proper size and rating; nameplate amperage to be within the range of the heater element size.
- h. Make a record of actual motor amperage and voltage, per phase, and verify that they do not exceed nameplate ratings.
- i. Verify specified vibration isolation accessories are correctly installed and adjusted.
- j. Insure that all fan drive components, motors, belts, sheaves, and fan wheels are all accessible to allow for servicing and verification of name plate data, sizes, and model and serial numbers, as applicable.

I. Automatic Controls:

1. Verify that all control components are installed in accordance with project requirements and are functional as intended by these specifications, including all electrical interlocks, damper sequences, air temperature resets, duct smoke detectors, safeties, etc.
2. Verify that all controlling instruments are calibrated and set for designed operating conditions with the exception of room thermostats which shall be calibrated at the completion of TAB services with cooperation between TAB Firm and controls system installer.
3. Automatic temperature control and/or energy management system installer shall thoroughly check all controls, sensors operators, sequences of operation, etc. before notifying the TAB agency that the automatic temperature controls and energy management system are operational. Automatic temperature control and/or energy management system installer shall provide technical support (technicians and necessary hardware and software) to the TAB agency to allow for a complete check out of these systems.
4. The scope of the TAB work as defined herein is indicated in order that the contractor will be apprised of his responsibility regarding the coordination and assistance required to complete the project requirements for final TAB. The TAB Firm will be responsible to the Engineer, and Owner for the satisfactory execution of the TAB services.

1.4 SERVICES OF THE TAB FIRM

A. TAB Firm Qualifications:

1. TAB Firm shall be one which is organized to provide independent professional testing, adjusting and balancing services. The firm shall have one (1) Professional Engineer licensed in the State of Texas, with current registration.
 2. TAB Firm shall have operated a minimum of ten (10) years, under its current firm name.
 3. All personnel used on the job site shall be either TAB engineers or TAB technicians, who shall have been permanent, full-time employees of the Firm for a minimum of one (1) year prior to working on this specific project.
 4. TAB Firm shall submit the following to the Engineer and/or Owner for approval prior to commencing services:
 - a. Name and biographical data of the Professional Engineer and all personnel to be assigned to this project.
 - b. Proof of company operation for a minimum of ten (10) years.
- B. TAB Firm Responsibilities:
1. Liaison: The TAB personnel on the job shall act as liaison between the Engineer, Owner and Contractor.
 2. Inspect the installation of mechanical piping systems, sheet metal work, temperature controls and other component parts of the HVAC systems during the early construction stages, and at other appropriate stages, for the purpose of reviewing that part of the work relating to proper arrangement and adequate provisions for TAB.
 3. When performing inspection services prepare a punch list to be copied to the Engineer and Contractor noting observed deficiencies that would prevent adequate access to equipment and components installed or missing that would prevent the TAB Services from being carried out successfully.
- C. TAB Firm Services:
1. TAB personnel shall, upon completion of the installation and start-up of the mechanical equipment systems, test, adjust and balance the HVAC systems to provide optimum temperature, airflow and noise conditions in the conditioned spaces in the building while the HVAC equipment is operating efficiently.
 2. The Firm shall be responsible for testing, adjusting, balancing and logging actual data on all air distribution and air moving equipment, fans, heating and cooling equipment and the operating conditions of all motors, etc. as indicated in this specification.
 - a. Air Distribution Devices:
 - 1) Preset all volume dampers in the 100% open position.
 - 2) Determine and verify proper air pattern deflection devices have been installed.
 - 3) Verify size and types of all air devices installed, versus, the sizes and types indicated on the Drawings.
 - 4) Read out all air distribution devices served by their source (Air Handling Unit, A/C unit, Ground Source Heat Pump Unit, Exhaust Fan, Make-up Air Fan, etc.)
 - 5) Balance all air distribution devices proportional to design CFM.
 - 6) Adjust source to design CFM.
 - 7) Verify that all air distribution devices are within plus or minus 10% of design (and all proportional to one another on each system).
 - b. Supply/Exhaust Fans:
 - 1) Verify correct fan rotation.
 - 2) If belt driven, verify proper belt tension and that fan and motor sheaves are properly aligned.
 - 3) Verify that all safeties and interlocks are operational.
 - 4) Verify correct size and rating of motor overload protection.
 - 5) Verify fan motor is not overloaded; amperage readings do not exceed nameplate rating, for each phase, as applicable.

- 6) Determine total air quantities of system served by the respective fan. Air quantities to be determined by duct traverse if duct configuration permits and air velocity is 1000 feet per minute or greater.
 - 7) If air volume is less than design and motor capacity is available, adjust fan to design CFM. If new sheave or sheaves and belts are required, data will be submitted to Contractor.
 - 8) Balance air distribution system (see Air Distribution Devices).
- c. Split DX A/C Units or Ground Source Heat Pump Units (New and Existing in area of work):
- 1) Verify that the outside, return and relief air dampers are operational and move freely.
 - 2) Verify that filters are clean at the time of testing.
 - 3) Verify correct evaporator and return or relief air (as applicable) fan rotation.
 - 4) If belt driven, verify proper belt tension and that fan and motor sheaves are properly aligned. If direct drive, verify that motor is a multi-speed motor and adjust speed setting for air balance purposes.
 - 5) Verify that all RTU safeties are operational, as applicable, (low and high pressure limit switches, freezestat, high static pressure, anti-recycle timer, etc.).
 - 6) Verify correct size and rating of motor overload protection for each fan motor.
 - 7) Verify each fan motor is not overloaded; amperage readings do not exceed motor nameplate rating.
 - 8) Determine total supply and return air. Air quantities to be determined by duct traverse if duct configuration permits and air velocity is 1000 feet per minute or greater.
 - 9) Balance air distribution system (see Air Distribution Devices).
 - 10) If air volume is less than design and motor capacity is available, adjust fan or fans, to obtain supply and return design CFM quantities to within + 10% of design. If new sheave or sheaves and belts are required, data will be submitted to Contractor for change out. For direct drive fans, adjust fan speed setting. After adjustments are made, retest units to determine final air balance quantities.
 - 11) Verify all temperature control devices are set and calibrated at design set points.
- d. Fire, Fire-Smoke, and Smoke Dampers:
- 1) Verify operation of all fire-smoke and smoke dampers only by witnessing the Contractor fully opening and closing these dampers.
 - 2) Verify each fire, fire-smoke, and smoke damper is located where indicated on the Drawings and tagged or identified with a permanent fire resistant tag or stencil (at access door location).
 - 3) Verify that each fire, fire-smoke, and smoke damper is provided with a suitably sized and located access door to allow full testing and observation of damper operation. Verify each duct access damper has suitable access through general construction features.
 - 4) Witness the Contractor testing each fire-smoke and smoke damper which shall be manually released, allowed to fully close, verifying it has a tight fit when closed, and then verify it does not bind when opening or closing.
 - 5) Witness each fire-smoke and smoke damper being fully opened by the Contractor and the fusible links on the fire damper portion of fire-smoke dampers being reset by the Contractor to include other related devices on smoke-fire dampers.
 - 6) Verify that all fire dampers are fully opened.
 - 7) Identify all dampers requiring repair or having a faulty installation.
 - 8) Write down pertinent information on damper testing tags to verify dates tested and initials of tester to confirm a successful test was conducted.
- e. Cooling and Heating Coils:
- 1) Verify that all coils are installed properly.
 - 2) Verify that all cooling and heating coils have filters installed upstream of coils.

- 3) Verify no simultaneous cooling and heating occurs at any piece of equipment except during a humidity control sequence.
 - 4) Verify correct overload devices are installed for electric heating devices.
 - 5) Verify operation of all safety devices.
 - 6) Record entering and leaving air dry bulb temperatures, as applicable, to determine actual air temperature drop or rise as compared to the design value for all equipment tested. Additionally, for cooling coils, record the entering and leaving wet bulb temperatures for each component.
3. During the balancing process, all abnormalities or malfunctions of equipment or components discovered by the TAB personnel, will be reported promptly to the Engineer, Owner and Contractor so that the condition can be corrected expediently.
 4. The temperature controls will be verified for calibration and proper relationship between control devices. The Contractor will be advised of any instruments out of calibration so that the Automatic Temperature Controls (ATC) contractor can recalibrate, using data supplied by the TAB Firm as required.
 5. Thoroughly test the Energy Management System (EMS), as applicable. The testing of the Energy Management System shall include all HVAC controls, sensors, operators, sequences, etc. The tests shall include verification that commands introduced at the EMS console actually occur and temperatures, pressures, etc. indicated at the EMS console correlate with the actual reading at the sensing point. The ATC and EMS contractor shall provide technical support to the TAB Firm for a complete check out of the HVAC temperature controls and the Energy Management System. The EMS workstation console and field direct digital control panel displays of measured variables such as temperature, relative humidity, carbon dioxide and pressure shall have the displayed values offset through software to be within 0.3 Deg.F. of the temperature, 5.0 percent for relative humidity, 25 parts per million (PPM) for carbon dioxide, and 0.01% for pressure of the actual variables measured in the field, with recently calibrated test equipment, at the sensor locations.
 6. After testing, adjusting and balancing to the design conditions, if comfort conditions are not being maintained, the air conditioning system shall be rebalanced within the limitations of the equipment installed to obtain comfort conditions. If comfort conditions cannot be obtained, a report will be submitted giving specific data regarding the trouble area.
 7. Make not less than three (3) inspections within ninety (90) days after occupancy of the building, and make adjustments if required, to insure that satisfactory conditions are being maintained throughout. Inspections are to be coordinated with Engineer, and Owner; and shall be documented with a supplemental report containing data and information, as required, after each visit, to document in writing that such visit took place and to note any unusual operating conditions.
 8. Make an inspection during the opposite season from that in which the initial adjustments were made and at that time make any necessary modifications to the initial adjustments required to produce optimum operation of the systemic components to produce the proper conditions in each conditioned space. The opposite season inspection shall be coordinated with the Engineer and Owner. This inspection shall be documented with a supplemental report containing any pertinent data and information regarding readings and adjustments made.

1.5 TAB REPORT

- A. TAB report shall incorporate all performance data for the HVAC systems. The intent of the final report is to provide a reference of actual operating conditions for the Owner's operating personnel.
- B. All measurements and recorded readings (of air, electricity, etc.) that appear in the report must be made on site by the permanently employed technicians or engineers of the TAB Firm.
- C. TAB report shall include but not be limited to the following:
 1. Index.
 2. Preface: A general discussion of the system, an outline of normal and ventilation modes of operation, any unusual operating conditions and any deficiencies not corrected as of the time the report was written.
 3. Instrumentation List: A list of instruments used by type, model, range and calibration date. All instruments must be calibrated within six (6) months prior to the starting date of TAB services.
 4. Air Distribution Devices (Supply, Exhaust and Return Air type where Balance Dampers are used):

- a. Manufacturer, model and size.
 - b. Location.
 - c. Design and actual CFM (cooling and heating).
 - d. Air distribution devices, where a velocity indicating instrument is used to determine CFM; provide the required and actual velocity in FPM (when an air flow hood is used to determine CFM, only CFM is required to be recorded.)
5. Supply/Exhaust Fans:
- a. Manufacturer, model and size.
 - b. Design and actual CFM.
 - c. Design and actual fan RPM.
 - d. Design and actual static pressure (leaving minus entering).
 - e. Motor nameplate data.
 - f. Motor starter data and motor overload protection (heater) sizes and rating.
 - g. Actual motor amperage and voltage (all phases).
6. Split DX A/C Units and Ground Source Heat Pump Units (New and Existing in area of work):
- a. Manufacturer, model, size and serial number.
 - b. Design and actual CFM (Supply, Return and Outside Air).
 - c. Design and actual Evaporator Fan RPM.
 - d. Static air pressure entering and leaving filters, coils and evaporator fan.
 - e. Unit and evaporator motor nameplate data.
 - f. Evaporator fan motor starter data and motor overload protection heater sizes and rating.
 - g. Actual motor amperage and voltage (all phases).
 - h. Filters; type, thickness, sizes, quantities of each size, actual static pressure drop across filters and condition (new, clean, dirty, loaded, etc.).
 - i. For belt driven fan motors, provide fan and motor shaft diameters, sheave model and serial numbers, number and size of belt(s), and center to center distance of shafts.
 - j. Ambient air temperature at RTU during testing and condenser coil discharge air temperature, Deg. F.
 - k. Design and actual entering and leaving air temperatures through both the heating section and cooling coils; include wet bulb temperatures for cooling coils.
7. Coils:
- a. Manufacturer.
 - b. Design and actual CFM.
 - c. Design and actual entering and leaving static pressures.
 - d. Design and actual entering air dry bulb temperatures. Provide design and actual entering air wet bulb temperatures for each cooling coil and latent energy recovery component.
 - e. Design and actual leaving air dry bulb temperatures. Provide design and actual leaving air wet bulb temperatures for each cooling coil and latent energy recovery component.
 - f. Actual outside air temperature, dry and wet bulb, during testing.
8. Fire, Fire-Smoke, and Smoke Dampers:
- a. Fill out a tag (provided by the Contractor) at each damper with a set of the tester's initials and the date that the damper was tested and operation verified, as witnessed by the TAB firm, as being acceptable.
 - b. Tags shall have additional spaces for future testing/verification.
9. Condensing Units:
- a. Manufacturer, Model, Size, and Serial Number.
 - b. Location.
 - c. Actual unit name plate data.
 - d. Actual unit (compressor and condenser unit motors) amperage and voltage, all phases.
 - e. Ambient temperature entering condenser.

- D. Instructions to Operating Personnel: TAB Firm shall instruct the operating personnel regarding the following:
 - 1. Systems Operation.
 - 2. Unusual Operating Conditions
 - 3. System Troubleshooting Procedures.

- E. Guarantee: Provide extended warranty of twelve (12) months after occupancy during which time the Engineer and/or Owner may, at his discretion, request check of the balance of any HVAC equipment. Provide TAB technicians to assist as required in making such tests. When any device is found not balanced in accordance with the mechanical plans and specifications, that HVAC system shall be completely rebalanced as directed by the Engineer and/or Owner at the TAB Firm's expense.

END OF SECTION

SECTION 23 07 00

INSULATION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- A. Comply with Division 1 - General Requirements and referenced documents.
- B. Comply with all other Division 23 Sections as applicable. Refer to other Divisions for coordination of work with other portions of work.

1.2 SYSTEM DESCRIPTION

- A. Provide the systems of insulation which are specified for the control of heat transfer, sound control, and prevention of condensation.
- B. Provide protective devices to prevent compression abrasion or puncture of the piping insulation systems installed to include inserts, pipe shields, PVC jacketing and aluminum jacketing as specified herein.
- C. Provide piping identification systems as specified in Section 23 05 53, Identification for Equipment and Piping.

1.3 QUALITY ASSURANCE

- A. The installation of all thermal insulation shall be performed by a single firm regularly engaged in the insulation business, using skilled insulation mechanics and using insulation materials which are the product of reputable manufacturers. The application of the materials by the insulator shall be in accordance with the published standards of the manufacturer of the materials, using any special materials as required by these specifications and by those published standards.
- B. Materials shall be manufactured by Schuller, Pittsburg Plate Glass, Owens-Corning, Foster, Certainteed, Johns Mansville, or Knauf.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's descriptive literature and installation instructions to allow review of Materials and Methods to ensure complete compliance with specifications.
- B. Shop Drawings: Submit materials to be used and method of application for each system in tabular form. General statements not specifically identifying means or methods to be used shall be cause for rejection. Include descriptive data and cut sheets on each type of insulation material, sealing method, adhesives used, insert types, shield sizes, and PVC or aluminum jacketing as specified.

1.5 PRODUCT HANDLING

- A. Cover and protect material in transit and at site. Material not properly protected and stored and which is damaged or defaced during construction shall and will be rejected.
- B. Promptly replace all damaged, deteriorated or wet insulation materials.
- C. Storage and protection of materials shall be in accordance with Section 23 05 00.

PART 2 - PRODUCTS

2.1 PIPING AND EQUIPMENT INSULATION MATERIALS

- A. Interior Domestic Cold Water Lines: Refer to Division 22.
- B. Domestic Hot Water and Hot Water Return Lines: Refer to Division 22.
- C. Waste, Drain and Miscellaneous Lines:
 - 1. The drain from each Roof-Top Unit, Split DX A/C Unit, or Water Source Heat Pump Unit shall be insulated with foamed plastic, Armacell Armaflex or Aeroflex Aerocell slipped on while the piping is being fabricated, and with all joints, butt type, sealed using an adhesive recommended by the manufacturer of the plastic. As an alternate to slipping on during fabrication, the Armacell Armaflex with lapseal may be used if insulation is installed after fabrication. The insulation shall be continuous from the drain opening in the D/X split system condensate pan to the point of discharge with an open sight air gap over a drain and all rooftop drains except for piping located on the roof. All formed plastic insulation shall meet ASTM E-84 requirements. Provide 1/2" thick insulation on condensate drains and 1-1/2 inch thick insulation on refrigerant suction piping. For all "Armaflex" type insulation installed outdoors apply two (2) coats of NOMACO K-Flex R-374, or Foster 30-64, or approved equal, protective coating (ultra-violet rays), white in color.
 - 2. The body of each floor drain and all primary and overflow roof drain bodies, where the body of the drain is out of the ground, or above a ceiling: Refer to Division 22.
 - 3. Waste lines serving electric water coolers and floor drains (includes P-traps) receiving cold condensate from air handling equipment condensate pans to the point where they join the nearest vertical waste stack or sanitary main, all horizontal and vertical primary storm drainage piping to the point of penetration to the underfloor and the first vertical piece of the overflow drain pipe (below the drain body) and the first horizontal section of overflow drain piping to the first three feet (3') of vertical pipe beyond that section: Refer to Division 22.
- D. Refrigerant Lines Exposed to the Outdoors:
 - 1. Insulate as described in A.1 above.
 - 2. Cover with an 0.016 inch thick aluminum with locked seams and banded joints made watertight. Jacketing shall be equivalent to Childers Aluminum roll jacketing conforming to ASTM E B-209, with smooth mill finish.
 - 3. Cover mechanical couplings and fittings with prefabricated aluminum jacketed fitting covers with factory applied moisture barriers to thickness to match that on piping and band in place. Fitting covers shall be equivalent to Childers ELL-JACS., Tee-Jacs, Flange-JACS, and Valve-JACS. Seal ends to prevent moisture penetration and to make completely weatherproof.
- E. Plenum Safe Jacketing:
 - 1. Where non-plenum rated piping (such as PVC, CPVC, FRP, PE, PP, ABS, PVDF, HDPE, etc.) is installed in return air plenums cover all exposed portions of this piping with a plenum safe jacketing, or wrap, system that is a factory manufactured and tested non-combustible barrier, to flame and smoke spread, designed to encapsulate non-rated or combustible items located in return air plenums, in accordance with the most recent additions of the International Building and Mechanical Codes.
 - 2. Plenum safe jacketing shall be covered with a light weight fiberglass reinforced foil scrim finished high temperature rated insulation with an approximate density of 6 pounds per cubic foot. Jacketing shall have a Flame Spread and Smoke Developed rating of 0 for the unfaced blanket and be under 25 and 50 respectively for these items as tested in accordance with U.L. 723 and ASTM E-84. Maximum Flame Spread in accordance with U.L.1887 shall be 0 feet. Maximum smoke/optical density and Average Smoke per U.L.1887 testing shall not exceed 01 and 0 respectively. U.L. 1887 test procedure is a modified tunnel test which provides test data for flame spread and smoke density using a single plastic pipe and a bundle of plastic pipes of various sizes subjected to a fire test.
 - 3. Thermal resistance of the barrier system shall be 4.2 as tested in accordance with ASTM C518. The Barrier System shall be able to withstand an operating temperature up to 2,300 Deg.F. and have a melting point of no lower than 3,100 Deg.F.

4. Plenum safe jacketing shall be a minimum 1/2 inch thick and have at least one side covered with a foil skin which must face the outer, or exposed, side. All joints in each direction shall be overlapped a minimum of one inch (1"). Jacket shall be secured tightly around the piping with either stainless steel banding or stainless steel tie wire. Use stainless steel crimp clamps on banding fasteners. Tie wires shall be secured using twist tensioning. Seal all cut edges with aluminum foil tape to ensure there is no exposed fiber.
5. Plenum safe jacketing shall be as manufactured by:
 - a. Great Lakes Textiles, Inc. or approved equals by;
 - b. 3M Corporation.
 - c. Thermal Ceramics.
 - d. FryeWrap by Unifrax.

2.2 DUCTWORK INSULATION MATERIALS

A. Duct Insulation - External:

1. Concealed (above ceilings) external duct insulation shall be glass fiber blanket-type insulation of not less than 1 lb. per cu.ft. density with a factory applied flame-retardant vapor barrier facing. Facing shall consist of a layer of aluminum foil, reinforced layer of glass fibers, and a layer of kraft paper all bonded together with fire-retardant and adhesive. Insulation, adhesives, and tapes shall be rated in accordance with U.L. 181A or 181B. Minimum ductwrap insulation thickness shall be two inches (2") thick and be equal to Certainteed Type IV duct wrap.
2. All insulation systems shall meet the requirements of the 2015 version of the International Energy Conservation Code, which requires a minimum installed R-value of 6.0 for conditioned, cooled or heated, and outside air system ductwork and plenums when located inside buildings or spaces. Increase insulation thicknesses as required to comply.
3. Water Vapor Permeance shall be no greater than 0.05 Perms per ASTM-E-96.
4. Fire Hazard Classification of installed duct insulation systems shall meet the requirements of ASTM-E-84; Flame Spread of 25, or less; Smoke Developed and Fuel Contributed of 50, or less. All insulation systems, adhesives, mastics, sealants, and tapes shall be U.L. rated for the application. All tapes used shall be acrylic based.
5. All external duct insulation shall be a regularly manufactured product of one of the following:
 - a. Knauf.
 - b. Owens Corning.
 - c. Johns Manville.
 - d. Certainteed.

B. Duct Insulation - Internal:

1. Internal duct insulation, liner, shall be in thicknesses as indicated herein, and be as specified in Specification Section 23 30 00. Duct liner shall be one inch (1") thick on all return, transfer, and relief air ducts, and on portions of general exhaust air ductwork systems as specified elsewhere herein. Internal duct insulation on all conditioned, cooled or heated, supply, all outside air ductwork systems and all mixed air plenums shall be 1-1/2" thick duct liner.
2. All duct liner shall be made of glass fiber coated with a bonded mat on the air stream side of the insulation. Coating shall be neoprene based meeting the requirements of NFPA-90A and U.L. Standard 723. Insulation shall not be less than 1.5 lbs. per cu.ft. density, and have a K-value of 0.28 per ASTM-C-177 at a mean temperature of 75 Deg.F.
3. All insulation systems shall meet the requirements of the 2015 version of the International Energy Conservation Code, which requires a minimum installed R-value of 6.0 for conditioned, cooled or heated, supply and all outside air system ductwork and mixed air plenums when located inside buildings or spaces. Increase insulation thickness as required to comply.
4. Fire Hazard Classification of installed duct insulation systems shall meet the requirements of ASTM-E-84; Flame Spread of 25, or less; Smoke Developed and Fuel Contributed of 50, or less.
5. All insulation systems, adhesives, mastics, sealants, and tapes shall be U.L. rated for the application.
6. All duct liner shall be suitable for the air velocities to be encountered in each system, and shall generally be suitable for velocities of up to 6000 FPM.

7. Acceptable duct lining manufacturers shall be:
 - a. Certaineed.
 - b. Knauf.
 - c. Owens Corning.
 - d. Johns Manville.

PART 3 - EXECUTION

3.1 GENERAL

- A. Apply insulation and pipe covering after all of the piping system to be insulated has been pressure tested, found to be completely tight (without leaks), and accepted as such. All extended handles and caps should be installed prior to commencing with insulation. Verify that control, isolation, and balancing valves and any other piping specialty where a valve stem or test port extends beyond the normal pipe insulation thickness to be installed is installed pointed upward vertically. Thoroughly clean and dry all surfaces prior to being covered.
- B. All insulation shall be continuous through wall and ceiling openings and sleeves. Use exterior duct wrap insulation on the outside of smoke and fire damper sleeves. Create a secondary sleeve around the primary sleeve to allow a complete insulation system as allowed by the local authority having jurisdiction.
- C. All insulation and accessories shall have composite (insulation, jacket and adhesive used to adhere the jacket to the insulation) fire and smoke hazard ratings as tested under procedure ASTM E-84, NFPA 255, and UL 723 not exceeding:

Flame Spread	25
Smoke Developed	50
Fuel Contributed	50

- D. Unightly work shall be cause for rejection, including poor application of adhesives and coatings beyond the insulation which coats valves or other piping specialties.
- E. Damage or Modification to Insulation: Where new insulation is disturbed or damaged during the process of installing other new materials, making new connections, etc., it shall be repaired or replaced to return it to its original condition and appearance. Where lines are removed and connections to insulated lines are capped, insulate those caps as well as repairing damaged insulation. Materials shall match those presently installed in thickness, density, insulating value, jacketing, etc.
- F. Miscellaneous Lines: Piping connected to chilled or hot water lines through which there might be fluid flow on occasions such as the lines connected to air vents, lines running to compression tanks, etc. shall be insulated as described for other piping in those systems.
- G. Hanger and Support Locations: At the location of hangers or supports for pipes run above ground and finished with a vapor seal insulation, provide rigid sections of cork, Foamglas, calcium silicate or high density polyurethane, at least the same thickness as the adjacent insulating material to adequately support the pipe without compression of the insulating material and cover with a vapor seal that is bonded to the adjacent insulation as described for fittings in the lines. Where the insert has an insulating value less than the adjacent pipe insulation the thickness of the insert shall be increased to equal the insulating value of the adjacent pipe insulation. Wood inserts shall not be allowed. Hangers and supports for piping insulation to receive a vapor barrier shall be installed exterior to the insulation.
- H. Material Changes: Wherever there is a change in materials on lines that are vapor sealed, apply a suitable adhesive that is compatible with both materials, tapes, etc., as required to maintain the vapor barrier.

- I. The following describes materials, thickness and finishes for insulation on piping. In the following "exposed" shall mean any line or duct exposed below the finished ceiling and structure where no ceiling is installed, in any room space, area, mechanical rooms, closets, and any line or duct run exterior to the building, including above the roof. "Concealed" shall mean any line or duct located above ceilings, in furrings, in chases, in crawl spaces, and buried in direct contact with the soil.
- J. All insulation materials and jacketing shall exhibit the following characteristics:
 1. Water sorption, per ASTM C 1104, shall be less than 0.02%.
 2. Linear shrinkage, per ASTM C 356, shall be negligible.
 3. Stress corrosion, per ASTM C 795, shall not cause corrosion.
 4. Corrosiveness, per ASTM C 665, shall not be any greater than sterile cotton.
 5. Resistance to fungi, mold and mildew and bacteria, per ASTM C 665, shall be rated as not promoting growth of fungi and bacteria. Inhibitors shall be added to specified products to meet these requirements.

3.2 DUCTWORK

- A. Duct Insulation - Internal: Provide sound absorbing and thermal insulation to the interior surface of the following duct systems: Line the first 10 foot from the unit of all rectangular low pressure supply (except kitchen and fume hood make-up air ducts), return, relief, transfer, and outside air ducts and supply, mixed, and return air plenums, unless noted, otherwise on the drawings. Additionally, line the first 10 feet of general exhaust ducts, except grease, fume, exhaust systems, on both sides of in-line fans and for the first 10'-0" from the fan curb toward the occupied space for roof mounted fans. All lined ductwork shall be increased in size to maintain the clear inside (air stream) dimensions designated on the Drawings.
 1. Duct liner shall be applied in accordance with the manufacturer's recommendations, with the coated, or mat-faced, surface located away from the metal (exposed to air stream). It shall be adhered to the metal with Foster 85-10 or 85-15 adhesive applied to the entire inner surface of the duct. The liner shall be further secured to the duct with Graham Insulating Pins and Clips or other metal clips of the type which do not protrude through the duct. Those clips shall be installed on not greater than 12" centers both ways. All seams and openings in the liner shall be carefully sealed with adhesive.
 2. Paint all joints in liner and butter the edges of sections where sections of ductwork will be joined using Foster No. 30-35, or equivalent adhesive.
 3. Where damper rods occur, suitable metal bushings shall be provided on each end of the damper rod inside the duct, to provide clearance between the damper blade and the lining.
 4. Refer to Section 23 30 00, HVAC Air Distribution.
 5. Due to the 2015 version of the International Energy Conservation Code, conditioned air, heated or cooled air (includes outside air intake ductwork), ductwork insulation located inside the building envelope shall have a minimum installed R-value of 6.0. For lined ductwork, this shall be accomplished by using 1-1/2" thick duct liner. Coordinate insulation requirements with other Sections of these Specifications.
- B. Duct Insulation - External:
 1. Externally insulate all rectangular and round supply and return air ducts not containing internal lining (Kitchen and fume hood make-up air ducts shall not contain internal lining and shall always be externally insulated).
 2. Additionally insulate the outside of all fire, fire-smoke, and smoke damper sleeves penetrating walls and floors to insure a continuous insulation system.
 3. External insulation shall be applied in accordance with the manufacturer's recommendations by impaling over pins using speed clips or be secured with adhesive.
 4. Seal all joints, breaks, fastener penetrations and punctures with a 3" wide vapor barrier strip similar to that of facing materials secured with adhesive. Pins shall be spaced 12" on center both ways. Adhesive shall cover the entire duct surface.
 5. Blanket type insulation shall generally be used on concealed ductwork only with rigid insulation board being used exclusively on exposed ductwork, which shall also receive a PVC jacket when located 12'-0", or less, above the finished floor.
 6. Mastic seal all jacketing penetrations with a vapor barrier coating with a maximum perm rating of 0.02 Perms.

3.3 SHIELDS AND INSERTS

- A. Metal saddles, shields, shall be applied between hangers or supports and the pipe insulation. Saddles shall be formed to fit the insulation and shall extend up to the centerline of the pipe and the length specified for hanger inserts. Shields shall be made of galvanized sheet metal and shall be of sufficient size and length to prohibit the crushing of the insulation materials. Saddle shields shall be as follows:

Pipe Size	Metal Saddles	
	Metal Gauge	Length
3/4" to 3"	18	12"
4" to 6"	16	12" - 18"
8" to 10"	14	24"
12" & Larger	12	24"

END OF SECTION

SECTION 23 09 00

CONTROLS AND INSTRUMENTATION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- A. Comply with Division 1 - General Requirements and referenced documents.
- B. Comply with Section 23 00 00 General Provisions, and all other Division 23 Sections, as applicable.
- C. Refer to other divisions for coordination of work with other trades.

1.2 SYSTEM DESCRIPTION

- A. The scope shall include the furnishing and installing of Energy Management System devices with new direct digital controllers, all local and remote control panels, temperature control field devices, appurtenances, etc., to accomplish specific control sequences specified herein, to provide fire and freeze protection; cocks and wells for various temperature and pressure control, sensing and indicating devices; pressure and temperature indicating instruments; supporting structures, and other required components for a complete and operating system.
- B. The scope shall include all new electric connections to existing thermostats, dampers and actuators, switches and relays, and all other new components of the system requiring electric connections.
- C. The scope shall further include all temperature control and interlocking wiring and wiring devices, including raceways, as indicated herein.
- D. Provide all software programs as required to effect the sequences of control, monitoring, reporting, etc., as indicated herein.
- E. The existing CSI or TAC system shall be modified by Schneider Electric to accommodate the new temperature sensor locations and associated control sequences.
- F. Bidders are specifically advised that full and effective two-way communication between the new system installed under this contract and the Owner's existing Central EMS must be achieved in an approved manner, including whatever may be required in the form of interface hardware and software without effecting or interrupting other system software. Simultaneous on-line communication of this system and others with the Central EMS is mandatory.
- G. This system of equipment and software shall be provided and installed by the single local factory trained and authorized sales, installation and service agent of Trane or Enviromatics (Reliable Controls). The existing control systems at the campuses that have controls scope of work are as follows:
 - 1. Academy at C.F. Thomas – Trane
 - 2. Green Valley Elementary – Enviromatics (Reliable)
 - 3. John D. Spicer Elementary – Trane
 - 4. North Ridge Elementary – Trane
 - 5. Smithfield Middle School - Trane.

1.3 QUALITY ASSURANCE

- A. The equipment provided under this Section of the Specifications shall be installed, calibrated, adjusted, and put in completely satisfactory operation by a Control Systems installer experienced in this type of work.

- B. The successful Control Systems installer shall meet the following requirements:
1. All spare parts must be locally stocked and readily available within a 24 hour period.
 2. Service personnel shall be available, on call, on a 24 hour a day, year round basis, or service personnel will respond by visitation to the site within four (4) hours of a service call considered serious in nature or classified by the Owner as an emergency.
 3. Be able to provide evidence of having successfully installed similar sized and types of systems for a minimum of ten (10) years.
 4. Bids by wholesalers, distributors, mechanical contractors and non-franchised contractors shall not be acceptable.
 5. All work described in the Plans and Specifications shall be installed, wired, and commissioned by factory certified technicians qualified for this work and in the regular employment of the control system manufacturer's local office.
 6. A local office is defined as a corporate branch office or an independently owned office with a current contractual agreement with the system manufacturer that allows the office to purchase, install, and service the manufacturer's products.
 7. The local office shall be full service facility within 50 miles of the project site. The local office shall be staffed with engineers and technicians trained on the installation, commissioning, and service of energy management and control systems based on the BacNET or existing Proprietary Trane Trace technology.
- C. All control devices shall be as specified in the technical portion of this section of the specifications. The system shall be installed by workmen skilled, experienced, and specifically trained in the application, installation, calibration, adjusting, and testing of instrumentation of the type specified.
- D. All control system components shall operate satisfactory without damage at 110% above and 85% below rated voltage and at ± 3 hertz variation in line frequency. Provide static, transient, and short circuit protection on all inputs and outputs. Communication lines shall be protected against incorrect wiring, static transients and induced magnetic interference. All bus connected devices shall be A.C. coupled, or equivalent, so that any single device failure will not disrupt or halt bus communications. Provide line voltage input protection to all network level controllers to protect these devices from over-voltage and lightning strike conditions.
- E. A service representative of the installer shall check the instrumentation for proper installation, calibrate all instruments and make all adjustments necessary to insure proper operation of the system in full cooperation with the Testing, Adjusting, and Balancing (TAB) Firm. Refer to Section 23 05 93. All instruments required for checking, calibrating, and proving the system shall be provided under this Section of the Specifications. The service representative shall spend sufficient time with all of the Owner's Representatives after the system is installed and properly functioning to instruct the Owner's Representative (Operations and Maintenance Personnel) in the operation and maintenance of the system for a minimum of two (2) hours for the basic Controls System and two (2) hours for the EMS. At final completion of the installation provide personnel and instruments of satisfactory quality available to check the calibration of all instruments, and to demonstrate system operation as described in "Sequences of Operation".
- F. All basic control devices, parts, and other materials, shall be standard catalog products of a single reputable manufacturer and shall essentially duplicate equipment which has been in satisfactory service for at least one (1) year. All materials and parts shall be items in current production by the manufacturers. First of a kind new technology devices will not be considered. Accessory equipment that is required to make a complete and functioning system that is not of the same manufacturer furnishing the basic control equipment shall carry the guarantee of the basic control equipment manufacturer and repair and replacement parts shall be available through normal local trade channels.
- G. All software updates and enhancements which evolve during the first year warranty period following system acceptance, "Substantial Completion", shall be furnished to the Owner without additional cost. This shall include the local stand-alone direct digital controllers and the building network manager computer(s).

- H. All network level controllers shall be "BacNET" or Trane Trace and shall communicate with all other BacNET or Trane Trace Protocol communication systems at the building network level or be provided with a gateway which shall facilitate the building network level controller communicating with one of this system.

1.4 SYSTEM START-UP AND COMMISSIONING

- A. After completion of the installation, Contractor shall place the system in operation and shall perform all necessary testing and debugging operations of the basic systems and EMS.
- B. An acceptance test shall be performed in the presence of the Testing, Adjusting, and Balancing (TAB) Company, to verify correct sequences of operation, calibration, and operation of the Controls and Energy Management System, when installed, with every part of the system functioning satisfactorily and having been fully commissioned, and with no outstanding items requiring completion or correction, the system will be accepted by the Architect and Owner for "Substantial Completion", and will then be placed under Warranty.
- C. The Automatic Temperature Control and Energy Management System Installer shall thoroughly check all controls, sensors, operators, sequences, etc., before notifying the TAB Agency that the Automatic Temperature Controls and Energy Management System are operational. The Automatic Temperature Control and Energy Management System Installer shall provide technical support (technicians and necessary hardware and software) to the TAB Agency to allow for a complete check-out of these systems.

1.5 SUBMITTALS

- A. Submittals shall be complete and be in full accordance with Section 23 00 00, General Provisions.
- B. Submittals shall include complete, continuous line, point to point wiring diagrams including tie-in points to equipment with written sequences of control adjacent to pertinent control diagrams. Specification sheets shall be submitted on each piece or type of equipment in a separate brochure and show sufficient detail to indicate compliance with these specifications. Drawings and Specification sheets shall show set points, throttling ranges, actions, proportional bands, and integration constants, where applicable. Complete brochures shall include the wiring diagrams as well as operating and maintenance instructions on the equipment.
- C. Complete and approved shop drawings shall be obtained prior to commencing installation work, unless otherwise approved by the Owner or Owner's Representative.
- D. Tag numbers, as shown or specified, shall appear for each item on the wiring diagrams and data sheets. Data sheets shall properly reflect in every detail the specific item submitted.
- E. After completion of the work, Contractor shall prepare and furnish maintenance brochures for the Owner. The maintenance brochures shall include operating instructions, specifications, and instruction sheets for all instruments and a complete set of "As-Built" control drawings. After approval of submittal, completion of all installation work, software checkout, and system commissioning in conjunction with the Testing, Adjustment and Balance (TAB) Firm, furnish to the Owner the following:
 - 1. One (1) sets of Blue or Black line prints of "As-Built" drawings, half size (11" X 17"), inserted in a three ring binder.
 - 2. One (1) copies of the final approved Shop Drawings in suitably sized three ring binders. This shall include copies of product data sheets and other operations and maintenance documentation.

1.6 EMS SOFTWARE TOOLS AND LICENSES

- A. Submit a copy of all software installed on the servers and workstations related to this project.
- B. Submit all licensing information for all software installed on the servers and workstations.
- C. Submit a copy of all software used to execute the project even if the software was not installed on the servers and workstations.
- D. Submit all licensing information for all of the software used to execute the project.
- E. All software revisions shall be as installed at the time of system acceptance.

1.7 PRODUCT HANDLING

- A. Cover and protect material in transit and at site. Material not properly protected and stored, and which is damaged or defaced during construction shall be rejected.
- B. Cover control panels, open ends of control piping and open ends of control valves stored on site until just prior to installation of wiring and valves respectively.
- C. Storage and protection of materials shall be in accordance with Division 1.

1.8 CODE COMPLIANCE

- A. All electrical components shall be UL listed or labeled.
- B. All equipment or piping used in conditioned air streams, spaces or return air plenums shall comply with NFPA 90A Flame/Smoke/Fuel contribution rating of 25/50/0 and all applicable building codes or requirements.
- C. All wiring shall conform to the National Electrical Code.
- D. Provide BAS components and ancillary equipment which are UL-listed and labeled.
- E. Provide enclosures and controls which comply with NEMA's Publication No. 250.
- F. Comply with FCC rules, Part 15 regarding Class A radiation for computing devices and low power communication equipment operating in commercial environments.
- G. Comply with FCC, Part 68 rules for telephone modems and data sets.

PART 2 - PRODUCTS

2.1 TEMPERATURE SENSORS

- A. Temperature sensors shall be nickel wire thermistor, 10,000 ohm resistance, with 1000 ohms resistance at 70 Deg.F., and a 3 ohms/per degree F temperature coefficient. Sensors shall operate in a stable manner in a 5-95% relative humidity, non-condensing environment.
- B. Ambient temperature limits shall be minimum of 0-125 Deg.F. with a +/- 0.5% accuracy at a nominal resistance equal to 70 Deg.F.
- C. Temperature sensors and cabling used for temperatures below 60 Deg.F. shall be hermetically sealed to prevent condensation damage to conductors or elements. Sensors for immersion locations shall not be affected by vibrations encountered in normal piping systems.

- D. Furnish sensors with maximum 6 to 9 inch insulated pigtail leads or trim sensor pigtail leads to meet this criteria once installed.
- E. All sensor actions shall be the same for the entire building.
- F. Mount all room wall sensors at 48" inches above finished floor to comply with A.D.A., unless indicated or approved otherwise by the Architect or Owner's Representative.
- G. Wall space temperature sensors for normally occupied spaces shall include the following accessories, features and functions:
 - 1. Normal Increase/Decrease Temperature Setpoint adjustments; limits set through software.
 - 2. Impact Resistant Lexan type cover material.
- H. Wall space temperature sensors in Common Public Areas (Corridors, Lobbies, etc.) or high abuse areas (Gyms, Locker Rooms, etc.) shall include the following accessories, features and functions:
 - 1. Stainless steel cover plates with temperature sensor on back of cover plate.
 - 2. Sensors shall be as manufactured by Trane; Reliable; or Automation Components, Inc. (ACI).

2.2 AUTOMATIC DAMPERS

- A. Provide all control dampers, under this Section of the Specifications, of the types and sizes indicated on the Drawings, including but not limited to outside air intakes, return, relief, and other motorized air control dampers where shown, or where not an integral part of the equipment furnished and specified in other sections of these specifications. All dampers shall be special low leakage extended performance type.
- B. Damper frames shall be not less than 16 gauge galvanized steel formed for extra strength with mounting holes for flange and enclosed duct mounting.
- C. Dampers shall be available in two-inch size increments from 8" horizontal and vertical to 48". Requirements for dampers over 48" in size shall be met by using standard modules with interconnecting hardware to limit damper blade length to a maximum of 48". Provide separate actuator for damper modules exceeding 32.0 square feet and as required for smaller sizes due to torque requirements.
- D. All damper blades shall be not less than 16 gauge galvanized steel roll formed for high velocity performance. Blades on all dampers must be not over 6" wide.
- E. Blade bearings shall be nylon or oilite with 1/2" zinc plated steel shafts.
- F. All blade linkage hardware shall be of corrosion-resistant finish and readily accessible for maintenance after installation.
- G. Provide continuous replaceable neoprene or butyl rubber edging seals for all outdoor and relief air dampers where blade edges meet when dampers are closed. Spring loaded stainless steel side jamb seals shall be provided for all dampers.
- H. Dampers and seals shall be suitable for temperature ranges of -20 degrees F to 200 degrees F at specified leakage ratings.
- I. Dampers used for proportional control shall have opposed blades.
- J. Leakage rates for all controlled dampers shall not exceed 5 CFM of air flow per square foot of face area based on a 16 square foot damper, at 1.0" W.C. differential, rated in accordance with AMCA 500. Furnish test data with submittals.
- K. Acceptable manufacturers (No other manufacturers will be allowed):
 - 1. Johnson Controls, Inc.
 - 2. Honeywell, Inc.
 - 3. American Warming and Ventilating, Inc.

4. Ruskin.
5. Nailor Industries, Inc.

2.3 ELECTRIC DAMPER ACTUATORS

- A. All control dampers shall receive electric actuators.
- B. Electronic direct-coupled actuation devices shall be provided.
- C. Electric Actuators shall be direct-coupled over the shaft, enabling it to be mounted directly to the damper shaft without the need for connecting linkage. The fastening clamp assembly shall be of a "V" bolt design with associated "V" shaped toothed cradle attaching to the shaft for maximum strength and to eliminate slippage.
- D. Spring return actuators shall have a "V" clamp assembly of sufficient size to be directly mounted to an integral jack shaft of up to 1.05 inches when the damper is constructed in this manner. Single bolt or set screw type fasteners are not acceptable.
- E. Actuators shall have electronic overload or digital rotation sensing circuitry to prevent damage to the actuator throughout the entire rotation of the actuator. Mechanical end switches or magnetic clutch to deactivate the actuator at the end of rotation are not acceptable.
- F. For power-failure/safety applications, an internal mechanical spring return mechanism shall be built into the actuator housing. Non-mechanical forms of fail-safe operation are not acceptable. This applies to all dampers directly connected to outside and relief air systems. All spring return actuators shall be capable of both clockwise and counterclockwise spring return operation by simply changing the mounting orientation.
- G. Proportional actuators shall accept a 0 to 10 VDC or 0 to 20 mA control input and provide a 2 to 10 VDC or 4 to 20 mA operating range. An actuator capable of accepting a pulse width modulating control signal and providing full proportional operation of the damper is acceptable. Floating point type control is not acceptable. All actuators shall provide for a 2 to 10 VDC position feedback signal although not used at this time. However, software feedback will be used at this time.
- H. All 24 VAC/VDC actuators shall operate on Class 2 wiring and shall not require more than 10 VA for AC or more than 8 watts for DC applications. Actuators operating on 120 VAC power shall not require more than 10 VA.
- I. All non-spring return actuators shall have an external manual gear release to allow manual positioning of the damper when the actuator is not powered. Spring return actuators with more than 60 in-lb. torque capacity shall have a manual crank for this purpose.
- J. All modulating actuators shall have an external, built-in switch to allow the reversing of direction of rotation. Modulating actuators shall be compatible with the PWM output of the direct digital controllers.
- K. Actuators shall be provided with a conduit fitting and a minimum three-foot electrical cable and shall be pre-wired to eliminate the necessity of opening the actuator housing to make electrical connections.
- L. Actuators shall be Underwriters Laboratories Standard 873 listed.
- M. Actuators shall be designed for a minimum of 60,000 full stroke cycles at the actuator's rated torque and shall have a minimum 2-year manufacturer's warranty, starting from the date of Substantial Completion.
- N. All actuators connected to all sequenced valves and dampers shall have independent control and adjustment from one another to emulate a pilot positioner.

O. Acceptable Manufacturer's:

1. Belimo.
2. Honeywell, Inc.
3. Johnson Controls, Inc.
4. Siemens.
5. Honeywell, Inc.

2.4 CURRENT SENSING STATUS RELAYS

- A. Provide current sensing status relays for motor operation status monitoring as specified elsewhere herein.
- B. Sensors shall be 100% solid state, no mechanical parts, and have no calibration drift.
- C. Sensors shall have an adjustable trip level, be isolated, have single set point adjustment, require no external power (power induced from conductor), and have integrated adjustable wall or floor mounting bracket.
- D. Sensors shall be suitable for motor loads from 0 to 100 HP, with a supply current of 1 ampere up to 135 amperes, 600 VAC RMS, setpoint adjustable to +/-1% range from 0-95% non-condensing relative humidity
- E. Sensors shall be as manufactured by Veris Industries, Inc.
- F. Pilot relays on output for current sensor shall be RH2 BUAC 24V 2PDT (10 amp) or SH2B05 (7.5 amp) as manufactured by Idec.

2.5 SMOKE DETECTORS

- A. One (1) smoke detector shall be furnished under Division 26 and installed by the Controls Contractor for each new air handling equipment item handling over 2,000 CFM of airflow; to be mounted in the return air stream, which shall stop the fan motors upon detection of smoke.
- B. Coordinate with Division 26 requirements to insure sampling tubes are provided suitable to the width of duct in which installed.
- C. Detectors shall be supplied with 24 volts, power supply under Division 26. Control circuit interlock wiring shall be installed by fire alarm contractor under Division 26. Controls Contractor to provide wiring to unit. Fire alarm Contractor to provide wiring to smoke detector or panel.

2.6 LOCAL CONTROL PANELS

- A. New local equipment control panels shall be installed in each equipment room, or other locations as indicated or as required, for new electric control equipment and control devices. They shall be totally enclosed and pre-wired, to labeled terminals to house all associated controllers, thermometers, relays, switches, etc. serving that equipment. Provide one cabinet for each air handling unit or group of units in the same room.
- B. Panels shall be mounted at a convenient height for access. Acceptable locations include mechanical equipment rooms, storage closets, electrical rooms, or other spaces as indicated on the Drawings. Above ceiling locations are typically not acceptable.
- C. Thermometers, pilot light switches, and gauges shall be flush mounted on panel surface, where applicable.
- D. Cabinet frames shall be extruded aluminum sections with riveted corners supported by internal angle brackets. Door shall have continuous hinged door, with latch and key lock.

- E. Sub-Panel and face panel shall be removable for ease of installation and replacement. Face panel shall be of a finished color with a finished frame.
- F. Knockouts for 1/2" x 3/4" EMT connections shall be provided at top and bottom of each panel.
- G. Identify each panel, switch, and device by an engraved, bolt-on, black phenolic nameplate with white lettering securely attached. Identify all control devices inside panels similarly. Embossed plastic tape will not be acceptable on panel front faces but will be allowed on panel interiors.
- H. Switches and pilot lights shall be mounted on the panel face with all other devices mounted inside the panel, as applicable. Devices wired through and inside panels, such as relays, shall be wired to numbered dual terminal strips.
- I. Start-Stop Pushbuttons and Pilot Lights, where called for, shall be of the low voltage and neon type. Pushbuttons shall be heavy duty type. Pilot lights shall be interlocked with starter auxiliary contacts except fans and pumps which shall have current sensing relays to indicate run status.
- J. Each new control panel installed shall have a minimum of 25% consolidated spare/extra space available inside the panel for mounting of control devices for future system modifications or changes. This space shall be indicated on the panel shop drawing.
- K. All wiring inside panels shall be concealed in a wiring harness.
- L. Permanently affix inside each panel a final "as-built" control drawing of the wiring of the panel.
- M. All panels shall be factory assembled and wired and include a key cylinder lock. All locks shall use the same master key.

2.7 ENERGY MANAGEMENT SYSTEM

- A. The central EMS HARDWARE is located in the District OPS Center Building and shall be reused. Reuse existing printers for recording alarms, operator transactions, and generating system reports, where applicable (120 character wide laser jet printer).
- B. Network Automation Engine:
 - 1. Provide a Network Automation Engine (NAE) which shall be a fully user-programmable supervisory controller. Automation Engine shall monitor the network of distributed application-specific controllers, provide global strategy and direction, and communicate on a peer-to-peer basis with other Automation engines.
 - 2. The NAE shall reside on the automation network. Each NAE shall support one or more sub-networks of a minimum of 100 controllers each.
 - 3. Each NAE shall have the ability to deliver a web based user interface. All computers connected physically or virtually to the automation network shall have access to the web based User Interface (U.I.). Systems without such capability at this level shall provide a user interface via the combination of operator workstations and web servers as determined by the owner for comparable operation.
 - 4. Processor-controllers shall be multi-tasking, multi-user, and real-time digital control/processors. Standard operating systems shall be employed. Controller size and capacity shall be sufficient to fully meet the requirements of this Section of the Specifications.
 - 5. Each controller shall have sufficient memory to support its own operating system, databases, and control programs, and to provide supervisory control for all control level devices.
 - 6. Each NAE controller shall have an integrated Hardware-Based, real time clock.
 - 7. The NAE shall provide at least one USB port and one URS-232 serial data communication port for the operation of operator I/O devices, such as industry standard computers, modems, and portable operator's terminals. Controllers shall allow temporary use of portable devices without interrupting the normal operation of permanently connected modems.
 - 8. Controllers shall continuously perform self-diagnostics, communication diagnostics, and diagnostics of all panel components. The automation engine shall provide both local and remote annunciation

- of any detected component failures, low battery conditions or repeated failures to establish communication.
9. In the event of the loss of normal power, the NAE shall continue to operate for a user adjustable period of up to 10 minutes, after which, there shall be an orderly shutdown of all the programs to prevent the loss of database or operating system software. Flash memory shall be incorporated for all critical controller configuration data.
 - a. During a loss of normal power, the control sequences shall go to the normal system shutdown conditions.
 - b. Upon restoration of normal power and after a minimum off-time delay, the controller shall automatically resume full operation without manual intervention through a normal soft-start sequence.
 10. All NAE controllers shall be listed by Underwriters Laboratories (U.L.).”
- C. Network Level Controllers shall have a 16 bit based microprocessor with EPROM operating system. DDC programs and data files shall be in non-volatile EEPROM or flash memory to allow simple and reliable additions and changes. Each network controller shall have an on-board 30 day battery back-up realtime clock. Controllers shall be provided as required with capacity to accommodate input/output (I/O) points required for the application plus any spare points as specified. Each panel shall be provided with a socket for a Portable Operators Terminal (POT), and a port for network communications at no less than 78,000 baud. Controllers shall have outputs which shall be binary for On-Off control, with true variable voltage (0-10v), for driving analog or pneumatic transducer devices. Analog outputs shall have a minimum incremental resolution of one percent of the operating range of the controlled device. Controllers shall have LEDs for continuous indication of all bus communications, power, and operational status. All panel electronics and associated equipment shall be installed in suitable enclosures.
- D. Terminal Equipment Controllers (TEC's) shall be UL916 standalone EEPROM based and configured to perform the sequences specified, and with I/O selected for the application. TEC enclosures shall be compact plastic conforming to UL94-5V or plated steel. Each TEC shall be provided with LED type annunciation to continually display its operational mode; power, normal, or in an alarm state. TEC networks operating on a 9000 baud rate shall be grouped with no more than 20 TEC's per primary bus connected device. For TEC networks operating over 50,000 baud, up to 100 TECs may be so grouped.
- E. General:
1. Software development and programming shall be as directed by the Owner and as described herein. Contractor shall install all program operating time schedules as furnished by the Owner. During construction, the Contractor may operate equipment in what is considered a Construction Schedule. The control systems installer, at Substantial Completion, shall remove such schedules and replace these with individual, independent, operating schedules for each system and individual piece of equipment, specifically air handling equipment.
 2. Program trend logging of all analog and binary points of control at intervals as directed by the Owner, initially use five (5) minutes for all control points.
 3. Overall systems control shall be performed by a field programmable direct digital controller, microprocessor based, which incorporates Direct Digital Control, all necessary energy management functions and provides for digital display and convenient local adjustments of desired variations at each individual controller cabinet. This shall include scheduled programming and system interlocks.
 4. DDC control units and all hardware shall be capable of continued operation at room temperatures of 40 Deg.F. to 120 Deg.F. and humidity from 10% up to a non-condensing point of 90%. All inputs shall be capable of withstanding continuous shorting to 120 VAC.
 5. Provide any external electrical power supply protection devices to protect controllers from external voltage surges to include high voltage and lightning disturbances/protection.
 6. Provide function switches in a local control panel, if not integral with the DDC controller, with "on-off" control and a "manual-auto" switch for each new DDC output (contact type) with switch status information being available to the central systems historical data files for all air handling units, fan coil units over 2000 CFM in capacity, pumps, chillers, controlled exhaust fans over 2000 CFM in capacity, boilers and cooling towers. Alternately, provide this capability integral with the Direct Digital Controllers. Terminal units such as Variable Air Volume boxes, small exhaust fans, small fan coil units, and rooftop A/C units are not required to have function switches. Switches shall be

- concealed within the local control panel or digital controller enclosure to be lockable. The network manager software shall identify points that are locally overridden and report by display to the building CPU to include generating a printout at the local or remote location printer.
7. Provide a hard wire connection between the Building LAN serving all new Controllers to the Central Facilities Energy Management System. Verify dependable utilization of this system and transfer of local system data and functions to the existing control system CPU. General data reporting and alarms transmission shall be verified.
 8. Energy Management System programs shall include, but not all are necessarily utilized, but shall not be limited to:
 - a. Optimal start-stop using an adaptive algorithm to prevent the need for manual adjustments of parameters.
 - b. Optimization programs controlling equipment using outdoor dry bulb and dew point temperatures. The outdoor wet bulb temperature shall be calculated by the following equation:

$$WB = (DB-DP)K+DP \text{ where } K = 0.560-0.0068 (DP-30)$$

F. Control:

1. Control algorithms shall be available and resident in the digital system controller to permit Proportional, Integral, and Derivative control modes in any combination to meet the needs of the application. Other control modes such as incremental, floating, or two-position must be available to adapt to job needs.
2. All control shall be performed in a digital manner using the digital signal from the microprocessor based controller converted through electronic circuitry for modulation of electric actuators.
3. Provide sensitivity adjustment for all DDC output control points.
4. The library of routines available in firmware must be capable of generating additional programs as may be required for specific client tailored requirements. The Owner shall be capable of revising programs without the aide of the installer.
5. Adjustments of all new control variables shall be conveniently available at the computer terminal through the use of the keyboard and display. The adjustments shall include, but not be limited to, proportional gain, integral rate, the velocity and acceleration constants associated with incremental control and on/off values of two-position control.

G. Field Programmable:

1. The local DDC controllers shall each contain all necessary mathematic, logic, utility functions; and all standard energy calculations and control functions in ROM to be available in any combination for field programming the unit. These routines shall include, but not be limited to:
 - a. Math Routines:
 - 1) Basic Arithmetic
 - 2) Binary Logic
 - 3) Relational Logic
 - 4) Fixed Formulas for Psychometric Calculations
 - b. Utility Routines for:
 - 1) Process entry and exit
 - 2) Keyboard functions
 - 3) Variable adjustments and output
 - 4) Alarm Indication
 - 5) Restart
 - c. Control Routines for:
 - 1) Signal compensation
 - 2) Loop control
 - 3) Energy conservation
 - 4) Timed programming
2. Final field programs shall be stored in battery backed up RAM or in permanent memory.

- H. Expandability: The DDC shall be expandable by adding additional field interface units that operate through the central processor of the DDC. The processor in the DDC shall be able to manage remote field interface units thereby expanding its control loop and energy management point capacity. Remote units shall be able to stand alone and have two-way communication in a LAN configuration. Systems furnished shall be fully manufacturer supported and under current production.
- I. Calibration Compensation: To maintain long term analog accuracy to the controller sensing circuits, the DDC shall sense the voltage being supplied to the resistance sensing element and through firmware compensate for power supply changes due to long term drift or drift due to ambient temperature changes at the power supply.
- J. Battery Backup:
 - 1. New DDC system controllers shall be supplied with a minimum of 48 hours of nickel-cadmium battery backup, during power outages, for the RAM, with an automatic battery charger to maintain charge while power is on, to prevent internal component damage or failure.
 - 2. DDC modules shall have automatic restart capabilities with sequencing after a power failure without program interruption. All EMS controlled equipment with motor loads of one horsepower, or equivalent, and larger shall be started after power resumes in equal load groups in intervals of every 20 seconds, adjustable, to minimize electrical demand.
- K. Associated Hardware:
 - 1. All actuators for valves and dampers shall be supplied under this section of the specifications.
 - 2. Where modulating electric actuators are used they shall be compatible with the (pulse width modulated) output of the Digital System Controller.
- L. Diagnostics: The Digital System Controller shall contain in its program a self test procedure for checking the digital controllers, and by means of a non-destructive memory, check the computer.
- M. Default Operating Procedure and Alarms:
 - 1. All variables shall be identified as being reliable or unreliable. When a calculation is required to use a value (sensed or calculated), which is identified as being unreliable, the unreliable data value will flash. The calculation will use a default value programmed into the unit.
 - 2. All alarms (a pump that did not start, etc.) and all deviation alarms (temperature, off, normal, etc.) will report to the CPU the type of alarm, designate equipment or system effected, date and time of alarm. A hard copy printout of alarms shall be generated at the CPU location. A scan can then identify all alarm conditions and their identifier.
- N. Cabinet:
 - 1. The DDC modules shall be enclosed in a metal frame cabinet. The cabinet shall be constructed such that it can be mounted and electrical terminations can be made during the construction phase of the project. The DDC electronics are to be removed and added at a later date, only prior to start-up.
 - 2. Cabinet shall be installed on the wall in the Mechanical Rooms or elsewhere as indicated.
 - 3. DDC cabinets shall be provided with a key lock. All cabinets on each installation shall utilize one master key.
 - 4. All control wiring and system communications shall be electrically terminated inside DDC cabinets.
- O. U. L. Approval: The DDC system panels shall be an approved U.L. System, with U. L. listing as a Signaling System.
- P. System Architecture: The network architecture shall consist of two levels. The top level controller shall contain a high speed LAN communication bus capable of sharing data over RISD's TCP/IP Ethernet Wide Area Network. Top level controllers will also contain a communication bus to lower level controllers, referred to throughout the specification as the field bus. The second level shall be a RS485 bus to support a family of dedicated local controllers for control of HVAC equipment and miscellaneous points of monitoring and control.
 - 1. Field Bus

- a. The Level 2 bus, or field bus, supports local control units of modular size for operation of the building's HVAC and lighting systems. This RS485 bus shall operate at a minimum speed of 19200 baud, with a minimum length of 4000 feet or 32 nodes before requiring a network repeater. A minimum of 16 HVAC or access controllers shall be configurable on the field bus. Manufacturers with baud rates of less than 19200 shall be limited to 64 Level 2 controllers to insure adequate global data and alarm response times
 - b. The field bus shall permit peer to peer communications among all Level 2 controllers and allow simultaneous communications with laptop computer service tools that are connected to a Level 2 controller. Failure of the Level 1 controller will not impair the operation of its associated field bus.
2. Network Transparency
 - a. All points contained on Level 1 and Level 2 controllers shall be considered global points. Any program in any controller on the network shall be able to reference any point in any controller regardless of its location on the network.
 3. Workstation Communications
 - a. Existing workstations located within the Administration Annex shall be able to communicate to the communication controller via a high speed WAN communication bus capable of sharing data over RISD's existing TCP/IP Ethernet Wide Area Network.
 4. Dial-up Communications
 - a. It shall be possible to access the network remotely through a standard dial-up modem. This modem shall permit direct access to the high speed LAN via a Level 1 network controller. It shall be possible to configure multiple modems in Level 1 network controllers to enable multi-user communications when more than 1 telephone line is available.
- Q. General software features of the CPU and field controllers, with sufficient internal memory, shall include the following as a minimum (although not all are necessarily used):
1. Start-Stop Functions
 2. Optimized Start-Stop Control (warm-up and cool-down)
 3. Time Programmed Commands
 - a. Normal occupancy
 - b. Holiday
 - c. Occupancy overrides
 - d. Schedules shall be programmable up to one year in advance with system wide or global scheduling and local, point by point scheduling.
 4. Duty Cycle Control
 5. Night Setback/Setup
 6. Electric Demand Limiting
 7. Override Feature
 8. Run Time Totalization with data in non-volatile module memory.
 9. Provisions shall be made for on-line programming and override.
- R. On/Off Points of System Control shall be provided for the following:
1. Split DX AC or Heat Pump Units
- S. Run Status (On/Off) of all units indicated above shall also be provided and shall be capable of being accessed for on-line programming. Status shall be by means of the local motor controller through the use of adjustable current sensing relays, or air flow differential pressure switch. For motors operated with variable frequency drives use the status from the drive. Coordinate the means of status with all equipment furnished.
- T. Failure Alarm Status for the following EMS controlled items shall be provided through the EMS:

1. Combined Safety Alarm, one (1) for each AC Unit.
 2. Low/High Temperature Alarms for each temperature sensor installed, four (4) Deg.F. above or below set point, adjustable.
- U. Provide cumulative run time logging and indication for equipment noted in Paragraph "R", above.
- V. Provide analog indication for the following:
1. For each A/C Unit:
 - a. Space temperature, Deg.F.
 - b. Supply air temperature, Deg.F.
 2. Re-use existing indication of outside air temperature in Deg.F for each building.
 3. Re-use existing indication of outside air relative humidity in % R.H. for each building.
- W. Building Computer Software Management features
1. Provide minimum of 15 User Selectable Passwords with a minimum of three levels of access. Highest level provides system access, secondary level provides access for command to field devices only, lowest level provides monitoring capabilities only with no field control allowed. Password access will be logged with time/date stamp and associated user ID.
 2. Provide a minimum of 16 Point Group Summaries with each point inclusion selectable by system operator. Summaries will have a minimum of six (6) character identifiers for each group. A separately selectable All Points Summary shall be available to the operator for a view of the complete system. Alarm Summaries, listing all points in an alarm status shall be provided, and shall be Owner definable.
 3. Trend logs and summaries:
 - a. The Central Computer Workstation (CPU), shall be provided with, as a part of this contract, the ability to periodically trend any hardware, software, or simulated point within any of the attached DDC panels, for this project, at an Owner selectable interval of a minimum of once per second, up to at least once per 1000 minutes.
 - b. The trending programming for selected points and all feature attributes of these points shall be accomplished online at the CPU with no disruption of dynamic communication with the remote DDC panels. The operator shall be able to add, delete, and modify points and attributes at any time while online. Online programmable attributes shall include:
 - 1) Point addition, deletion, and modification
 - 2) Sampling intervals and ranges
 - 3) Historical samples to be stored per individual point
 - 4) Dynamic data values
 - 5) Engineering units of each point
 4. Online editing capabilities shall be provided for, but not limited to the following:
 - a. Add/Delete Points
 - b. Modify Engineering Units
 - c. Modify/Create Point Groups
 - d. Adjust Set Points
 - e. Adjust Individual Start/Stop Times
 - f. Trend Selected Points
 - g. Observe Any System Point, Hardware, or Software
 - h. This editing capability shall be for both CPU resident programs and remote DDC panel programs.
 5. English language shall be used for all inputs, outputs, and display. Code or computer language will not be acceptable.
 6. Remote DDC Field Communication: Communication between the Central Computer Workstation and the remote DDC panels shall be achieved via digital transmission utilizing a distributed polling technique for recognition of all field points, both software and hardware points status, issuing of commands, programming of DDC units, etc. Additionally provide software for the existing Central

Computer to allow the same interaction/communication features as noted for the Computer Workstation Building. Data transmission shall be via hardware connection compatible with electric category Type 3002, as described in Bell System Technical Publications for Data Transmission using 9600 Baud Rate.

7. New field panels/controllers shall be able to communicate with the existing front end system same as currently exists.
8. CRT Format:
 - a. The CPU CRT format shall include and display in an individually dedicated and protected area of the viewing screen the following Dynamic information:
 - 1) The current time, date, and day of week (including Holidays).
 - 2) Sequential as occurred alarms.
 - 3) Visual indication of alarm or off normal conditions which are active.
 - 4) Current operator identification.
 - 5) Operator work area to display various forms of point information issue commands, and data base information relevant to current activities.
 - b. Operator will have full access to the system for issuing commands, etc. while this display is active.
9. Provide a graphic software package and programming to result in a schematic illustration for each controlled piece or group of pieces, of equipment to illustrate all related controlled variables, setpoints and operating parameters. Additionally provide a building floor plan with room numbers and locations of all space sensors and controlled equipment. The user shall be able to click on any feature to pull up related system graphics.

2.8 ELECTRICAL WIRING

- A. All wire, wiring, and conduit required for the operation of the control system shall be the responsibility of this section of the specifications and shall be installed as described and in full accordance with the requirements of Division 26 of these Specifications.
- B. The control manufacturer shall be responsible for supplying complete and approved wiring diagrams and installation supervision of the wiring of the control system and shall perform all necessary set-up and calibration labor.
- C. Starters, furnished in other sections of these specifications, shall be installed under Division 26, but all wiring from auxiliary contacts or relays shall be under this section of the specifications.
- D. All wiring, including Class 2 signal wiring, shall be installed as a Class 1 electrical system as defined by the National Electrical Code (NEC).
- E. All control conduits with #8 conductor or smaller (cross-sectional area) shall have one pull wire each run in conduits carrying 5 or more conductors. Conduits with 9 or more conductors shall have two pull wires installed. Terminate pull wires at control panels in an acceptable manner and tag wires as "future".
- F. The electrician shall be licensed by the City and local authorities having jurisdiction over the area in which the work is to be performed.
- G. All class 1 control wiring conduit shall be run with not more than 30% fill based on inside conduit diameters and cross-sectional area. This provision is for future modifications or additions to the control system.
- H. All conduit carrying shielded twisted pair cabling, communication, or signal, Class 2 wiring, shall be sized for a maximum of 40% fill based on inside conduit diameter and cross-sectional area. This provision is for future modifications or additions to the control system.
- I. All wiring shall be run in conduit. All Class 1 power wiring shall be run in conduit. All Class 2 signal wiring, low voltage control type, shall be run in conduit. No exposed wiring of any kind will be allowed.

Class 2 signal wiring may be installed above accessible lay-in ceilings only if run-in plenum rated cable supported independently from structure and run parallel and perpendicular to the structure.

- J. All conduit shall be 3/4 inch size minimum, except raceways terminating at control devices manufactured with 1/2" knock-outs, i.e., conduit from junction box to smoke or fire detectors (local single device wiring only).
- K. Electrical Systems Installer on project may perform temperature control conduit and wiring installation on project only that this portion of work shall be bid directly to the Temperature Control Systems Installer, and all work in relation to temperature control wiring shall be done subordinate to this Section of the Specifications. Wiring terminations shall be under this Section of the specifications.
- L. Under this Section of Specifications, furnish and install, at an early stage of construction (when walls are being constructed) galvanized steel back boxes for all wall mount space sensors, suitably secured with 3/4" EMT routed to four inches (4") above an accessible ceiling. Install with pull wire for installation of sensors and related wiring at a later stage of construction. For existing construction, either fish flexible conduit down accessible walls, use surface mounted wire mold components on masonry walls (color to be approved by Architect) in finished areas, or use surface mounted EMT in unfinished areas.
- M. Work Not Included Under this Section of Specifications: The Electrical Systems Installer shall provide:
 - 1. Branch circuit and motor feeder circuit conductors, raceway, connections, and overcurrent protection for each motor or item of equipment furnished by the Owner or other Contractors.
 - 2. Installation of motor controllers furnished by the Owner or other Contractors, along with branch circuit and motor feeder circuit conductors, raceway, and connections in accordance with the manufacturer's approved wiring diagrams.
 - 3. Disconnect switches, where indicated on the drawings or required by codes, except as provided as an integral part of manufactured equipment.
 - 4. Power supply conductors, raceway, connections, and over-current protection for input power to HVAC Temperature Controls, HVAC Automation, and HVAC Energy Management Systems in accordance with approved rough-in and connection diagrams furnished by the system suppliers only when shown on Division 16 (or 26) Drawings.
 - 5. The above represents an outline of the work for the purpose of describing one division of the work which is acceptable to insure that all work is contained within the General Contract. The Contractor is fully responsible for the installation of complete, operating systems in accordance with the functional intent of the specifications.
 - 6. Nothing herein shall be construed to confine the Contractor from assigning the work to any single member or group of systems installers deemed best suited for executing the work to effect completion of the contract. Refer to specific bidding instructions of the General Contract for the actual division of the work.
- N. Work Included Under this Section of the Specifications: The Mechanical Systems Installer shall provide:
 - 1. Motors and equipment, erected in place and ready for final connection of power supply wiring, along with manufacturer's approved wiring diagrams.
 - 2. Motor controllers, in suitable enclosures and of the type and size in accordance with the manufacturer's recommendations and NEMA requirements, along with properly sized overload elements or devices which are normally provided as part of manufactured equipment.
 - 3. Disconnecting switches or devices which are normally provided as a part of manufactured equipment.
 - 4. Rough-in and connection diagrams for input power supply and connections for the HVAC Temperature Control, HVAC Automation, and HVAC Energy Management Systems.
 - 5. The above represents an outline of the work for the purpose of describing one division of the work which is acceptable to insure that all work is contained within the General Contract. The Contractor is fully responsible for the installation of complete, operating systems in accordance with the functional intent of the specifications.
- O. Contractor, under this section of the Specifications, shall insure the furnishing and installation of:
 - 1. All new branch circuit wiring, conduits, protective devices and accessories for power wiring to serve new control panels, control transformers, electric control dampers and valve actuators, combination

- fire-smoke dampers and any other control system power requirements where not shown to be performed by others. Field verify spare electrical circuits available where applicable. Do not tap into existing branch circuits without approval by the Owners Representative. Run all new circuits back to electrical feeder panels.
2. Conductors and raceways for the HVAC temperature control, HVAC automation, and HVAC Energy Management System in accordance with approved rough-in and connection diagrams furnished by the system suppliers.
 3. Termination of all conductors, raceways, devices, and connections for low voltage systems for the HVAC Temperature Control, HVAC Automation, and HVAC Energy Management Systems in accordance with the provisions of Division 16, and approved systems shop drawings to provide complete operating systems in accordance with the functional requirements of the specifications.
- P. Wire all safety devices in series to include freezestats, smoke detectors, and static pressure high limit controls; any single device when tripped, shall de-energize air handling equipment.
- Q. Wiring Requirements shall also include the following:
1. The conduit/wiring system required for the Automatic Temperature Control (ATC)/Energy Management System shall be a complete, separate, independent system. Conduit sharing with other unrelated electrical systems is not permitted.
 2. All wiring shall be labeled at both ends and at any spliced joint in between. Wire and tubing shall be tagged using 3M, Scotch Code Write On Wire Marker Tape Identification System; product number SWD-R-11954 with 3/4" x 5/16" write-on area or SLW 12177 with 1" x 3/4" write-on area and with 3M Scotch Code SMP Marking Pen. In addition to tagging at field device end and at spliced joints, a tag shall be placed 6" after entering each DDC panel. Identification and tag information shall be included in engineering/wiring submittal which must be submitted for Owner approval prior to beginning work. Tag information shall coincide with equipment/point information as written in the specification Input/Output summary.
 3. Digital Input (D.I.) wiring (Class 2) may be run in a common conduit with Digital Output (D.O.) Wiring (Class 1) where local codes permit.
 4. Analog Input (A.I.), Analog Output (A.O.), Digital Input (D.I.), and Network Communications Trunk (N.C.T.) wiring may be run in a common conduit.
 5. Digital Output (D.O.) wiring run in a common conduit with Analog Input (A.I.), Analog Output (A.O.), or Network Communication Trunk (N.C.T.) is not permitted under any circumstances.
 6. AC line power to DDC panel shall be #12 THHN.
 7. Digital Output (D.O.) wiring shall be minimum #16 THHN.
 8. Digital Input (D.I.), Analog Input 4-20 mA (A.I.) and Analog Output (A.O.) wiring shall be min., #20 TSP (twisted shielded stranded pair with drain wire).
 9. Analog Input or voltage types (A.I.) wiring shall be min., #20 TSP (twisted shielded stranded pair with drain wire).

2.9 GENERAL

- A. System shall be installed complete with DDC panels, remote panels, thermostats, sensors, control dampers, all actuators, switches, relays, alarms, etc., in accordance with the extent of the sequences of operation. Provide all auxiliary equipment required. All controls shall be installed under this section of work.
- B. Control Systems manufacturer shall submit a complete and final check list verifying final calibration and set points for each system prior to final construction review.
- C. Complete control drawings shall be submitted for approval before field installation is started. The submittals shall give a complete description of all control devices and show schematic piping and wiring, as well as a written sequence for each operation.
- D. Work under this section shall regulate and adjust the control system, including all controllers, thermostats, relays, motors, and other equipment provided under this contract. They shall be placed in complete operating condition subject to the approval of the TAB firm. Contractor shall cooperate fully with the balancing agency in the testing, check-out and adjustment of the various systems. Contractor, under other sections of these specifications, shall install all automatic dampers.

- E. Control system herein specified shall be free from defects in workmanship and material under normal use and service. If, within twelve (12) months from the date of "Substantial Completion", any of the equipment herein described is proven to be defective in workmanship or material (except electrical wiring done by others), it shall be adjusted, repaired, or replaced free of charge.

PART 3 - EXECUTION

3.1 SEQUENCE OF OPERATION – SPLIT DX AC HEAT PUMP UNITS (SINGLE ZONE TYPE) - (1.5 TONS AND LARGER)

- A. The direct digital control system shall monitor and control each heat pump unit. An electronic room temperature sensor shall, through a local terminal unit DDC Controller, one per unit, control its DX Cooling /Heating (minimum 1-stage for all units), refrigerant reversing valve, and outside air damper, as applicable.
- B. The DDC controller shall be of the automatic change-over type to provide for a heating and a cooling set point to be software interlocked to prevent the cooling set point from being set below the heating set point and vice-versa. Provide for a minimum Deg.F. dead band between set points, adjustable.
- C. Include optimized start and stop features for unit control where the space temperature is compared to the ambient outdoor air temperature to calculate the minimum run time necessary to attain the normal mode set point by the occupied time scheduled.
- D. The fan control circuit shall include all safety controls, an H.O.A. Switch, timer (EMS) energized controls, and a manual disconnect switch.
- E. Safety controls shall consist of but not be limited to the following:
 - 1. Building fire alarm relay as required by local code.
- F. Each supply fan is of the two-speed type and space temperature shall be controlled by a room thermostat which will energize a heat pump on a call for cooling or heating. Unit compressor(s) and fan shall be staged or cycled to maintain a 72 Deg.F., adjustable, cooling set point and a 70 Deg.F., adjustable, heating set point.
- G. Upon a need for mechanical cooling, the DX cooling system shall be energized in such a manner as to maintain a stable space temperature set point of 72 Deg.F (adj.). On an increase in space temperature, 1 Deg.F., adjustable, above set point the 1st stage of cooling, or first compressor shall be energized. For 2 stage units the second compressor, or stage, will only be energized upon a further rise (2 Deg.F., adjustable) above set point and when the first compressor has been on longer than 5 minutes, adjustable. On a decrease in demand for cooling (drop in space temperature 1 Deg.F. below set point) the second stage or compressor shall be cycled off. On a further decrease in space temperature, the first stage or compressor shall be cycled off. Each stage of cooling shall have a minimum off time of approximately 5 minutes (Variable as determined through PID loop control).
- H. The heating temperature set point shall be 70 Deg. F., adjustable. On a drop in space temperature below heating set point, the reversing valve shall change to the heating mode and the DX section shall be energized, in stages, as required, to maintain set point. A supply air high limit control feature shall be provided to prevent the supply air temperature from raising above 90 Deg.F., adjustable, by overriding and de-energizing the heat as required. The heat, when a demand for heat remains, shall shut-off for a minimum of three (3) minutes, adjustable, and be energized when the supply air temperature drops (fan runs continuously) below 80 Deg.F., adjustable. For 2-stage heating units, the compressors will stage on as required to meet demand in a stable fashion. The auxiliary heat shall stage on when both compressors or stages are energized and space temperature continuous to drop or when unit is in the de-frost mode.

- I. Minimum outside air is provided through an outside air intake duct with a two-position motorized damper.
- J. Units shall cycle on/off to control space temperature.
- K. Space temperature sensors will also be used to operate the units in the unoccupied modes of operation.
- L. During the optimized start morning “warm-up” mode (winter), the air unit fan motor will be cycled on and the unit will be energized, as required, to bring space temperature to the normal heating set point. During this mode the minimum outdoor air damper will be closed. When the space reaches warm-up set point, one (1) Deg.F. below the heating set point, the unit will then be allowed to operate in the “occupied” mode at which time the outdoor air damper will be allowed to open. Warm-up shall occur not more than once each day. The discharge air temperature high limit control sequence shall remain in control during the morning warm-up mode.
- M. During the optimized start morning cool-down (summer) mode, the air unit fan motor will be cycled on and the unit cooling system will operate at the capacity as required to bring the space temperature to the normal cooling set point. During this mode, the outdoor air damper will be closed. When the space reaches cool-down set point, one (1) Deg.F. higher than the cooling set point, the unit will operate in the occupied mode at which time the outdoor air damper will be allowed to open and the space temperature sensor will control as described above. Cool-down shall occur not more than once each day.
- N. During the night set-forward and night set-back modes the equipment will be cycled as required to maintain those set points; on at 80 Deg.F. and off at 76 Deg. F., adjustable, for set-forward and on at 55 Deg.F. and off at 60 Deg.F., adjustable, for night set-back. The outdoor air dampers shall be closed in both of these modes. The discharge air temperature high limit control sequence shall remain in control during the night set-back mode.

3.2 SEQUENCE OF OPERATION – EXISTING MULTI-ZONE AIR HANDLERS

- A. The existing Multi-Zone air handlers shall operate as currently programmed. Primary space temperature sensors shall be re-located or revised as noted on the floor plans. Units shall be re-balanced and re-sheaved as needed to accommodate revised airflow.

3.3 SEQUENCE OF OPERATION – EXISTING GROUND SOURCE HEAT PUMPS

- A. The existing Ground Source Heat Pumps shall operate as currently programmed with re-located temperature sensors or re-balanced airflow as noted on the floor plans, other than as noted below.
- B. Two temperature sensors shall be provided for the units noted below in the table. The sensors for each unit shall be noted as primary and secondary at Green Valley Elementary as follows:

UNIT	PRIMARY SENSOR SPACE	SECONDARY SENSOR SPACE
HP-D102	Recp. D102	A.P. D103

The primary sensor shall control heating and cooling set point, unless the space temperature in the secondary space is greater/less than 2.5 Deg. F., difference from set point. When this occurs, the secondary sensor shall control the heating and cooling set point until such time as it is within in 1 Deg. F. of space set point. Once this temperature is reached, the primary space temperature sensor shall return to being the control sensor for the unit.

3.4 SEQUENCE OF OPERATION - NIGHT SET-BACK AND SET-UP MODES

- A. Night set-back and set-up modes shall be provided to keep equipment from operating except as needed to heat or cool the space to protect the building systems from freezing and potential water damage in cold weather or from excessive heat or humidity build-up in warm weather.
- B. Designate one of the space temperature sensors shown on the plans, preferably located on an interior partition within 8 feet of a Northern exposure, selection as recommended by the balancing agency, to be used for night set-back control. Sensor, adjustable, shall be set for 55 Deg.F. Provide one per AHU for VAV units. For single zone systems, utilize the space temperature sensor shown. Use this same sensor for night set-up control which shall have a set point of 84 Deg.F., adjustable.
- C. Below set-back setpoint, respective air handlers shall receive a control signal, fans shall be energized, and related heating equipment shall be started if not already energized, until all units are no longer in the night set-back mode, temperature rises above 60 Deg.F.
- D. Above the night set-up set point, respective air handlers shall receive a control signal, fans shall be energized and related cooling equipment shall be started if not already operating, until the units are no longer in the night set-up mode, temperature drops below 80 Deg.F.
- E. During the night set-back mode, lockout cooling system, ventilation cycles, morning warm-up and cool-down modes, night set-up mode, close all outside and relief air dampers, as applicable, and de-energize all EMS controlled toilet exhaust fans located in the areas served by the units being controlled.
- F. During the night set-up mode, lockout the same systems, except allow the cooling system to be energized and lock-out the heating system.

3.5 SEQUENCE OF OPERATION - MORNING COOL-DOWN MODE

- A. A morning cool-down mode shall be provided to cool the building, or area served by a system, to within 1 Deg.F. of the normal occupied cooling set point, adjustable, through the building Energy Management System optimized start feature.
- B. Cool-down shall function the same as night set-up, except the set point shall be as noted above.
- C. Lockout the cool-down mode after the cycle is completed until the following scheduled cycle, generally not to occur more than once per day.
- D. During the cool-down mode, lockout the heating system, night set-back, morning warm-up, night set-up, close all outside and relief air dampers, as applicable, and de-energize all EMS controlled toilet exhaust fans in the areas served by the units being controlled.

3.6 SEQUENCE OF OPERATION - MORNING WARM-UP MODE

- A. A warm-up mode shall be provided to warm the building, or area served by a system, to within 1 Deg.F. of the normal occupied heating setpoint, adjustable, through the building Energy Management System optimized start feature.
- B. Warm-up shall function the same as night setback, except the setpoint shall be as noted above.
- C. Lockout the warm-up mode after the cycle is completed until the following scheduled cycle, generally not to occur more than once per day.
- D. Lockout the cooling system, ventilation cycles, night set-back, morning cool-down, night set-up, close all outside and relief air dampers, as applicable, and de-energize all EMS controlled toilet exhaust fans located in the areas served by the units being controlled.

3.7 ELECTRICAL INTERLOCKS

- A. Certain electrical interlocks shall be as listed herein and in other sections of these specifications.
- B. All electrical interlocks shall be made by means of auxiliary contacts on motor starters or shall be accomplished with separate relays unless indicated otherwise. No motor power lead shall be utilized in an interlock circuit, unless indicated otherwise. Each separate control power lead serving a starter shall be provided with a disconnecting switch suitably identified and housed, which may be a toggle switch or other suitable disconnecting device, of proper capacity and number of poles.

3.8 DDC CONTROL

- A. Provide complete DDC Control for all equipment as indicated elsewhere herein.
- B. Not more than one local unitary direct digital controller shall be utilized per AHU/piece of equipment.
- C. Separate monitoring only control points not associated with specific pieces of equipment and which are global in nature are desired to be grouped together in a separate controller, or controllers, other than dedicated equipment controllers.

END OF SECTION

SECTION 23 21 13

HYDRONIC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Comply with Division 1 - General Requirements and referenced documents.
- B. Comply with all other Division 23 Sections, as applicable. Refer to other divisions for coordination of work with other portions of Work.

1.2 SYSTEM DESCRIPTION

- A. Furnish and install all piping of every kind required, specified, or shown on the Drawings for the installation of the work specified in Division 23. The location, direction, and size of the various lines are indicated on the Drawings. Lines for pilot and controls and instrumentation are not shown but shall be installed as required and as specified.
- B. Piping systems shall include all appurtenances shown on the drawings and specified herein.
- C. The work shall include the furnishing and installing of all supporting structures and members for pipes, ducts, and equipment.
- D. Support devices and members shall include vibration and noise isolating devices and assemblies. Penetrations of walls to structure shall be sealed off to limit noise transmission through sleeves.

1.3 QUALITY ASSURANCE

- A. All equipment and materials shall be new and of the best quality.
- B. All equipment and materials shall be installed by experienced mechanics certified and trained for the work performed.

1.4 SUBMITTALS

- A. Product Data: Submit complete manufacturer's descriptive literature and installation instructions in accordance with Division 1 for all piping materials to be used for each system, valves and hydronic specialties as specified herein.
- B. Shop Drawings:
 - 1. Submit in accordance with Section 01 33 23 and Section 23 05 00.
 - 2. Submit 1/4" = 1'-0" Scale HVAC and Plumbing Piping Shop Drawings.
 - 3. Overlay piping Shop Drawings over other Shop Drawings of other trades to include electrical and sheet metal Shop Drawings.
 - 4. Plan views of congested areas and sections thereof shall be drawn at a scale of 3/8" = 1'-0".
 - 5. A "Release of Liability" form must be signed after which a single CD will be produced.
- C. Fully coordinate all piping shop drawings with sheet metal shop drawings and other trades. Failure to submit shop drawings in a timely manner, as required to keep pace with the construction and work of all other trades, will result in delays, and possible stoppage, of payment to the Contractor. Additionally, no work may proceed until such shop drawings are submitted, reviewed, and found to be acceptable by the Engineer.

1.5 PRODUCT HANDLING

- A. Cover and protect material in transit and at site. Material not properly protected and stored and which is damaged or defaced during construction shall and will be rejected.
- B. Storage and protection of materials shall be in accordance with Section 23 05 00.
- C. Take special precautions to protect control valve internals from construction dirt and debris. If valves are stored on site cover valve openings until just prior to installation but in no case shall valves be unprotected for more than 48 hours.
- D. Openings in piping system, coil headers, and other heat exchangers shall be covered during the construction period to protect the interior accumulation of dirt and debris in these systems until immediately prior to connection to these components to similarly protected systems.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. In general, the following listed materials shall be used in fabricating the piping systems. Where special classes of piping are involved and are not listed, the Contractor shall request instructions as to the class of material involved and the method of fabricating it before ordering the materials. Steel pipe 2-1/2" and larger shall generally have plain ends to be assembled by welding and pipe 2" and smaller shall generally have screwed ends, except where special requirements dictate otherwise.
 - 1. Condensate drains from cooling coils: Type "M" or DWV (1-1/4" and larger) hard drawn copper below the roof.
 - 2. Condensate drain lines with Pro-Press type fittings: Type "L" hard drawn copper tubing below the roof.
 - 3. Refrigerant Piping: Type "ACR" hard drawn copper with 156 Silfos solder joints. Refer to specification Section 23 23 00, "Refrigerant Piping".
- B. Steel pipe shall be made and tested in accordance with the latest edition of the "Standard Specifications for Welded Steel Pipe" of the National Tube Company, or Youngstown Sheet and Tube Company. Piping 2" and smaller shall be manufactured by LeClerc, Sawhill, or Wheatland. Piping 2-1/2" and larger shall be manufactured by Tex-Tube, Paragon, U.S. Steel, or Armco. Unless otherwise specified, all pipe shall be Schedule 40 of ASA Standard B36.10.
- C. In general, fittings used for the various piping systems shall be as listed below. Special fittings shall be used where required by job conditions and when approved for particular use.
 - 1. Welding Fittings: All fittings in welded lines shall be factory fabricated welding fittings of the same material and the same schedule or weight as the piping system in which installed.
 - a. All elbows, reducers, tees, caps and special fittings shall be standard factory fabricated butt welding fittings, conforming to ANSI B16.9, with the following exceptions: Branch takeoffs from lines 2-1/2" in size and larger and where the size of the takeoff does not exceed two-thirds of the nominal diameter of the mains to which connected may be made with shaped nipples or with Bonney or Grinnell Weldolets or Threadolets as required by the class of fabrication. Mitering of pipe to form elbows, notching of straight runs to form tees, or any similar construction will not be permitted.
 - b. Welding fittings shall be Weldbend Corporation, Tube Turn, Hackney, or approved equals. Welding and fittings shall have the same bursting pressure as pipe of the same size and schedule. All elbows shall be the long radius type unless noted otherwise.
- D. Screwed Fittings in Steel Lines: 150 lb. black malleable iron banded pattern screwed fittings made by Grinnell Company, Crane Company, or Walworth Company. All screwed fitting elbows shall be the long radius type unless noted otherwise.

- E. Fittings for non-propress copper tubing shall be Chase Sweat Fittings, Nibco, Elkhart, or Mueller Brass Company's "Streamline" type solder fittings. Drainage type fittings shall be used wherever possible in drainage systems only. All solder for copper tubing shall be 95-5, Silfos or Eutectic No. 180F. All piping shall be installed according to the manufacturer's instructions. All joints shall be thoroughly cleaned before connecting. Silfos solder shall be used on all refrigerant piping. All elbows shall be the long radius type unless noted otherwise.
- F. As an alternate to standard sweat fittings for copper tubing, Pro Press type fittings shall be allowed for all drain lines as follows:
 - 1. 3" and smaller, wrought copper. Press fittings, or ASME 16.2.2, ASME 15.18 sealing with EPDM sealing element for ½" to 2" and ProPress XL for 2-1/2" to 3.
 - 2. Contractor shall provide Owner at completion of project one (1) complete set (½" to 3") of new actuators and jaws.
- G. Miscellaneous Fittings: Provide all reducers, increasers, adapters, bushings, etc., as required to properly inter-connect the various items, to change sizes, etc. Steel fittings shall be used in steel lines, and copper and red brass fittings shall be used in copper lines.
- H. All piping materials and fittings shall be manufactured in the United States.

2.2 FLANGES

- A. Flanges in welded lines for water systems shall be 150 pound forged steel, welding neck flanges, except where cast iron fittings are used as specified elsewhere in these specifications, and except as otherwise shown.
- B. Flanges in screwed ferrous lines shall be 125 pound cast iron or 150 pound forged steel screwed flanges.
- C. Where ferrous flanges connect to flat faced flanges on valves, items of equipment, etc., the companion flange shall be flush faced and where the flanges on items of equipment are raised face flanges, the companion flanges shall have raised faces.
- D. Flanges in copper lines shall be solder joint type cast brass flanges.
- E. Flange bolts and nuts shall conform to the applicable requirements of the latest edition of the Code for Pressure Piping.
- F. Slip-on welding neck flanges are prohibited.
- G. Flanges shall be Weldbend, Tube Turn, Hackney, or approved equals.

2.3 GASKETS

- A. Install gaskets between flanges of all flanged joints. Where used with brass or bronze flanges or with flat face ferrous flanges, they shall be full face type. For all other flanges they shall be ring gaskets properly cut to fit within the inside edges of the bolts.
- B. Gaskets in water lines shall be Garlock No. 24 Wire Insertion Red Rubber Sheet Packing, 1/16" thick and for any other systems use special materials suitable for the duty as recommended by their manufacturer.

2.4 INSULATING FITTINGS

- A. Except that no dielectric fitting shall be installed in connections between copper or brass and sanitary cast iron waste, drain and vent lines, wherever an interconnection is made between ferrous pipes or vessel and copper tubing or brass pipe, or vice versa, install a dielectric fitting.
- B. In lines assembled with screwed or soldered joints, use insulating couplings (unions) suitable for the intended service and where flanged connections are required, use insulating gasket material between

flange faces, insulating grommets between bolts and holes in flanges and insulating washers under both bolt heads and nuts.

- C. PVC couplings of any kind shall not be acceptable for insulating couplings.
- D. Insulating fittings shall be suitable for the service medium, operating pressure and temperature. Fittings shall be rated for 1.5 times the normal system operating temperature and pressure in which installed.
- E. Insulating fittings shall be as manufactured by EPCO, Maloney, or Crane.

2.5 PIPE HANGERS

- A. Pipe hangers shall be as manufactured by Anvil International, Inc. and be of a type suitable for each use. Approved equals by Mason Industries, Inc., B-Line, Grinnell, and PHD Manufacturing, Inc. will be considered.
- B. For cast-iron pipes up to three inches (3") in size, use Anvil Fig. 104 malleable iron, adjustable, split ring, swivel hanger, or Anvil Fig. 590 steel clevis hanger. For cast iron plumbing piping four inches (4") and larger, use only Anvil Fig. 590 steel clevis hanger.
- C. Where several pipes are routed parallel to each other and at the same elevation, trapeze hangers may be used. Where trapeze hangers are used, the pipes shall be supported on rollers where rollers are called for elsewhere by these specifications.
- D. For bare copper pipes (uninsulated only) up to and including three inches (3") in size, use Anvil Fig. CT-109 malleable iron, copper plated, split ring, hangers or Anvil Fig. CT-65 copper plated clevis hangers. For uninsulated copper pipes larger than three inches (3"), use Anvil Fig. CT-65 copper-plated clevis hanger.
- E. Hanger rod sizes shall conform to the following schedule:

Pipe up to, and including 2"	3/8" rods
Pipe 2-1/2", 3", and 3-1/2"	1/2" rods
Pipe 4" and 5"	5/8" rods

- F. Unless shown otherwise on the Drawings, all horizontal runs of ferrous piping shall be suspended from the floor or roof joists or beams, as the case may be, by means of hangers with the following maximum spacing:

Pipe up to, and including 1-1/4"	8 feet
Pipe 1-1/2" and 2"	10 feet
Pipe 2-1/2" and 3"	12 feet
Pipe 3-1/2" and 4"	14 feet

- G. Unless shown otherwise on the Drawings, all horizontal runs of copper piping shall be suspended from the floor or roof joists or beams, as the case may be, by means of hangers with the following maximum spacing:

Pipe up to 3/4" in size	6 feet
Pipe 1" and 1-1/4"	8 feet
Pipe 1-1/2" and 2"	10 feet
Pipe 2-1/2" and larger	12 feet

- H. There shall be a hanger within two feet (2') of each elbow or tee. Additional supports shall be provided for valves, strainers, etc. Cast iron pipe shall have not less than one hanger per length of pipe. Vertical risers shall be supported by approved riser clamps. Vertical pipes within a space shall have not less than two (2) supports. Where the vertical run of pipe in a space exceeds 14 feet then three (3) supports shall be required.
- I. Supports and hangers shall be installed to permit free expansion and contraction in the piping systems. Hangers shall permit vertical adjustment to maintain proper pitch. Where necessary to control expansion and contraction, the piping shall be guided and firmly anchored. No piping shall be self-supporting; nor shall it be supported from equipment connections.
- J. Inserts shall be used where piping or equipment is to be hung from concrete construction. Inserts shall be Anvil Fig. 281, wedge type, concrete inserts. All inserts shall be pre-treated to prevent rusting. After the forms are removed, clip off all nails flush with the exposed surface of the inserts.
- K. Expansion bolts shall be Ackerman-Johnson.
- L. Beam clamps suitable for the use with the type of steel construction involved shall be an Anvil product or an approved equal as indicated elsewhere herein.
- M. No perforated straps shall be used to support any mechanical equipment item or piping of any kind.
- N. Condensate drain piping hangers shall be sized to go around the insulation with shields being provided to protect the insulation. Shields shall be Anvil Fig. 167.
- O. All steel hangers, base plates, supports, nuts, bolts, and all thread rod located outdoors, in crawl spaces, and exposed to the weather, shall be made of galvanized steel or equally suitable corrosion resistant steel alloy or aluminum. Where steel components are allowed and used under these conditions they shall be painted with an equivalent protective coating similar to a two-part epoxy. Refer to Section 09 90 00.
- P. For pipe sizes 8" and under use Anvil Fig. #93 and 94 beam clamps. For pipe sizes 10" through 18" use Anvil Fig. #66 in the "U" position.

2.6 SLEEVES AND ESCUTCHEONS

- A. Generally where pipes pass through interior building walls or floors above the first floor (out of the ground), 22 gauge galvanized sheet metal sleeves shall be used. Sleeves shall extend a minimum one inch (1") above a floor or beyond the wall, as applicable.
- B. All pipes penetrating grade beams, exterior walls, concrete structural members, or concrete slabs of mechanical equipment rooms on the first floor shall generally use standard weight galvanized steel pipe as the sleeving material.
- C. For concrete or masonry walls, sleeves shall be inserted into the masonry, decking or form work prior to the pouring or placement of concrete or masonry units to create a leave out.
- D. The sizes of all sleeves shall be such as to permit the subsequent insertion of the intended pipe of the proper size with adequate clearance for movement due to expansion and contraction. In the case of insulated lines, the diameter of the sleeves shall be at least 1/2" greater than the outside walls of the pipe with specified thickness of insulation. This will require that the inside diameter of galvanized steel pipe sleeves be at least 1/2" greater than the outside diameter of the service pipe with insulation. Galvanized steel pipe sleeves set in floors shall project two inches (2") above the floor.
- E. After the pipes are installed, fill the annular space between the pipe, and insulation as required, and its sleeve with an approved mastic or caulk. Use loose fibrous insulation packing as required to accomplish this. In all cases the annular spaces around the pipes within the sleeved openings shall be filled with loose fibrous insulation and then sealed with an approved caulking or expanded foam insulation.

- F. Escutcheons, except as specifically noted or specified, shall be installed on all pipes passing exposed through floors, walls, or ceilings. Escutcheons shall be equal to the Crane No. 10, chrome plated sectional floor and ceiling plates, and shall fit snugly and neatly around pipe or pipe insulation or insulated lines. Solid chrome plates with set screws shall be used if sectional plates do not fit properly or stay in place. Where multiple pipes penetrate floors or walls in close proximity in concealed areas, shop made sheet metal escutcheons may be used.
- G. Pipes sleeved through grade beams open to basements, crawl spaces or void spaces below grade shall additionally receive "Link Seal" or equal closures made of interlocking synthetic rubber links. Seals shall provide for absolute water tightness. Seal shall be constructed to insulate electrically pipe from wall. Install as recommended by manufacturer. Provide Century-Line sleeves with water stop and anchor collar for pipes penetrating grade beams designated to be anchored.
- H. Where PVC pipes, 3 inches and smaller, and small copper water piping under 2 inches in size, penetrated a horizontal floor slab a metal sleeve will not be required. For these piping systems, completely wrap the piping with a polyethylene tape, or wrapping. This tape shall be minimum 4 mils thick and shall be wrapped at least two times around the pipe and secured sufficiently to hold the wrap in place during the pouring of the slab. This wrap shall be in sufficient length or height to insure that no concrete will be in contact with the pipe. All other piping shall be sleeved as indicated elsewhere herein.
- I. Refer to Section 23 05 00 for additional requirements of penetrations through fire-rated assemblies.

2.7 ACCESS DOORS

- A. Wherever access is required above inaccessible ceilings, in walls, furrings, chases or soffits to physically reach concealed piping, ductwork, fire/smoke dampers or mechanical equipment installed under Division 23, provide access doors of sufficient size to maintain, repair, replace or suitably access devices intended to be adjusted as indicated herein.
- B. Provide an access door or panel for each of any valves, group of valves, damper pull rods, splitter dampers, manual volume dampers, actuators or other controlling mechanism installed under Division 23 which would otherwise be concealed in the building construction with no access.
- C. All access doors in toilet rooms, locker rooms, showers, or other similar wet areas shall be the flush mounted type and be made of brush or satin finish stainless steel as manufactured by Milcor.
- D. All access doors shall be minimum 12" x 12" in size unless otherwise approved in writing in advance by the Engineer. Doors shall be increased in size as required to allow for a person to reasonably access, adjust, maintain, service, inspect or replace the largest single component concealed. Provide special sizes of access doors as required.
- E. Coordinate the final location of all concealed equipment and devices requiring access with the final location of the required access panels or doors. Allow ample space for the removal of all parts and equipment that require replacement or servicing.
- F. Where mounting heights are not detailed or dimensioned, install mechanical piping and overhead equipment to provide the maximum headroom possible while maintaining reasonable access and service to those items being accessed.
- G. Extend all equipment grease fittings to an accessible location which shall be within reach (maximum of 18") from the access door.
- H. Install all access doors in locations to suit the intended purpose but have each location reviewed and approved by the Engineer. In no case shall access doors be located such that the intended purpose is rendered useless.
- I. Access doors shall all have spring concealed hinges, screwdriver operated cam latches, be the flush mounted type, open up to, but not more than, 175 degrees, be made of steel, or stainless steel to suit the

application, be fire rated (U.L. rated) to match the rating of the surface where the door is placed, and have a powder coated electrostatic primer paint on all steel doors. Furnish the following access door types as described below:

1. Milcor Style DW - Flush drywall type with frame made of 16 gauge steel, panel door made of 14 gauge steel, galvanized steel drywall bead on frame, and removable hinge pins for removal of panel door. Provide minimum of two hinges (12" x 12" and larger) up to 24" x 24" in size and three hinges on access doors above this size. Provide one cam for access doors 14" x 14" and smaller and a minimum of three cams on larger sizes.
2. Milcor Style K - Flush plaster wall or ceiling type made similar to Style DW except with a 22 gauge expansion casing bead, one hinge on 12" x 12" access doors, two hinges on larger doors with either side no larger than 24", three hinges on doors with any dimension of 24" or larger, minimum one cam on doors with no dimension larger than 18" and two or more cams on larger access doors.
3. Milcor Style M or MS - Flush drywall, masonry or tile type made similar to Style DW except with 14 gauge steel frame and doors (16 gauge when made of stainless steel-satin finish), one hinge on access doors up to 18" x 18" in size, two hinges on sizes 20" x 24" and 22" x 22", three or more hinges on sizes 24" x 24" and larger, and the number of cams as standard with the manufacturer.
4. Provide other types of access doors suitable for the application to include surface mount, double leaf for access doors exceeding 36" in any dimension, louvered where indicated on the Drawings, fire rated, recessed or security/detention types as required and compatible with the surface penetrated.

PART 3 - EXECUTION

3.1 PIPING - GENERAL

- A. Where special classes of piping are involved and are not listed, the Contractor shall request instructions from the Owner's Representative as to the class of material involved and the method of fabricating it before ordering any material. All steel lines 2-1/2" and larger shall be assembled by welding. All steel lines 2" and smaller may be assembled either by welding or by screwed fittings as specified.
- B. Welding shall be done by mechanics who satisfy qualification requirements of the American Welding Society. The pipe ends to be welded shall be machine beveled wherever possible. Gas cuts shall be true and free from all burned metal. Before welding, surfaces shall be thoroughly cleaned. The piping shall be carefully aligned and no metal shall project within the pipe. Fully ream, to the full inside pipe diameter dimensions, the inside of all piping to be welded. Miter joints will not be allowed in any case. All headers, connections, elbows, reducers, flanges, and special flanges and special fittings shall be made using forged steel welding fittings of the same weight as the pipe to which they are attached. All unions and connections to valves 2-1/2" and larger shall be made by the use of welded flanges.
- C. Branches in lines where the branch side is equal to 2/3 of the size of the main or smaller may be connected by using Weldolets or Threadolets; where the sizes are greater than 2/3 of the main, standard weight seamless tees as manufactured by Tube-Turns or Grinnell, A.S.T.M. Standard A-234 shall be used.
- D. The location, direction, and size of all lines are generally indicated on the drawings. Branch connections in general are indicated and shall be so installed as to provide proper grades.
- E. All lines shall be made up straight and true at proper grades. All water filled and condensate drain lines shall grade down to drains.
- F. Piping shall follow as closely as possible the routes shown on the plans and take into consideration conditions to be met at the site. Should any unforeseen conditions arise, lines shall be changed or rerouted as required after proper approval has been obtained.
- G. All piping shall be installed with due regard to expansion and contraction and so as to prevent excessive strain and stress in the piping, in connections, and in equipment to which the lines are connected.
- H. All headers shall be assembled as indicated using welding fittings throughout.

- I. All screw joints shall be made with taper threads, properly cut. Joints shall be made tight with graphite and oil applied to the pipe threads only and not to the fittings.
- J. Dielectric couplings shall be installed where ferrous pipe joins copper lines and shall be rated for the intended medium pressure and temperature or service.
- K. Provide and install unions at proper points to permit removal of pipe and various equipment and machinery items without injury to other parts of systems. No unions will be required in welded lines or lines assembled with solder joint fittings except at equipment items or coils, machinery items and other special pieces of apparatus. Unions in 2" and smaller lines shall be ground joint and unions 2-1/2" and larger shall be flanged unions. Unions shall be the same material and strength as other fittings in the lines. Companion flanges on lines at various items of equipment, machines, and pieces of apparatus shall serve as unions to permit removal of the particular item.
- L. All piping shall be supported by hangers independently of equipment connections. The weight of the piping and its contents shall not be imposed on the equipment in any way.
- M. Mitering of pipe to form elbows, notching of straight runs to form tees, or any similar construction will not be permitted.
- N. Swing joints or expansion loops shall be provided wherever shown on the Drawings or wherever else necessary to allow for the expansion and contraction of piping. This shall be accomplished in an approved manner and this Contractor shall be responsible for any damage which may occur as a result of expansion and contraction of his piping.
- O. Nipples shall be of the same size and material as the piping in the system in which the nipples are installed, except that "close", or "all thread" nipples shall not be used.
- P. Keep all open ends of piping in each system plugged or capped to prevent dirt or other debris from entering the pipe at any and all times during construction and before fixtures or equipment is connected. All piping shall be flushed clear prior to connection to the central building systems.
- Q. The ends of all piping furnished and installed in all systems shall be thoroughly reamed to the full inside diameter of the respective pipe.
- R. Exposed and concealed lines shall be run parallel with, and perpendicular to building lines and wherever possible shall be grouped together for easy service and identification. Whenever possible, horizontal and vertical runs shall be held as close as possible to the walls, ceilings, struts, members, etc., so as to occupy the minimum space consistent with the proper installation requirements for insulation, conduit, ductwork, lighting fixtures, etc., and the expansion requirements of each of these items and the building proper or the removal of the respective or adjacent pipes, conduits, and ductwork, and to allow for necessary access to valves, other pipes, conduits, dampers, etc.

3.2 CROSS CONNECTION AND INTERCONNECTIONS

- A. No plumbing fixtures, device, or piping shall be installed which will provide a cross connection or interconnection between a distributing water supply for drinking or domestic purposes and a polluted supply such as drainage system, or a soil or waste pipe which will permit or make possible the backflow of sewage, polluted water, or waste into the water supply system.

3.3 FLASHINGS

- A. Flash around all pipes passing through the roof with sheet lead, built a minimum of 10" into the roofing, in all directions from the outside of the pipe running up the pipe a minimum of 10" and more where vent terminals must be higher to conform to the requirements of the local Plumbing Code in effect, and then turned over one inch (1") into the pipe cavity. All seams and joints shall be completely soldered closed and the entire flashing shall be completely waterproof.

- B. Make all roof penetrations in accordance with the roofing system manufacturers approved methods.

3.4 PIPE INSULATION INSERTS AND SHIELDS

- A. Provide a section of Foamglas insulation, calcium silicate, or urethane of thickness specified at hanger support locations and provide No. 16 gauge galvanized steel protection shield minimum 12" long. Shield shall be full half cylinders equal to Grinnell Fig. 167.
- B. Refer to Section 23 07 00, Insulation.

3.5 SAFETY GUARDS

- A. Furnish and install all safety guards required in order to obtain certificates of inspection from all authorities having jurisdiction.
- B. All belt driven equipment, projecting shafts and other rotating parts shall be enclosed or adequately guarded.

3.6 TESTING AND REPAIRING

- A. During the progress of each portion of the work or upon its completion, make such tests of this work as herein specified, or as required by the Architect, or by State or Municipal Bureaus having jurisdiction and under their supervision.
- B. Provide all apparatus, temporary piping connections, or any other requirements necessary for such tests. Take all due precautions to prevent damage to the building and its contents incurred by such tests as will be required to repair and make good, at no cost to the Owner, any damage so caused. Testing of piping to be insulated shall be done before insulation is applied.
- C. Perform any other tests as may be required by the Owner's Representative to indicate the fulfillment of specification requirements.
- D. All water piping shall be hydrostatically tested to a pressure of 150 psig or to 1-1/2 times the operating pressure, whichever is the greatest, for six (6) hours.
- E. Systems shall be tested in portions as required by the construction schedule and the portions being tested shall be effectively isolated and sealed off. When previously tested sections are connected into other sections, tests shall be rerun to include the new connections.
- F. Partial systems shall be tested prior to connecting into existing lines.
- G. Leaks in screwed joints shall be repaired by tightening the joint until the leak has stopped, or by remaking the joint if tightening fails to stop the leak. Leaks in welded joints shall be repaired by chipping out the weld around the leak and rewelding until it is stopped. Leaks in caulked joints shall be completely stopped by additional caulking of the joint, but, if that fails, the joint shall be re-made. A leak in a compression joint shall be repaired by remaking the joint using a new seal, compression ring, coupling, etc., as required. Leaks in soldered joints shall be repaired by remaking the joint and no soldering or brazing over existing joints will be permitted. Any defective piping shall be replaced.
- H. Additional testing shall be as specified in the individual Sections of these Specifications.
- I. During testing and cleaning of piping systems, use a fine mesh, 20 mesh or smaller, start-up strainer screen for all strainer pipe sizes. After piping system is cleaned each strainer shall be taken apart, cleaned, and final strainer mesh shall be placed back in strainer for normal operating conditions.

3.7 SEALING PENETRATIONS

- A. Seal all pipe and duct penetrations through walls run to structure, ceilings, floors and roofs. Fill the annular space between the insulation on the pipe, or the pipe only where uninsulated, or duct and its sleeve, with neoprene or non-hardening sealant.
- B. No pipe or duct shall be allowed to contact its surrounding sleeve or the wall, floor, or ceiling. Effective isolation shall be provided as described in Section 23 05 48 to the end that no vibration or direct noise transmission shall be transmitted. Vibration transmission limits shall be as established in Section 23 05 48. Use special materials as may be required to comply.
- C. Firestop pipe and duct floor and wall penetrations.

3.8 PAINTING

- A. All equipment specified in Division 23 shall be delivered to the site with suitable factory finishes as specified elsewhere herein.
- B. Items with factory applied finishes shall be protected during installation and other construction work. Damaged factory applied finishes shall be refinished to match the original finish appearance.
- C. Field painting of items specified and installed in Division 23 shall be as specified in Section 09 9000.
- D. All ferrous metals that are not galvanized or made of a corrosion resistant alloy shall be painted. This shall include steel pipe hangars, trapeze supports, pipe stands, all thread hangar rods and other miscellaneous systems.

END OF SECTION

SECTION 23 23 00
REFRIGERANT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Comply with Division 1 - General Requirements and referenced documents.
- B. Comply with all other Division 23 Sections, as applicable. Refer to other divisions for coordination of work with other portions of Work.

1.2 SYSTEM DESCRIPTION

- A. Furnish and install all refrigerant piping of every kind required, specified, or shown on the Drawings for the installation of the work specified in Division 23. The location, direction, and size of the various lines are indicated on the Drawings. Lines for pilot and controls and instrumentation are not shown but shall be installed as required and as specified.
- B. Piping systems shall include all appurtenances shown on the drawings and specified herein.
- C. Valves or cocks shall be installed to control the flow of refrigerant to each of the various systems, to segregate individual items of equipment, and to permit ease of installation and servicing as directed on the Drawings and specified.
- D. The work shall include the furnishing and installing of all supporting structures and members for pipes and equipment.
- E. Support devices and members shall include vibration and noise isolating devices and assemblies. Penetrations of walls to structure shall be sealed off to limit noise transmission through sleeves.

1.3 QUALITY ASSURANCE

- A. All equipment and materials shall be new and of the best quality.
- B. All equipment and materials shall be installed by experienced mechanics certified and trained for the work performed.

1.4 SUBMITTALS

- A. Product Data: Submit complete manufacturer's descriptive literature and installation instructions in accordance with Section 01 33 00 for all piping materials to be used for each system, valves and refrigerant specialties as specified herein.
- B. Shop Drawings: Submit in accordance with Sections 01 33 00 and 23 05 00. Submit 1/4" = 1'-0" Scale Refrigerant Piping Shop Drawings. These shop drawings may be inclusive with other piping or ductwork shop drawings.

1.5 PRODUCT HANDLING

- A. Cover and protect material in transit and at site. Material not properly protected and stored and which is damaged or defaced during construction shall and will be rejected.

- B. Storage and protection of materials shall be in accordance with Section 23 05 00.
- C. Take special precautions to piping and special internals from construction dirt and debris. If valves are stored on site cover valve openings until just prior to installation but in no case shall valves be unprotected for more than 48 hours.
- D. Openings in piping system, coil headers, valves and other heat exchangers shall be covered during the construction period to protect the interior accumulation of dirt and debris in these systems until immediately prior to connection to these components to similarly protected systems.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. In general, the materials indicated herein shall be used in fabricating the refrigerant piping systems. Where special classes of piping are involved and are not indicated, the Contractor shall request instructions as to the class of material involved and the method of fabricating it before ordering the materials.
- B. Piping shall be Type L, ACR cleaned and capped, copper. All fittings shall be long radius elbows and standard tees.
- C. Only "Silfos" solder joints shall be used for fitting fabrication.
- D. Miscellaneous Lines: Pilot, bleed, control, sampling, and equalizing lines, and similar auxiliary lines shall be fabricated of the material used in the system to which they are connected in each case.
- E. Miscellaneous Fittings: Provide all reducers, increasers, adapters, bushings, etc., as required to properly inter-connect the various items, to change sizes, etc. Copper and red brass fittings shall be used in copper lines.
- F. Fittings for copper tubing shall be Chase Sweat Fittings or Mueller Brass Company's "Streamline" solder fittings. All piping shall be installed according to the manufacturer's instructions. All joints shall be thoroughly cleaned before connecting. Silfos solder shall be used on all refrigerant piping.

PART 3 - EXECUTION

3.1 DELIVERY AND PROTECTION

- A. Deliver all piping and appurtenances to each site. All components shall be handled carefully to avoid damage and be protected from exposure to the weather and dirt. All items shall be examined upon delivery to the site and evidence of abuse, damage, or exposure to weather and dirt shall be grounds for refusal to accept individual pieces. Rejected items shall be replaced promptly at no cost.
- B. During construction, take all steps necessary to protect piping and accessories from damage or vandalism. All damage or vandalism shall be repaired at no cost to the Owner.

3.2 CONDENSING UNIT INSTALLATION

- A. Install condensing units level on roof supports where shown with vibration isolation as specified in Section 23 05 48.
- B. Route refrigerant piping and make connections to DX coils as recommended by the unit manufacturer and as required to meet the capacity control requirements specified.

- C. Furnish and install, if not specified to be factory assembled, all refrigerant piping specialties including, but not limited to, thermal expansion valves, sight glasses, solenoid valves, accumulators, hot gas bypass components, hot gas mufflers, and filter dryers.
- D. Charge all refrigerant piping systems and equipment to maintain a fully operating refrigerant charge.
- E. Pipe refrigerant relief piping to the outdoors or as otherwise required by the local authorities having jurisdiction and the manufacturer.

3.3 REFRIGERATION PIPING

- A. Piping shall be Type "L" copper. ACR cleaned and capped. All fittings shall be cleaned and degreased before use.
- B. Flow inert gases such as dry nitrogen through the piping while heating pipe or fittings for joining. Install liquid line drier and sight glass near condensing unit.
- C. Leak testings: After the system is installed and before any piping is insulated. The entire refrigeration circuits must be thoroughly leak tested. The following test procedure is recommended:
 - 1. Remove and plug the connection points of any controls or relief valves that could be damaged by test pressure.
 - 2. Connect a cylinder of oil-pumped, dry nitrogen to the front seat port of the compressor discharge valve or at the liquid line charging valve.
 - 3. Test at 150 psig or the leak test pressure specified by local code.
 - 4. Tap each solder connection sufficiently hard to start any leak that might subsequently open from thermal expansion and contraction or vibration.
 - 5. Test all pipe joints for leaks. Brush each connection with a soap solution and watch for bubbles.
 - 6. After leak test, charge enough refrigerant through the liquid line charging valve to raise the system pressure to approximately 10 psig. Remove the refrigerant connection and charge enough nitrogen into the system to raise the test pressure to 150 psig or the local code requirement.
 - 7. Check all parts of the system with a halide torch, or electronic leak detector.
- D. Evacuation:
 - 1. Connect the vacuum pump to as many points of the system as possible. Vacuum gauge, a Zimmerli Gauge, or an electronic vacuum gauge, shall be connected to the liquid line charging valve. Open compressor valves. Open the liquid line charging valve.
 - 2. Operate vacuum pump until a vacuum equivalent to 500 microns is registered by the vacuum gauge.
 - 3. When the system has been evacuated, charge enough oil-pumped dry nitrogen into the system to raise the pressure to atmospheric. Re-evacuate the system.
 - 4. After the 500 micron vacuum reading has been re-established, stop the system and allow it to stand under vacuum for a minimum of 12 hours. If the vacuum reading remains unchanged, the system is ready to receive its charge of refrigerant.
- E. Charging:
 - 1. Charge the system with new, clean oil and refrigerant of the proper type.
 - 2. Charge until the sight glass is bubble free.
 - 3. Check charge level after system has operated for 24 hours in warm weather. Add oil and refrigerant as needed under these conditions.

END OF SECTION

SECTION 23 30 00

HVAC AIR DISTRIBUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Comply with Division 1 - General Requirements and referenced documents.
- B. Comply with all other Division 23 Sections as applicable. Refer to other Divisions for coordination of work with other portions of work.

1.2 SYSTEM DESCRIPTION

- A. The scope shall include the furnishing and installation of all ductwork as shown on the Drawings; acoustical and thermal linings; flexible ducts and connections; combination smoke and fire dampers, smoke dampers, and fire dampers; duct access doors; air diffusers, grilles and registers; air volume control devices; hangers and supports; plenums and casings; turning vanes; air filters; installation of temperature control dampers, and other appurtenances necessary for a complete and operational system.
- B. All work shall be preceded by taking measurements at the job site, fully coordinating all work with other trades, verifying available spaces for ductwork, and developing Shop Drawings illustrating such.

1.3 QUALITY ASSURANCE

- A. All equipment and materials shall be new and of the quality as specified herein. All work shall comply with the most recent Local Building Code, Mechanical Code, Fire Code, and all other applicable National, State and Local Codes or ordinances.
- B. All equipment and materials shall be installed in a workmanlike manner by trained and experienced sheet metal technicians and mechanics as recommended by the manufacturers of the products installed.
- C. Where the standards and requirements of this specification exceed those of the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) the requirements herein shall govern. As a minimum all ductwork shall be constructed to meet all functional criteria defined in Section 11 of the 2005 SMACNA "HVAC Duct Construction Standards, Metal and Flexible," Third Edition. However, all ductwork shall comply with all code requirements noted above to include meeting deflection limits established in the local Mechanical code.
- D. The work shall be guaranteed for a period of one (1) year from and after the date of acceptance of the job, "Substantial Completion", against noise, chatter, whistling, or vibration, and free from pulsation under all conditions of operation. After the system is in operation, should these defects occur, they shall either be removed and replaced or reinforced as directed by the Owner's Representative.
- E. Air quantities shown on the Drawings, or specified, are based on air at 75 Deg.F. dry bulb, 50 percent relative humidity, and 29.92 inches H.G. barometric pressure.
- F. Except where specified otherwise, all sheet metal used shall be constructed from prime galvanized steel sheets or coils up to 60 inches in width. Each sheet shall be stenciled with manufacturer's name and gauge. Coils of sheet steel shall be stenciled throughout on 10 foot centers (fabricate with stencils to the outside of the ductwork so they are visible when installed) with manufacturer's name and gauge tolerances in inches:

Gauge No.	Nominal Thickness	Minimum Thickness
26	0.0217	0.0187
24	0.0276	0.0236
22	0.0336	0.0296
20	0.0396	0.0356
18	0.0516	0.0466

- G. Contractor shall comply with this specification section in its entirety. If during a field observation, the engineer of record finds changes have been made without prior written approval, the contractor shall make the applicable changes to comply with this specification at the contractor's expense.
- H. At the discretion of the Engineer of Record, sheet metal gauges and reinforcing may be randomly checked to verify all duct construction is in compliance with this is specification section.
- I. All ductwork and fittings shall have a computer generated label affixed to each section detailing all applicable information including the duct dimensions, gage, reinforcement type/class, and connector type of the systems manufacturer. In addition, galvanizing thickness and country of origin shall be clearly stenciled on each duct section.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's descriptive literature and installation instructions in all items specified herein in accordance with Section 23 05 00.
- B. Shop Drawings shall be submitted on all items of sheet metal work specified herein. Shop drawings of ductwork shall be submitted at a minimum scale of 1/4" equal to one foot except that the Congested Areas and all Air Handling Unit Mechanical Rooms shall be submitted at a minimum scale of 1/2" = 1'-0". Provide sections for all Congested Areas and Mechanical Room Plans.
- C. Shop Drawings shall include the reflected ceiling plan, screened back, overlaid onto the floor plan indicating the proposed installation of all light fixtures; ductwork layout; duct fittings; duct connection details; offsets; bottom of duct elevations; all sheet metal dimensions (sizes); overall air device sizes, air device neck sizes, air device air flow quantities, and device type; duct pressure classifications; all mechanical piping; any conflicts discovered and unresolved through the use of transitions and offsets in the available space; turning vanes; manual volume dampers; automatic control dampers; smoke and fire dampers; duct access doors; flexible connections; and all mechanical fans and equipment.
- D. Sheet metal shop drawings shall be overlaid on piping shop drawings and other shop drawings for other portions of work specified in other sections of these specifications for complete coordination of all work prior to commencing with any installation. These Shop Drawings shall not be prepared directly on the Shop Drawings of other trades; they will be separate from all other shop drawings. Coordination Drawings shall be prepared in accordance with Specification Sections 01 33 23.
- E. Shop Drawings shall be based on actual field measurements taken at the job site and shall take into consideration all obstacles and be fully coordinated with all piping, conduits, structure, equipment, and general construction features.
- F. Shop Drawings shall be generated by a computer aided design and drafting (CADD) system as a CADD drawing. CADD files with Architectural Backgrounds and Mechanical design drawing files will only be provided when requested, if this privilege has not been previously abused, after a Release of Liability Form has been completed.

- G. Include a brochure, with individually assembled cut sheets, and details of all sheet metal fittings, duct construction standards proposed for each system, air volume control devices, and other accessories proposed to be used for job duct construction standards. This shall be done prior to submission or preparation of any sheet metal shop drawings.
- H. Should any ductwork installation commence without approved ductwork shop drawings or written approval by the Engineer of Record, the Contractor assumes all liability, to include all costs, in revising any portion of the sheet metal work that is deemed unacceptable by the Owner's Representative to include any conflicts discovered in installation that could have been resolved through the Shop Drawing process.

1.5 GUARANTEE

- A. The work shall be guaranteed for a period of one (1) year from and after the date of acceptance of the job, "Substantial Completion", against noise, chatter, whistling, or vibration, and be free from pulsation under all conditions of operation. This guarantee shall include defects in material, equipment and workmanship.
- B. After the system is in operation, should these defects occur, they shall either be removed and replaced or reinforced as directed by the Owner's Representative. This shall include repair of damages to building materials related to these deficiencies.

1.6 PRODUCT HANDLING

- A. Cover and protect material in transit and at site. Material not properly protected and stored, which has been damaged or defaced, or which has gotten wet during storage or construction shall be rejected.
- B. Prior to ductwork being installed the roof system, or floor above the ductwork, must be sufficiently installed to protect ductwork from rain water entering ductwork. If the building is not dried-in and walls, windows, etc., are not completed, then cover all openings in ducts with securely fastened heavy duty, minimum three (3) mil thick, plastic to protect from rain damage.
- C. Storage and protection of materials shall be in accordance with Section 23 05 00.

PART 2 - PRODUCTS

2.1 DUCTWORK

- A. General:
 - 1. All ductwork shown on the Drawings, specified or required for the heating, ventilating, and air conditioning systems, shall be constructed and erected in a first-class workmanlike manner by trained and skilled sheet metal workers.
 - 2. All ducts shall be erected in the general locations shown on the Drawings, but must conform to all structural and finish conditions of the building. Before fabricating any ductwork, Contractor shall check the physical conditions of the job site, and shall make all necessary changes in cross sections, offsets, etc., whether they are specifically indicated or not.
 - 3. Before starting shop drawings or fabrication of any ductwork, the Contractor must have an approved reflected ceiling plan with which he can coordinate location of air outlets, lights, tile patterns, etc.
 - 4. The sizes of ducts indicated on the Drawings are the required net internal air stream dimensions, and where ducts are lined, the sheet metal sizes shall be increased three inches (3") in both dimensions to accommodate the linings (1-1/2" thick lining, unless indicated otherwise). Assume all rectangular ducts are lined unless noted otherwise.
 - 5. Ductwork shall be classified, for construction standards, as follows:
 - a. All exhaust ductwork, except grease or other special exhaust systems specified elsewhere herein, all constant volume ductwork (supply and return) served by packaged rooftop units, split direct expansion (supply, return and outside air) A/C units, fan coil units, ground source heat pump units, and all transfer air ducts shall be constructed to meet one inch (1") W.G. standards.

6. Except as noted otherwise, ducts, plenums, and casings shall be constructed of new lock forming quality galvanized prime grade steel sheets. The gauges of metal to be used, duct construction details, and the construction and bracing of joints shall be in accordance with the latest edition of the published standards of the ASHRAE Handbook or in accordance with the latest editions of Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) "Duct Construction Standards Manual, Metal and Flexible".
7. Plenum chambers shall be constructed of 18 gauge sheets thoroughly braced with 1-1/2 inch angle irons. All duct panels in rectangular galvanized steel ducts which are 12 inches and wider and which are not lined shall be cross broken.
8. Make square elbows where shown or required, with factory fabricated double thickness turning vanes. Job fabricated vanes will not be acceptable. Except as otherwise specified or indicated on the drawings, make all other changes in direction with rounded elbows having a centerline radius equal to 1-1/2 times the width of the duct in the plane of the bend.
9. Make transformations in duct shape or dimension with gradual slopes on all sides. Normally, make increases in dimension in the direction of air flow, with a maximum slope of one inch (1") in seven inches (7") on any side. Where conditions prevent the normal slope specified above, a maximum slope of one inch (1") in four inches (4") will be allowed only where conditions necessitate.
10. Where a transition must be made with less slope than that noted above, install single thickness guide vanes to insure proper air flow, and to minimize air pressure drop. Transitions that require less slope than that noted above shall be noted on Shop Drawings, and require review and approval by the Engineer prior to installation.
11. Ducts shall be routed in conjunction with all types of pipes, electrical conduits, ceiling hangers, etc., so as to avoid interferences insofar as possible. When duct penetrations are unavoidable, provide streamline-shaped sleeves around such material penetrations, made airtight at duct surfaces, except that such sleeves are not required at tie rods. When the Contractor believes such penetrations are unavoidable, notify the Owner's Representative for approval prior to commencing with such work. Otherwise all such penetrations are not expected to occur and are not allowed. Such penetrations will not be allowed for the convenience of, or lack of coordination by, the Contractor. Where obstructions necessitate, are approved by the Owner's Representative, and are of a size exceeding 10% of the total duct area, the duct shall be transformed to maintain the same original duct area.
12. Where each duct passes through a fan room wall, it shall be wrapped with not less than 1/2" thick closed cell neoprene tightly fitted to the outer surface of the duct all around and sealed. In lieu of this method, completely fill the annular space between the duct and penetration by packing with fibrous insulation and seal the perimeter of the penetration around the duct, on both sides of the penetration, with a flexible non-hardening sealant, to be fire rated when applicable.
13. All outlets or grilles in ceilings shall be supported rigidly from ceiling construction with suitable adapters or bucks installed as necessary and as shown to insure outlets and grilles will be accurately trued up with ceiling.
14. Ductwork shall be fabricated in a manner to prevent the seam or joints being cut for the installation of grilles or diffusers.
15. All sheet metal ductwork shall be securely hung from the building construction. All ducts shall be hung adjacent to the seam in the duct and shall be secured in a suitable manner to both the duct and the building construction. All vertical riser ducts shall be supported at each floor with angle iron secured to the ducts and set on the structure members. These angles shall be the same size as specified for bracing.
16. All holes in ducts for damper rods and other necessary devices shall be either drilled or machine punched (not pin punched), and shall not be any larger than necessary. All duct openings shall be provided with sheet metal caps if the openings are to be left unconnected for any length of time. All panels of uninsulated ducts twelve inches (12") and larger shall be cross broken. In general, sheet metal screws shall not be used in duct construction unless the point of the screw is in the air stream unless specifically indicated otherwise elsewhere herein.
17. Manual dampers shall be installed as shown on the Drawings and as required to afford complete control of the air flow in the various duct systems. In rectangular supply ducts, a splitter damper shall be installed at each point where a branch is taken off and additional volume dampers shall be installed where shown or required to achieve the final air balance. No splitter dampers shall be installed in medium pressure ductwork, unless specifically shown on Drawings.

18. Splitter dampers and volume dampers of the "butterfly" type, installed in rectangular ducts, shall be constructed of 16 gauge galvanized steel riveted or welded to square operating rods. Dampers shall have brass, bronze, or approved plastic bearings. The length of any splitter damper blade shall be 1-1/2 times the width of the smaller split in the duct, but shall be not less than twelve inches (12"). Where splitter dampers exceed 12 inches in height two (2) pull rods shall be used. Splitter dampers 12 inches (12") in height or less shall have one (1) pull rod.
19. Butterfly damper blades in round ducts shall be the full width of the duct in which they are installed. Dampers shall be constructed of a minimum 22 gauge metal. Dampers over twelve inches (12") in diameter shall be constructed of 20 gauge metal, have a continuous rod with end bearings opposite the damper handle, and a quadrant type locking handle.
20. The operating rods of all dampers shall be fitted with Young Regulators and the operating head shall be securely fastened in place so as to be accessible in the finished building unless shown otherwise. Operators shall be attached to duct where regulator occurs above a lay-in ceiling. Use a Ventlok No. 555 locking quadrant on accessible concealed splitter dampers. Where locking quadrants are installed on externally insulated ductwork a hat channel extension shall be used to match the same height as the insulation thickness. Where dampers occur above or behind plaster or other inaccessible ceilings, walls, chases or furrings, the regulator shall be the concealed type with adjustable cover plate equal to Young Regulator Company Type 315 with maximum 2-1/2" diameter cover plate and required accessories. Young Regulator bearings shall also be provided on the opposite end of each operating rod.
21. Behind each ceiling supply outlet, provide and install a turning vane or approved equalizing grid, where noted or scheduled. Where adjustable air pick-ups are indicated at points branch ducts meet trunk ducts, they shall be Titus AG-45 or approved equal with operator adjustable from the duct exterior.
22. Rectangular opposed blade volume dampers shall be as manufactured by American Warming and Ventilating or Ruskin. Blades shall not exceed 48 inches in length or twelve inches (12") in width, and shall be the opposed interlocking blade type. The blades shall be of not less than No. 16 gauge steel supported on one-half inch (1/2") diameter rustproofed axles. Axle bearings shall be the self-lubricating ferrule type.

B. Low Pressure Ductwork:

1. Rectangular low pressure ducts, systems designated to be operating at up to two (2) inches W.G., shall be constructed of the following medium gauges:

Largest Dimension of Duct	U.S. Gauge of Metal	Maximum Reinforcement Spacing
Up to 26"	26	5'-0"
27" to 42"	24	4'-0"
43" to 48"	22	4'-0"
49" to 60"	20	4'-0"
61" to 84"	18	4'-0"
85" to 96"	18	3'-0"
97" and Over	18	2'-6"

- C. The above rectangular ducts shall be constructed in accordance with Section 1 the latest edition of the "Duct Manual" published by the Sheet Metal and Air Conditioning Contractors National Association. However, the gauge thickness of the ductwork shall meet that as scheduled above.

1. Rectangular low pressure ducts, for systems designated to be operating at up to one (1) inches W.G., shall be constructed of the following medium gauges:

Largest Dimension of Duct	U.S. Gauge of Metal	Maximum Reinforcement Spacing
Up to 36"	26	5'-0"
37" to 48"	24	5'-0"
49" to 60"	24	4'-0"
61" to 72"	22	4'-0"
73" to 84"	20	4'-0"
85" to 96"	18	4'-0"
Over 96"	18	2'-6"

2. The above rectangular ducts shall be constructed in accordance with Section 1 the latest edition of the "Duct Manual" published by the Sheet Metal and Air Conditioning Contractors National Association. However, the gauge thickness of the ductwork shall meet that as scheduled above.
3. Round low pressure ducts shall be spiral wound as manufactured by United Sheet Metal Company or have grooved seams with flat snaplock longitudinal seams. Spiral seam round duct gauge thicknesses shall be that standard by the manufacturer for the pressure rating of the system. Gauges for snaplock shop fabricated ducts shall be as follows, without exception:

Largest Dimension of Duct	Gauge of Metal	Gauge of Longitudinal Seams and Fittings
Up thru 8" in Diameter	26	26
9" to 14"	26	24
15" to 26"	24	22
27" to 36"	22	20
37" to 50"	20	18
51" to 60"	18	16

4. Elbows shall have a centerline radius of 1-1/2 times duct diameter or width and for round ducts may be smooth elbows or 5 piece 90 degree elbows and 3 piece 45 degree elbows. Joints of round ducts shall be slip type with a minimum of three (3) sheet metal screws.
5. All low pressure ductwork shall be externally sealed using water based products to include, United McGill Corporation United Duct Sealer, Hardcast "Iron-Grip 601", Childers CP-146, Foster 32-18 or Polymer Adhesive Sealant Systems, Inc. "Air Seal No. 11" duct sealer installed in the joints after closure. All sealants shall be U.L. rated for the application. Seal all external transverse joints, longitudinal seams, and all fitting connections externally to include sealing all duct work accessories, connections to accessories and duct and accessory penetrations (tubes, rods, wires, etc.). Do not seal control rods for actuated dampers and fasteners. Each system shall meet a seal class of "A".
6. Low Pressure Duct Supports:
 - a. All horizontal ducts up to and including 40 inches in their greater dimension shall be supported by means of No. 18 U.S. gauge band iron hangers attached to the ducts by means of screws, rivets or clamps, and fastened above to inserts, toggle bolts, beam clamps or other approved means. Duct shall have at least one pair of supports 8'-0" on centers. Clamps shall be used to fasten hangers to reinforcing on sealed ducts.
 - b. Horizontal ducts larger than 40 inches in their greatest dimension shall be supported by means of hanger rods bolted to angle iron trapeze hangers. Duct shall have at least one pair of supports 8'-0" on centers according to the following:

Angle Length	Angle	Rod Diameter
4'-0"	1-1/2" x 1-1/2" x 1/8"	1/4"
6'-0"	1-1/2" x 1-1/2" x 1/8"	1/4"
8'-0"	2" x 2" x 1/8"	5/16"
10'-0"	3" x 3" x 1/8"	3/8"

- c. Vertical ducts shall be supported where they pass through the floor line with 1-1/2" X 1-1/2" X 1/4" angles for ducts up to 60". Above 60" the angles must be increased in strength and sized on an individual basis considering space requirements.
 - 7. All low pressure ductwork shall be reinforced to maintain a maximum reinforcement spacing as scheduled with the rigidity classification as needed to meet the specification construction standard. Reinforcement spacing shall be reduced as required to meet the construction standard specified using the gauge thickness scheduled.
- D. Round Flexible Insulated Ductwork:
- 1. All round flexible insulated ducts, low and high pressure type, shall be factory fabricated and insulated as manufactured by Thermaflex or Flexmaster USA, Inc. Flexible ducts shall be equal to Thermaflex factory insulated type "M-KC" or Flexmaster "Type 3M".
 - 2. Flexible duct thermal conductance shall be based on a 75 Deg. F. mean temperature and an aged condition (not out of the box value). Flexible duct insulation shall be a minimum nominal two inches (2.0") in thickness with a minimum 0.75 lb. density. The completed duct assembly shall have a minimum R-value of 6.0. To verify compliance with the Energy Conservation Code in effect, the minimum R-value of 6.0 will need to be documented on the outside of the jacket to allow field verification of compliance with this requirement.
 - 3. The core liner of the flexible duct system shall be a tri-laminate aluminum foil, made with fiberglass and aluminized polyester, or a PVC coated fiberglass cloth. The outer liner shall be a polyester reinforced aluminized foil jacket.
 - 4. Flexible ducts shall be U.L. Listed in accordance with U.L. 181 as a Class I insulated air duct, and shall comply with NFPA Standard 90A and 90B. Flexible ducts shall have a maximum flame spread of 25 and maximum smoke developed rating of 50.
 - 5. Flexible ducts shall be suitable for operating temperatures of -20 up to 250 Deg. F.
 - 6. Flexible ducts shall be suitable for negative pressures of minus one inch W.G. in sizes up to 16" in diameter; and positive pressures up to 10 inches W.G. for sizes up to 16" in diameter. Maximum operating duct velocity rating shall be a minimum of 4,500-5,500 feet per minute.
 - 7. Maximum vapor transmission rating shall be 0.05 Perms as rated in accordance with ASTM-E-96.
 - 8. Unless otherwise noted, the maximum length of flexible duct shall be limited to five feet (5').
 - 9. Securement of flexible ducts to air devices shall consist of sliding the duct onto the air device collar or connector and securing it with plenum rated nylon or teflon panduit band on the inner liner which shall be U.L. rated for the application. Fold insulated outer vapor barrier jacket liner over the first band and secure with a second plenum rated panduit band. Make connection vapor tight with a vapor barrier seal using polyester reinforced aluminized duct tape that is two inches (2") wide, wrapped 2 times around the duct, or by the use of a fiberglass mesh wrapped in a similar fashion and coated with a vapor barrier coating, Foster's Vapor Safe 95-90 or 95-96 mastic or Childers CP-38. Coating must adhere to MIL-PRF-19565C with a permeance rating of less than 0.02 perms per ASTM-E-96, procedure B. No cloth backed duct tape is allowed. All fasteners, adhesives, and duct tape used shall be U.L. rated for the application. All duct tapes used shall be acrylic based.

2.2 FIRE, SMOKE, AND COMBINATION SMOKE-FIRE DAMPERS

- A. Contractor shall furnish and install fire, smoke, and combination smoke-fire dampers in air passages, openings, and ductwork wherever shown on the Drawings, and as required by the local authorities having jurisdiction. Installations shall be in accordance with all applicable NFPA standards and the SMACNA Duct Manual. All dampers shall carry the U.L. Label and shall be installed such as to conform to conditions under which the U.L. Label was granted. All dampers shall be constructed and tested in accordance with the latest edition of U.L. Safety Standards 555 or 555S, as applicable. Provide sleeves, typically 12" in length minimum, for all dampers as required for the installation conditions encountered.

- B. Fire dampers shall be constructed in accordance with the recommendations of the NFPA and shall be of metal gauges required by the class of separation in each case.
1. Interlocking curtain blade type fire dampers carrying the Underwriters' Label will be acceptable, except at locations where an operating type damper is required to meet local requirements, to meet sequence of operations indicated in Temperature Control Specifications, Section 23 0900, or to meet the limited spaces available.
 2. Use Style "B" rectangular and style "CR" for round dampers such that blades are out of the air stream.
 3. For grille installations at fire rated partitions, use Style "B" thin line fire dampers or Style "G" integral sleeve type for grilles.
- C. Smoke dampers shall be designed for vertical or horizontal applications as encountered in accordance with NFPA 90A and meet the latest requirements of UL 555 S. Smoke dampers shall be installed in, or adjacent to, the smoke barrier; but in no case, more than 24 inches from the smoke barrier. Smoke dampers shall be a Ruskin Model SD35, 36, 37, or SDRS25 as applicable for the application. Frames shall be made of 16 gauge single piece galvanized steel hat shaped channel frames. Blades shall be 6" wide galvanized steel and be the triple V-groove or air foil type. Provide stainless steel jamb seals, silicone edge type blade seals where required for the classification, stainless steel sleeve bearings and linkages concealed in the frame. Leakage Class shall be Class 1, 2, or 3, as required, to meet the requirements specified elsewhere herein. Provide compatible electric actuator on all dampers, factory installed.
- D. Combination fire-smoke dampers shall be Leakage Class 1 dampers with electric, manually resettable, fuse link operated by 120 volt electric actuator furnished with the damper. Fire-smoke dampers shall be Ruskin FSD-60, or equal, with minimum 16 gauge galvanized steel hat channel shaped frames. Fire-smoke dampers shall be increased in size to maintain a minimum of 90 percent free area of the ductwork size indicated on the Drawings thru each fire-smoke damper. Leakage shall be Class 1, 2, or 3, as required, to meet the requirements specified elsewhere herein. Provide compatible electric actuator on all dampers, factory installed.
- E. Insulated all metal access panels, secured with sash locks, shall be installed to service all fire, smoke, and combination smoke-fire dampers. Access panels shall be identified with "FIRE DAMPER", "SMOKE DAMPER", or "SMOKE-FIRE DAMPER" stenciled thereon in a visible or conspicuous location. Removable flexible duct shall not be permitted as a means of damper access. Access shall be direct and shall not be obstructed by turning vanes or other duct accessories.
- F. General Requirements:
1. For "Ductmate" connections at fire, smoke, or combination smoke-fire dampers, do not use screw fasteners.
 2. Use four inch (4") draw band connections at round duct fire damper connections.
 3. Use blade dampers when the blade width exceeds 12 inches.
 4. Install vertical or horizontal mount dampers suitable for the application.
 5. Dampers shall be suitable for the maximum air system operating pressures expected to be encountered. Medium pressure ductwork is expected to operate at up to six inches (6") W.G.
 6. Use multi-section dampers where damper size openings are larger than single section maximum sizes.
 7. Fire, smoke and combination smoke-fire dampers shall be sized to provide for 100 percent of the ductwork size (minimum 95% free area) indicated on the Drawings through each damper.
 8. Provide 165 Deg. F. rated fusible links for fire dampers.
- G. Acceptable Manufacturers:
1. Ruskin, or approved equals by:
 2. Greenheck, or
 3. Nailor, or
 4. Prefco, or
 5. National Controlled Air (N.C.A.), or
 6. Air Balance, or
 7. Pottoroff.

2.3 FLEXIBLE CONNECTIONS

- A. Where ducts connect to fans, including roof exhausters, flexible connectors shall be made that are fire-resistant, (up to 200 Deg. F.), waterproof, mildew-resistant and essentially airtight, and shall weigh approximately thirty ounces (30 oz.) per square yard.
- B. There shall be a minimum of one-half inch (1/2") slack in these connections, and a minimum of two and one-half inches (2-1/2") distance between the edges of the ducts for a total of three inches (3"). There shall also be a minimum of one inch (1") of slack for each inch of external static pressure on the fan system for medium pressure systems.
- C. Acceptable Manufacturers:
 - 1. Vent Fabrics "Ventglas", or approved equals by:
 - 2. Duro-Dyne.

2.4 ACCESS DOORS

- A. Furnish and install hinged, low leakage access doors in ductwork or plenums to provide access to all fire, smoke and combination fire - smoke dampers, mixed air plenums, automatic dampers, coils, filters, and elsewhere as detailed on the Drawings.
- B. Where the ducts are insulated, the access doors shall be double skin doors with a minimum one inch (1") of insulation in the door. The insulation shall have a minimum R-value of 5.0. Increase the thickness of the insulation as needed to comply. Where the access door is installed in non-insulated ductwork the access door shall be unlined sheet metal of the same gauge thickness as the duct.
- C. In no case shall access doors be smaller than eight (8") by eight inches (8"). Access doors shall be sized to permit testing or servicing of duct mounted components, such as, for coil cleaning, installation of control devices, resetting of fusible links, filter replacement, etc., as applicable and suitable for the application.
- D. Where duct access doors are above a suspended, normally non-readily accessible ceiling, such as plaster, gypsum board or spline type ceilings, Contractor, under this Section of Specifications, shall be responsible for the proper location, and furnishing of, ceiling access doors, or panels, to make duct access doors easily accessed through the ceiling system. Ceiling access doors, or panels, shall be rated, where applicable, to match the fire rating of the ceiling system penetrated. Ceiling access doors, or panels, shall be installed under other Sections of these Specifications. Ceiling access doors, or panels, shall be centered directly beneath duct access doors or immediately adjacent thereto when duct access is through the side of the duct.
- E. All access doors shall be fully double gasketed, door to frame and frame to duct, and include a sash type or compression latches for sizes under eighteen inches (18") by eighteen inches (18"). Use one (1) sash type latch per twelve inches (12") of height or width. Access doors 18" x 18" and larger shall have quarter turn handle latches. Provide one handle per 24" section, height or width, of door. As an example, provide two (2) handle type latches for a 48" tall access door.
- F. Provide a minimum of two (2) heavy loose pin hinges for each access door unless indicated otherwise herein. Piano style hinges will be an allowed substitute.
- G. Where the installation conditions prohibit suitable access with hinged access doors, then non-hinged access doors may be used in conjunction with a corrosion resistant cable or chain, of suitable length, attached to the access door and duct.
- H. For duct systems constructed to 2 inches W.G standards, or less, provide standard access doors meeting all requirements specified herein, which have a tested air leakage rating of less than 4.0 CFM at a test pressure of 2 inches W.G., and as manufactured by:

1. Ventlok with hinges and No. 90 or No. 99 latches (less than 18" x 18"), or No. 100 or No. 140 latches (18" x 18" and larger), as applicable, or approved equals by:
 2. Ductmate, or
 3. Duro Dyne DDIAD-0806, or
 4. NCA Manufacturing ADH-T-1, or
 5. Pottorff HAD or CAD, or
 6. Nailor 08SH with HP Seal, or 0890, or
 7. Cesco Products HDG, or
 8. Ward Sandwich Style Access Doors, DSA or DDA, for round ductwork.
- I. For duct systems constructed over 2 inches W.G., up to 6 inches W.G. standards, provide high pressure low leakage access doors meeting all requirements specified herein, which have a tested air leakage rating of less than 1.0 CFM at a test pressure of 6.0 Inches W.G. and as manufactured by:
1. Ventlok similar to that noted above, or their Twist-In Door (insulated), or approved equals by:
 2. Ductmate "Sandwich" (Rectangular ducts), or Ductmate "Metu" (Round ducts), or
 3. Ward Duct Connector Industries Type 'F' (Rectangular ducts) or Type 'R' (Round Ducts), or
 4. Nailor 0820-1 or 0895, or
 5. Pottorff OAD.

2.5 TURNING VANES

- A. Turning vanes shall be Harper double wall turning vanes fabricated from the same material as the duct.
- B. Turning vane front and back panels shall be securely locked together with adequate crimping to prevent twisting of vane. Vanes shall be capable of withstanding 250 pounds of tensile load when secured according to the manufacturer's instructions.
- C. Rails for mounting vanes shall have self-locking, friction fit tabs designed to facilitate proper alignment of vanes. Tab spacing shall be as specified in Figure 4-3 of the 2005 SMACNA Manual, "HVAC Duct Construction Standards, Metal & Flexible", Third Edition standard. Rail systems with non-compliant tab spacing shall not be accepted.
- D. Acoustical Turning Vanes shall be used in applications that require quiet operating systems. Mounting rails shall have friction insert tabs that align the vanes automatically. These shall only be required where designated on the Drawings.
- E. Approved Manufacturers:
1. Ductmate Industries PRO-Rail Turning Vane or approved equals.

2.6 DUCT LINER

- A. Where indicated on the Drawings or specified herein, all rectangular ducts; except kitchen grease hood, kitchen dishwasher and fume hood exhaust ducts; shall be lined with Fiberglass mat faced duct liner in the thicknesses, type, and locations as indicated elsewhere herein.
- B. Kitchen grease hood exhaust, kitchen dishwasher exhaust, kitchen hood make-up air, and fume hood make-up air and other industrial type exhaust air ducts shall not be lined. Line all other general building exhaust air ducts within 10'-0" on each side of each in-line exhaust fan with one inch (1") thick liner. Roof mounted exhaust fan ductwork shall also be lined, one inch (1") thickness, but only for the first 10'-0" of ductwork from the roof curb toward the occupied space.
- C. All return, transfer, and relief air ducts shall be lined with one inch (1") thick duct liner for the first 10'-0" from the unit.
- D. The liner insulation system shall be one and one-half inches (1.5") in thickness for the first 10'-0" from the unit, on all conditioned air, heated or cooled, as well as outside air intake ducts, and mixed air plenums to obtain a minimum R-value of 6.0 thereon.

- E. All sound sensitive areas shall be lined with two inch (2") thick duct liner.
- F. All ductwork systems are required to meet the most recent version of the International Energy Conservation Code.
- G. All duct liners shall comply with NFPA 90A and 90B and ASTM C 1071, Type I, for ducts and Type II for plenums (rigid liner). Liner shall consist of flexible, matt faced insulation made of inorganic glass fibers bonded by a thermosetting resin with an encapsulant edge coating, and shall be a rotary style duct liner product with a water repellent ingredient on the mat face to help keep moisture from penetrating the air stream surface. Other technical requirements shall include:
 - 1. Be suitable for temperatures up to 250 Deg. F. per ASTM C 411.
 - 2. Be suitable for air velocities up to 6,000 FPM per ASTM C 1071 for Type I products and 5000 FPM for Type II products.
 - 3. Water vapor sorption shall be less than 3% by weight per ASTM C 1104.
 - 4. Air stream surface mat facing shall be tested with an EPA registered anti-microbial agent to aid in the prevention of fungal and bacterial growth. Mat face, as treated, shall not support the growth of mold, fungi, or bacteria per ASTM C 1338, ASTM G 21 and ASTM G 22.
 - 5. Does not exceed a Flame Spread of 25 and Smoke Developed and Fuel Contributed of 50 per ASTM E 84, NFPA 225, and UL 723.
 - 6. Conductance of 0.24 (R-value of 4.2) for a 1.5 PCF or 2.0 PCF duct liner at a 75 Deg. F. mean temperature per ASTM C177 for a one inch (1") thick product.
 - 7. Greenguard Compliant (Greenguard Environmental Institute).
 - 8. Noise Reduction Coefficient (NRC) of 0.70 or higher for a one inch (1") thick product and 0.80 for a two inch (2") thick product per ASTM C 423, type A mounting.
- H. All duct liners shall be able to be cleaned in accordance with the North American Insulation Manufacturers Association (NAIMA) "Cleaning Fibrous Glass Insulated Air Duct Systems Recommended Practices".
- I. Liner shall be applied to the inside of rectangular ducts and plenums with fire-resistant adhesive, Fosters 85-60, 85-65, or Childers CP-127, Hardcast "Seal-Tack" or Ward "Premium Duct Liner Adhesive", or approved equals only, complying with ASTM C 916, completely coating the clean sheet metal. All uncut joints in the insulation shall be "buttered" and firmly butted tightly to the adjoining uncut liner using the same fire resistant adhesive.
- J. Where a cut is made in the insulation for duct taps, etc., the "raw" edge shall be accurately and evenly cut and shall be thoroughly coated with a water based fire resistant adhesive. Where tears in the insulation occur coat such with the same adhesive (duct liner protective coating). Adhesives shall be Design Polymerics Duct liner Protective Coating (2510/2515/2540/2545), Ductmate Super Liner Seal (SLS), or approved equals only.
- K. On ducts over twenty-four inches (24") in width or depth, the liner shall further be secured with mechanical fasteners. Fasteners shall be Graham or Gemco weld pins. "Stick Clips", "Sheet Metal Clips", or other fasteners secured to the ducts by adhesive are not allowed. Fasteners shall be placed on a maximum spacing of eighteen inches (18") and shall be pointed up with fire-resistant adhesive. Fasteners shall not compress the insulation more than 1/8".
- L. Liner shall be accurately cut with all cut ends thoroughly coated with an approved liner edge coating adhesive so that when the duct section is installed, the liner shall make a firmly butted and tightly sealed joint. Provide metal nosings securely installed over transversely oriented liner edges facing the air stream at all fan discharges, at access doors, and at any interval of lined duct preceded by unlined duct. This adhesive type shall be Duro Dyne "Dyn-O-Coat", or equal. This shall be an aerosol which is quick drying, flexible and tack free. Treat all exposed edges, butt seams, and inadvertent tears.
- M. Where rectangular ducts are lined and adjoins externally insulated rectangular ducts, the two insulations shall be overlapped not less than twenty-four inches (24").

- N. Dimensions given on the Drawings are inside air stream, free area, dimensions only and sheet metal sizes shall be increased in size to maintain these free area dimensions when liner is installed.
- O. All exposed ductwork shall be internally lined unless specifically indicated otherwise.
- P. Refer to Section 23 07 00, Insulation, for further related requirements.
- Q. Acceptable liner manufacturer shall be:
 - 1. Certaineed, Tough Gard R with enhanced surface.
 - 2. Knauf, Rotary Duct Liner E-M with Hydrosield.
 - 3. Owens Corning, Quiet R Acoustic Duct Liner, Type 150 or equivalent Duct Liner Board.
 - 4. Johns Manville, Linacoustic RC or R-300.

2.7 GRILLES, REGISTERS, AND DIFFUSERS

- A. Grilles, registers, ceiling outlets, diffusers and other air devices shall be as scheduled on the Drawings and shall be suitable for the intended use.
- B. Provide air devices with sponge rubber or soft felt gaskets at flanges where the devices mate up to a ceiling or wall surface.
- C. If a manufacturer other than the one scheduled is used, the sizes shown on the Drawings shall be checked for performance, noise level or criteria, face velocity, throw, drop, pressure drop, air diffusion, etc., before the submittal is made. Selections shall meet the manufacturers' own published data for the above performance criteria. The throw shall be such that the terminal velocity will be not more than 50 FPM or less than 25 FPM at the point of penetrating the occupancy zone. The occupancy zone is defined as six feet (6') above the finished floor and six inches (6"), or farther, from the walls.
- D. Noise levels shall not exceed those published in current ASHRAE Standards and Guidelines for the type of space being served (N.C. level) or that scheduled.
- E. Locations of outlets on Drawings are approximate and shall be coordinated with other trades to make symmetrical patterns and shall be governed by the established pattern of the lighting fixtures, structure and Architectural Reflected Ceiling Plan (RCP). Air devices shall have margins, frames, and sizes to be compatible with the ceiling and wall systems installed. All color and finishes are subject to final approval by the Architect.
- F. Where called for on the schedule, grilles, registers, ceiling outlets, diffusers and other air devices shall be provided with deflecting devices and manual dampers.
- G. Where indicated on the Drawings, provide a fire rated blanket on the back side of steel ceiling mounted air devices (supply, return, exhaust, etc.).
- H. Where indicated on the Drawings, provide an insulation blanket on the back side (all surface area) of ceiling mounted supply air devices to prevent condensation.
- I. All air devices shall be the standard product of the manufacturer, subject to review by the Architect. Acceptable manufacturers are:
 - 1. Titus, or approved equals only by:
 - 2. Krueger.
 - 3. Nailor.
 - 4. Metal-Aire.
 - 5. Carnes.
 - 6. Price Industries.

2.8 LINED SPIRAL DUCT

- A. Lined spiral duct shall be United McGill Acoustic-K27 duct or equivalent. Utilize duct-duct slip joint connector, conical reducing tees, and 5 gore elbows (60 Deg. and 90 Deg.) for offsets and end runs.
- B. Inner duct liner shall be perforated 28 gauge galvanized steel with 1.5" thick [1.0" thick allowed if ductwork is exposed in a conditioned space], 1.5 pound density, fiberglass insulation sandwiched between it and the outer duct. The outer duct shall be spiral seam construction, and be a minimum of 24 gauge galvanized steel.
- C. In lieu of the perforated steel and factory installed insulation liner, an extra heavy density liner, field installed, may be used as an equivalent to the 1.5" thick Johns Manville Spiracoustic Plus. This system shall have a minimum R-value of 5.0 at 75 Deg. F Mean Temperature, with a noise reduction coefficient of 0.80. The airstream surface shall be coated and be suitable for mechanical cleaning.
- D. Externally seal all duct connections, transverse and longitudinal, with a sealant being listed and labeled in accordance the requirements of U.L. 181A or U.L. 181B such as Foster 32-19 duct sealant.

2.9 AIR FILTERS

- A. Provide appropriately sized and number of air filters for each piece of individual air handling equipment to include, but not be limited to, the following:
 - 1. Split DX A/C Units.
 - 2. Fan Coil Units.
 - 3. Ground Source Heat Pump Units.
 - 4. Filter Return Grilles.
 - 5. Elsewhere as required to protect air type heat exchangers, such as warm air furnaces, or coil surfaces, such as duct mounted direct expansion coils.
- B. Medium efficiency air filters shall generally be two inches (2") thick, unless indicated otherwise and shall be the pleated media, disposable type, listed by Underwriters Laboratories as Class 2, with the following features:
 - 1. Air filters shall be rated in accordance with the most recent version of ASHRAE Standards 52.1 and 52.2, test methods as indicated herein, and shall conform to Section 7.4 of ARI Standard 850.
 - 2. Filter media enclosing frame shall be constructed of rigid, heavy duty, high wet-strength resistant, "beverage" board with diagonal support members on the air entering and air exiting sides. Expanded diamond grid media support, integral with frame, shall be chemically bonded to filter media at each pleat, to insure pleat spacing and stability. Pleated media shall be bonded to the inside of the frame to eliminate air bypass.
 - 3. Filter media shall be high performance, non-woven, reinforced cotton-poly, synthetic blend fabric formed in a V-shape.
 - 4. Filters shall have the following performance data:

THICKNESS	SQUARE FEET MEDIA AREA TO ONE SQUARE FOOT FACE AREA	MINIMUM PLEATS PER LINEAL FOOT	INITIAL AIR RESISTANCE (INCHES W.G.)	RESISTANCE BASED ON AIR FLOW OF
One Inch (1")	2.4	16	0.25 (350 FPM)	1400 CFM
Two Inch (2")	4.3	15	0.28 (500 FPM)	1500 CFM

- 5. Filters shall be suitable for operation with varying velocities of up to 500 feet per minute (FPM) for 2" filters and 350 FPM for 1" filters.
- 6. Filters shall have a minimum efficiency of 30% with an average arrestance of 90 to 92% minimum dust holding capacity which shall be no less than 170 grams as tested in accordance with ASHRAE Standard 52.1. Filters shall also have a MERV rating of 8 as tested in accordance with ASHRAE Standard 52.2-2007.

7. Acceptable Manufacturers:

- a. Camfil Farr, Inc., Model Aeropleat IV, or approved equals by:
- b. Environmental Filter Corporation.
- c. Eco-Air.

- C. All filters shall be standard sizes that are readily and locally available, in stock, through multiple over the counter sources without requiring special order. Standard acceptable sizes shall be 16" x 20" and 16" x 25".

2.10 OUTSIDE AIR INTAKE AND RELIEF AIR/EXHAUST OUTLET HOODS

- A. Furnish and install outside air intakes and relief air outlets of sizes as scheduled or shown on the plans. Face velocities shall generally not exceed 1000 FPM for outlets and 500 FPM for intakes. Air pressure drop shall not exceed 0.15 In. W.G. in all cases.
- B. Hoods shall be of all welded and lock formed galvanized steel or all aluminum construction. Furnish with aluminum bird screen and a removable sloping top insulated on the bottom with mastic insulation and coated with an anti-condensate coating. Hoods shall be hinged for access to ductwork and shall be fastened closed.
- C. Furnish 12 inch high curbs for intakes made of 16 gauge spot welded galvanized steel and insulated on the inside of the curb with 2" thick fiberglass board for thermal insulation and to prevent condensation. Provide wood nailer for fastening.
- D. Provide a 2" wide neoprene rubber pad continuous around the curb for mounting of intake to provide a weather seal and to damper wind born vibration. Secure hoods with stainless steel screws 8" on centers.
- E. Acceptable hood manufacturers:
 1. Penn "Airette", or approved equals by:
 2. Greenheck.
 3. Loren Cook.
 4. Acme.

2.11 ADHESIVES AND SEALANTS

- A. All adhesives and sealants used on this project must have a Volatile Organic Compound (VOC) content less than that listed in the current South Coast Air Quality Management District (SCAQMD) Rule 1168, and all sealants and fillers must meet or exceed the requirements of the Bay Area Air Quality Management District Regulation 8, Rule 51.
- B. All adhesives and sealants shall meet the most current Leadership in Energy and Environmental Design (LEED™) requirements.

2.12 FIBERGLASS DUCTBOARD

- A. Fiberglass duct board of any type is not allowed on this project without exception.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install all ductwork and equipment as indicated on the Drawings in full accordance with these specifications including foundations, hangers, supports, etc.
- B. Seal all ductwork as specified, pressure test and repair leaks.

- C. Install all air intake, relief and exhaust air hoods on continuous neoprene strips set level on top of wood nailers of the specified roof curbs. Hoods shall be secured at 8" O.C. to the curbs with corrosion resistant screws if not secured by other fasteners as specified. Flash and counterflash to prevent water leakage through the overall roofing system.
- D. Install all duct mounted components such as heating coils, electric or water type, sound attenuators, air terminals, etc. in accordance with the manufacturer's recommendations.
- E. Should defects or installation deficiencies become apparent, or are observed, after the systems have been in operation, the deficient components shall be removed and replaced or reinforced as directed by the Owner's Representative.

3.2 CLEANING OF DUCT SYSTEMS

- A. Before the grilles or diffusers are installed, all fans and air conditioning units shall be operated and all debris and foreign matter shall be removed from the ducts.
- B. The air conditioning units shall be thoroughly cleaned, and the drain pans shall be thoroughly cleaned and flushed out with a hose; the filters shall be thoroughly cleaned and the grilles shall then be installed.
- C. Insure all duct openings are capped and sealed during construction when additions are not being made.

3.3 AUTOMATIC CONTROL DAMPERS

- A. Refer to Section 23 09 00, Controls and Instrumentation.
- B. Install all temperature control modulating dampers under this section of the specifications, furnished in Section 23 09 00.

3.4 FILTERS

- A. No air moving equipment may be operated at any time without filters being fully installed in equipment.
- B. Provide a minimum of three (3) spare sets of two inch (2") thick, medium efficiency, pleated media filters for all air handling and fan coil units, as well as for filter return air grilles where scheduled, in addition to manufacturer furnished filters specified elsewhere herein. Where other sections of these specifications require one inch (1") thick filters, or other types of filters, provide spare sets of matching thickness and type.
- C. Additionally replace filters during construction as directed by the Owner's Representative.
- D. Install one (1) new complete set of filters, as directed by the Test and Balance (TAB) Firm, just prior to performance of TAB work.
- E. Install one (1) new set of filters at "Substantial Completion" of the project.
- F. Where the minimum number of filter sets are not used for the aforementioned purposes, provide the left over filters to the Owner for maintenance stock.
- G. Document, in writing, when each filter change-out occurs.

END OF SECTION

SECTION 23 81 26

SPLIT DIRECT EXPANSION HEAT PUMP AIR CONDITIONING UNITS

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- A. Comply with Division 1 - General Requirements and referenced documents.
- B. Comply with all other Division 23 Sections as applicable. Refer to other Divisions for coordination of work with other trades as required.

1.2 SYSTEM DESCRIPTION

- A. Work shall include installing remote air cooled heat pump condensing units, direct expansion (DX) cooling coils, and indoor blowers units with auxiliary electric heating coils where indicated on the Drawings to meet scheduled capacities. Condensing units shall be matched with indoor direct expansion cooling coils mounted with upflow or horizontal blower sections.
- B. Contractor shall connect all piping, refrigerant specialties, required controls, field installed accessories, appurtenances, insulation, hangers, supports, foundations, etc. to make a complete and operational system.
- C. Refer to Section 23 23 00, Refrigeration Piping.

1.3 QUALITY ASSURANCE

- A. All equipment and materials shall be new and of the best quality complying with all standards specified herein.
- B. All equipment and materials shall be installed in a workmanlike manner by experienced mechanics and as recommended by the equipment manufacturer or as detailed.
- C. All products shall meet the most current version of the International Energy Conservation Code (IECC).
- D. All air handling unit electrical equipment shall be U.L. Listed.
- E. All coils shall be A.H.R.I. Rated for the application listed in accordance with AHRI Standard 410.
- F. All fans shall be rated in accordance with the Air Moving Council Association (AMCA), and bear the label thereof.
- G. All condensing units shall meet the Energy Star® guidelines for energy efficiency.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's descriptive literature and installation instructions and method for the configuration of equipment proposed, including wiring diagrams, piping connections, sizing and other descriptive literature necessary to evaluate the Submittals for compliance with specifications.
- B. Include matched combination ratings for condensing units and indoor coils to account for refrigerant line routing and length of run.
- C. Shop Drawings: Submit in accordance with Section 23 05 00.

1.5 PRODUCT HANDLING

- A. Deliver all equipment to the site where it shall be covered and protected. Material not properly protected and stored and which is damaged or defaced during construction shall be replaced at no cost to the Owner.
- B. Storage and protection of materials shall be in accordance with Section 23 05 00.

1.6 INSTALLATION, OPERATION, AND MAINTENANCE BROCHURES

- A. Furnish all installation manuals required by a qualified mechanical system installer for proper installation of equipment. Manuals shall be provided with equipment and be attached thereto.
- B. Complete bound Operating and Maintenance Brochures shall be submitted a minimum of 30 days prior to completion of construction.

PART 2 - PRODUCTS

2.1 AIR COOLED HEAT PUMP CONDENSING UNITS

- A. Furnish air cooled condensing units, as scheduled on the Drawings. Brass service valves with refrigerant line fittings and service ports shall be located on the exterior of the unit. Each unit shall be fully assembled and tested at the factory. It shall be designed for use with Refrigerant 410a.
- B. Capacities shall be as scheduled, with submitted equipment capacities based on combination ratings for the matched indoor coil, heat pump unit, blower, and installation conditions shown on the Drawings including accounting for refrigerant line losses.
- C. Condensing coils shall be of non-ferrous (copper) construction above a nominal 5 ton capacity and aluminum or copper below five (5) tons. Aluminum coils shall be warranted for five (5) years. Coils shall have aluminum plate fins, mechanically bonded to the coil tubes. Coils shall be provided with the manufacturer's furnished, field installed, heavy duty condenser coil air inlet hail and vandal guards/grilles.
- D. Units shall be furnished with direct driven, propeller-type condenser fans arranged for vertical air discharge. Condenser fan motors shall have inherent thermal overload protection, shall be the permanently lubricated type, and be resiliently mounted. Each fan shall have a discharge corrosion resistant safety guard. Motors shall be the totally enclosed fan cooled type (TEFC) and permanent-split-capacitor type.
- E. Compressors shall be of the welded-hermetic type with internal vibration isolation. Compressors above 2.5 tons shall be two-stage or dual compressor units. Compressors below 2.5 tons shall be single stage. Compressor motor shall have both thermal and current sensitive overload devices, and start assist capacitance devices shall be standard on single phase units, where the refrigerant line length exceeds 50 feet in total equivalent length (one way). Compressors shall be equipped with a crankcase heater and have internal high pressure protection.
- F. Controls and protective devices shall include a liquid line low-pressure switch, suction line accumulator, pressure relief device, reversing valve, anti-short cycle timer, and evaporator defrost control. Control wiring terminal board shall be designed to match indoor unit terminal board and accessory thermostat terminals for standardized point-to-point connectors.
- G. Accessories shall include Solid-State Time Guard, Liquid Line Filter Dryer, sight glass, Flare-to-Compatible Coupler, crankcase heater (for low ambient (below 55 Deg.F.), long line or hard start kit (over 50 feet) applications, evaporator freeze protection thermostat (low ambient (below 55 Deg.F.) operation), winter start control (low ambient applications and with low pressure switch), and a head pressure controller to allow operation down to 20 Deg.F. ambient temperature.

- H. Air cooled condensing units shall carry the full one (1) year warranty on the entire unit, plus, an additional four (4) year parts only warranty on the motor compressor unit.
- I. All condensing units shall have a minimum SEER and or EER rating as noted on the drawings, at combination rating with matched DX-coil and blower section.
- J. Acceptable Manufacturers:
 - 1. Trane.
 - 2. Lennox.
 - 3. Carrier.
 - 4. Mitsubishi (Smithfield Middle School Only).

2.2 AIR CONDITIONING UNITS

- A. Direct Expansion (DX) Cooling Coils:
 - 1. Furnish and install A/C Unit Direct Expansion (DX) cooling coil modules to meet capacities scheduled to be matched with condensing units as detailed and shown on the Drawings. Units shall be horizontal design as indicated on the Drawings.
 - 2. Unit enclosures shall be fully insulated and constructed of cold-rolled steel, bonderized and finished with baked enamel.
 - 3. Cooling coils shall be constructed with aluminum plate fins mechanically bonded to non-ferrous copper tubing with all joints brazed. Coils shall have factory installed refrigerant line fittings which permit mechanical connections and condensate pans with primary and auxiliary drain connections on each side. Coil pressure drop scheduled shall not be exceeded. Include factory installed expansion and reversing valve.
 - 4. Condensate pan shall be made of 18 gauge galvanized, or Type 304 stainless steel, and be insulated to prevent condensation.
 - 5. Coil modules shall be as manufactured by:
 - a. Trane.
 - b. Lennox.
 - c. Carrier.
- B. Provide horizontal direct expansion fan/blower assemblies matched to direct expansion (DX) coils and condensing units to meet scheduled capacities as indicated on the Drawings. Units are upflow in design; refer to the Drawings for configuration.
- C. Unit enclosures shall be insulated with one inch (1") thick, R value of 6.0, insulation and have panels constructed of cold rolled steel, bonderized and finished with baked enamel, or may be made of embossed galvanized steel. Large front service access panels shall provide easy access to all components. Provide supply air duct collar.
- D. Furnish front access flat filter racks, capable of accepting one or two inch (1" or 2") thick filters. Two inch (2") thick (MERV 8) filters will be used in this application. Furnish filters and spare media same as for constant volume air handling units. All filters shall be standard filter sizes of all filter manufacturers.
- E. Fans shall be the forward curved type with double inlet, be mounted on a motor shaft, and be dynamically and statically balanced. Provide multi-speed (min. three speed), Electrically Commuted (ECM) fan motors. Motors shall be factory lubricated, have internal overload protection, and be resiliently mounted. Fan motor assembly shall slide out for service. Fans shall be statically and dynamically balanced and be of indicated capacities. Fan wheels shall be constructed of a minimum of 22 gauge galvanized steel and be forward curved design. Furnish permanently lubricated long life heavy duty ball bearings. All motors shall be provided with thermal overload protection.
- F. Electric Auxiliary Heaters: Auxiliary electric heat modules shall be installed in unit. Electric heater elements shall be constructed of heavy-duty nickel chromium elements internally connected for the scheduled electrical requirements. Staging shall be achieved through the unit control processor. Each heater package shall have automatically reset high limit control operating through heating element

contactors. All heaters shall be individually fused from factory, and meet all NEC requirements when properly installed. Power assemblies shall provide single point connection for entire indoor unit. Electrical heat modules shall be UL listed or CSA certified.

- G. Unit electrical connections shall consist of suitable openings in the cabinet for routing of all utility connections for side power supply connection. The base unit shall contain a terminal strip in the control compartment to allow for terminal-to-terminal connection of thermostat (temperature sensor) and field installed accessories. Electrical controls shall be complete with self-contained low voltage control circuit protected by an automatic reset device. All unit power wiring shall enter the cabinet at a single factory pre-drilled location designed for single point electrical service.
- H. Provide with manufacturer furnished condensate pump for unit at Smithfield Middle School only.
- I. Acceptable Manufacturers:
 - 1. Trane.
 - 2. Carrier.
 - 3. Lennox.

2.3 TEMPERATURE CONTROLS

- A. Under Specification Section 23 09 00, Controls and Instrumentation, space temperature, relative humidity, and carbon dioxide sensors, as applicable, shall be provided for field installation along with factory mounted and wired terminal unit controllers to control units.
- B. Each A/C unit shall have wiring terminals to receive signals from the Terminal Unit controller to receive 4-20 ma, or 0-10 volt D.C. as applicable, signals to stage on and off heat, modulate the indoor evaporator fan motor, energize compressor(s) stages, and modulation of the outside air dampers. Provide contacts to energize and de-energize the unit.

PART 3 - EXECUTION

3.1 DELIVERY AND PROTECTION

- A. Deliver all equipment to each site. All equipment shall be handled carefully to avoid damage and be protected from exposure to the weather and dirt. All equipment shall be examined upon delivery to the site and evidence of abuse, damage, or exposure to weather and dirt shall be grounds for refusal to accept individual pieces of equipment. Rejected items shall be replaced promptly at no cost.
- B. During construction, take all steps necessary to protect equipment from damage or vandalism. All damage or vandalism shall be repaired at no cost to the Owner.

3.2 AIR COOLED HEAT PUMP CONDENSING UNIT INSTALLATION

- A. Install condensing units level on roof supports where shown with vibration pads beneath unit legs.
- B. Route refrigerant piping and make connections to DX coils as recommended by the unit manufacturer.
- C. Furnish and install all refrigerant piping specialties including, but not limited to, thermal expansion valves, sight glasses, and filter dryers.
- D. Charge all refrigerant piping systems and equipment to maintain a fully operating refrigerant and oil charge.

3.3 AIR CONDITIONING UNITS

- A. Install air conditioning units level suspended from structure.

- B. Provide for positive gravity drainage of coil condensate. Pipe condensate full size of unit connection as detailed on the Drawings to include a P-trap. Verify proper drainage is attained from each unit.
- C. Remove all shipping restraints and unfasten any hold down fasteners.
- D. Verify correct rotation of fan and proper wiring of motor to include verification of proper line voltage and insuring actual motor amps does not exceed name plate amps.
- E. Lubricate all greaseable ball bearings with manufacturers suggested lubricant.
- F. Adjust belt tension and align belts to eliminate wear and excessive vibration per manufacturers recommendations.
- G. Verify starter (motor controller) motor overload heaters are sized within the nameplate motor amp range, i.e., a heater range of 8.0 - 9.0 amps would only be suitable for a motor within that range. A motor nameplate of 9.1 amps would need a different heater.
- H. Adjust fan drives as required to obtain scheduled capacities as directed by the Test and Balance firm to include one sheave and belt replacement, as required thereby.
- I. Lubricate all greaseable ball bearings with manufacturers suggested lubricant.
- J. Replace filters as specified in Section 23 30 00. Keep the filter section loaded with filters at all times. Provide the new specified type just prior to the commencement of the Test and Balance work. Do not operate any unit without proper filters in place.
- K. Make piping connections so as not to interfere with future coil removal work, access door operation, filter removal and maintenance, or motor and drive maintenance.
- L. Provide power to units for operation for system balancing in sufficient time to perform TAB work prior to Substantial Completion.

3.4 OPERATING PROCEDURES AND REQUIREMENTS

- A. Three (3) copies of the operating and service instructions, in illustrated and bound form, shall be furnished by the manufacturer.
- B. At start-up, the equipment manufacturer shall furnish skilled personnel to supervise, check out performance, make any required adjustments, place all units in service, and instruct the Owner's personnel for a full period of two (2) HOURS per 15 units furnished. Additionally, start-up personnel shall fill out a start-up form, in legible handwriting or be typed, for each and every unit installed.
- C. The manufacturer of each item of equipment shall provide complete power and wiring diagrams to the Electrical and Control Systems installers, respectively. Drawings shall show all required external wiring and arrangements of electrical connections.

3.5 WARRANTY

- A. Transfer all Warranties to Owner for a full one (1) year period after the A/C systems are put into sustained operation to obtain building cooling effect for the benefit of occupancy by the Owner, Substantial Completion.
- B. Transfer any and all other warranties as applicable over to the Owner at the completion of construction, Substantial Completion, including extended four (4) year compressor warranties, as applicable, on refrigeration equipment.

END OF SECTION

SECTION 26 00 00

ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Division and all Electrical sections contained hereinafter are subject to the Contract Documents of Division 1 whether attached or not, the various Divisions of the General Construction specifications and Division 23 of the Construction specifications and respective plans.
- B. All drawings, material in other Divisions of these specifications, addenda, and other pertinent documents are considered to be a part of the technical requirements of this Division of the specifications insofar as they are applicable.
- C. The material contained in this section shall be applicable to other sections of the specifications under this Division.

1.2 DEFINITIONS

- A. The following definitions shall apply to all sections of this Division:
 - 1. "Owner" shall mean the Owner or his designated representative.

1.3 SCOPE OF WORK

- A. This Division and all electrical sections of the specifications include all labor and material to complete all electrical systems as specified or shown on the Drawings.
- B. All work shown and specified shall be completely installed and connected in a workmanlike manner by mechanics properly qualified to perform the work required. All work shall be left in a satisfactory operating condition as determined by the Owner.
- C. Provide all services and perform all operations required in connection with or properly incidental to the construction of complete and fully operating systems with all accessories as herein specified or shown on the Drawings.

1.4 GENERAL

- A. The accompanying plans show diagrammatically the location of the various light fixtures, devices, conduits and equipment items, and methods of connecting and controlling them. It is not intended to show every connection in detail or all fittings required for a complete system. The Contractor shall carefully lay out his work at the site to conform to the conditions, to avoid obstructions and provide proper routing of raceways. Exact locations of light fixtures, devices, equipment, and connections thereto shall be determined by reference to the accompanying Plans, etc., by field measurement at the project, and in cooperation with other Contractors and Sub-Contractors, and in all cases shall be subject to the approval of the Owner. Minor relocations necessitated by the conditions at the site or directed by the Owner shall be made without any additional cost to the Owner.
- B. These specifications and the accompanying drawings are intended to describe and illustrate systems which will not interfere with the structures, which will fit into available spaces, and which will insure complete and satisfactorily operating installations. The Contractor shall be responsible for the proper fittings of his material and apparatus into the building and shall prepare installation drawings for all critical areas illustrating the installation of his work as related to the work of all other trades. Interferences with

other trades or with the building structures shall be corrected by the Contractor before the work proceeds. Should any changes become necessary due to failure to comply with these stipulations, the Contractor shall make such necessary changes at his own expense.

- C. All work shall be run parallel or perpendicular to the lines of the building unless otherwise noted on the Drawings.
- D. It is the intent of the Contract Documents to provide an installation complete in every respect. In the event that additional details or special construction may be required for work indicated or specified in this section or work specified in other sections, it shall be the responsibility of the Contractor to provide those details or special construction as well as to provide material and equipment usually furnished with such systems or required to complete the installation.
- E. The Contractor, by submitting a bid on this work, sets forth that he has the necessary technical training and ability and that he will install his work in a satisfactory manner which is up to the best standards of the trade, complete and in good working order. If any of the requirements of the Drawings and Specifications are impossible to perform, or if the installation when made in accordance with such requirements will not perform satisfactorily, he shall report such occurrences to the Owner promptly after discovery of the discrepancy.
- F. No extra compensation will be allowed for extra work or changes caused by failure to comply with the above requirements.

1.5 INSPECTION OF THE SITE

- A. The Contractor shall visit the site, verifying all existing items indicated on the Drawings or specified, and familiarize himself with the existing work conditions, hazards, grades, actual formations, soil, conditions, and local requirements. The submission of bids shall be deemed evidence of such visit.
- B. All proposals shall take these existing conditions into consideration, and the lack of specific information on the Drawings shall not relieve the Contractor of any responsibility.
- C. All site visits shall be coordinated and scheduled with the Owner.

1.6 CUTTING AND PATCHING

- A. When cutting or patching becomes necessary to permit the installation of any work under this contract, or should it become necessary to repair any defects that may appear in patching up to the expiration of the guarantee, such cutting shall be done under the supervision of the Architect by the trade or Contractor whose work is to be disturbed. After the necessary work has been completed, damage shall be repaired by the Contractor or trade whose work has been disturbed. The cost of all such cutting and patching shall be paid by the Contractor requiring it to be done.
 - 1. Refer to Division 1 requirements.
- B. The Contractor shall do all necessary cutting and drilling of present walls, floors, ceilings, etc. for the installation of new work or for modifications to the existing work, but no structural work shall be cut unless specifically approved by the Architect. Patching and painting of services as required shall be by the General Contractor unless specified otherwise hereinafter.
- C. Locations of the various existing services, walls, and equipment to be altered, removed or connected to have been taken from plans of the existing building and other substantially reliable sources and are offered as a general guide only, without guarantee as to their accuracy. This Contractor shall examine the site and shall verify to his own satisfaction the location of all existing work and shall adequately inform himself as to their relation to and effect on the work before entering into a contract. Submission of a bid shall constitute evidence that the submitting Contractor has inspected the site of the proposed work.

- D. The Contractor shall examine the existing building and plans for the new work and note the sizes of the openings available and shall be responsible for any cutting, patching, and alterations required to place new equipment in the building.
- E. Where walls, acoustical tile, suspended ceilings, etc., not scheduled to be re-worked or re-finished under the general contract are damaged during installation of new raceways, or other work, etc., such walls, tiles, etc., shall be replaced by the General Contractor at the expense of the Contractor.
- F. All damage done to the existing equipment, services, etc., incurred in the execution of this contract shall be repaired and restored to its original conditions by the Contractor.
- G. Holes through concrete shall be drilled with "Mole", or "Core-It", or equal diamond point hole saw.

1.7 DEMOLITION OF EXISTING EQUIPMENT

- A. Certain types of equipment will be retained by the Owner. The Owner will provide a list of all such salvage items. Before removal of any equipment, contact the Architect, who will determine the disposition. Equipment designated to be salvaged and remain the property of the Owner shall be carefully removed to prevent damage and delivered to a location on the site as directed by the Architect. Any equipment not retained by the Owner shall become the property of the Contractor and shall be removed from the premises.
- B. The Contractor shall visit the site and verify all outlets, devices, wall switches, light fixtures, etc., that are to be removed due to remodeling work and building additions.
- C. The attendant raceways, hangers, wiring, foundations, etc., of those items of existing equipment to be removed and not intended for reuse, shall also be removed in their entirety. No raceways, hangers, etc., shall be abandoned in place except those raceways concealed in existing walls or buried below grade.

1.8 CODE REQUIREMENTS

- A. All work shall comply with the provisions of these specifications, as illustrated on the accompanying drawings, or as directed by the Architect, and shall satisfy all applicable local codes, ordinances, or regulations of the governing bodies, and all authorities having jurisdiction over the work, or services thereto. In all cases where alterations to, or deviations from, the drawings and specifications are required by the authority having jurisdiction, report the same in writing to the Architect and secure his approval before proceeding. Upon completion of the work, furnish a statement from the inspecting authority stating that the installation has been accepted and approved. Provide complete utility service connections as directed, and submit, as required, all necessary drawings; secure all permits and inspections necessary in connection with the work, and pay all legal fees on account thereof. In the absence of other applicable local codes acceptable to the Architect, the National Electrical Code shall apply to this work.

1.9 RECORD DRAWINGS

- A. The Contractor shall, during the execution of the work, maintain a complete set of drawings upon which all locations of equipment, panels, and all deviations and/or changes in the work shall be recorded. All underground and overhead utilities provided under, or affected by, work of this Division shall be accurately located by dimensions. These "Record" drawings shall be delivered to the Architect in good condition upon the completion and acceptance of the work and before final payment is made.
 - 1. Refer to Division 1 requirements.

1.10 RECORDS AND INSTRUCTIONS FOR OWNER

- A. The Contractor shall accumulate, during the project's progress, the following sets, prepared in neat brochures or packet folders and turned over to the Architect for checking and subsequent delivery to the Owner:
 - 1. All warranties and guarantees and manufacturer's directions on equipment and material covered by the Contractor.
 - 2. Approved equipment brochures, wiring diagrams and control diagrams.
 - 3. Copies of reviewed Shop Drawings.
 - 4. Operating instructions for all systems. Operating instructions shall include recommended maintenance procedures.
 - 5. Any and all other data and drawings required during construction.
 - 6. Repair parts lists of all major items and equipment including name, address, and telephone number of local supplier or agent.
- B. All of the above data shall be submitted to the Architect for review at such time as the Contractor makes application for final payment, but in no case less than two weeks before final observation.
- C. The Contractor shall also give not less than two (2) days of operating instructions, during the adjustment and testing period, to the Owner's operating personnel in order to familiarize them with the proper care and operation of the equipment. The written operating instructions referred to in above paragraphs shall be used as a basis for this on-the-job instruction.
 - 1. Refer to Division 1 requirements.

1.11 SHOP DRAWINGS AND SUBMITTALS

- A. The Contractor shall submit, to the Architect, shop drawings and catalog data on all equipment and materials designated on the Drawings and specified herein.
- B. The submittal will be reviewed for compliance with general requirements of design and arrangement only; it is not a contract document and acknowledgement of compliance does not relieve the Contractor from responsibility for performance of the work in compliance with all provisions and requirements of the Contract Documents. Job measurements and the coordination of all the dimensions for proper fit of all parts of the work and performance of all equipment supplies to meet specification requirements are and remain specific responsibilities of the Contractor.
- C. Shop Drawings shall be furnished by the Contractor for the work involved after receiving approval on the make and type of material and in sufficient time so that no delay or changes will be caused. This is done in order to facilitate progress on the job, and failure on the part of the Contractor to comply shall render him liable to stand the expense of any and all delays, changes in construction, etc., occasioned by his failure to provide the necessary detailed drawings. Also, if the Contractor fails to comply with this provision, the Architect reserves the right to go directly to the manufacturer he selects and secure any details he might deem necessary, and should there be any charges in connection with this, they shall be borne by the Contractor.
- D. The Shop Drawings submitted shall not consist of manufacturers' catalogues or tear sheet therefrom that contain no indication of the exact item offered. Rather, the submission on individual items shall designate the exact item offered.
- E. Shop Drawings submitted without indicating markings or Contractor's stamp shall not be reviewed and will be returned to the Contractor for correction of such discrepancies.
- F. The Shop Drawings are not intended to cover detailed quantitative lists of electrical specialties, and similar items, as the plans and specifications illustrate and describe those items, and it is the Contractor's responsibility to procure the proper sizes and quantities required to comply with the established requirements.

- G. Any Shop Drawings prepared to illustrate how equipment can be fitted into available spaces will be examined under the assumption that the Contractor has verified all the conditions, and obtained any approval thereon shall not relieve the Contractor of responsibility in the event the material cannot be installed as shown on those Drawings.
 - H. Various material submissions of such as raceways, switches, panelboards, and related items shall be assembled in brochures or in other suitable package form and shall not be submitted in a multiplicity of loose sheets.
 - I. Each Contractor shall process his submitted data to insure that it conforms to the requirements of the plans and specifications and that there are no omissions, errors or duplications.
 - J. Shop Drawings shall be accompanied by certification from this Contractor that Shop Drawings have been checked by him for compliance with Contract Drawings.
 - K. Samples of various products or mock-ups of particular details or systems may be required by various sections of this Specification.
 - L. Refer to Division 1 requirements.
- 1.12 PENETRATIONS THROUGH FIRE-RATED ASSEMBLIES
- A. Seal voids around ducts and pipes penetrating fire-rated assemblies and partitions using fire-stopping materials and methods in accordance with provisions in Division 1.
- 1.13 CONNECTION OF EQUIPMENT FURNISHED BY OTHERS
- A. All equipment furnished under other Divisions of the specification requiring service connections shall be connected by this Contractor. Materials and labor required for the connection of this equipment shall be furnished under Division 26. The respective supplier shall furnish proper roughing-in diagrams for the installation of these items. All items shall be roughed-in and connected in strict accordance therewith. All equipment requiring connection may not be specified herein, but may be included in other Division documents. This Contractor shall ascertain for himself all equipment so specified is included as part of his work.
 - B. Refer to Section 26 05 23.
- 1.14 DRAWINGS
- A. The drawings show diagrammatically the locations of the various conduits, fixtures, and equipment, and the method of connecting and controlling them. It is not intended to show every connection in detail and all fittings required for a complete system. The systems shall include, but are not limited to, the items shown on the drawings. Exact locations of these items shall be determined by reference to the general plans and measurements at the building and in cooperation with other trades and, in all cases, shall be subject to the approval of the Architect. The Architect reserves the right to make any reasonable change in the location of any of this work without additional cost to the Owner.
 - B. Should any changes be deemed necessary in items shown on the contract drawings, the shop drawings, descriptions, and the reason for the proposed changes shall be submitted to the Architect for approval.
 - C. Exceptions and inconsistencies in plans and specifications shall be brought to the Architect's attention before bids are submitted; otherwise, the Contractor shall be responsible for the cost of any and all changes and additions that may be necessary to accommodate his particular apparatus.
 - D. Lay out all work maintaining all lines, grades, and dimensions according to these drawings with due consideration for other trades and verify all dimensions at the site prior to any fabrication or installation; should any conflict develop or installation be impractical, the Architect shall be notified before any

installation or fabrication and the existing conditions shall be investigated and proper changes effected without any additional cost.

- E. Titles of Sections and Paragraphs in these specifications are introduced merely for convenience and are not to be construed as a correct or complete segregation or tabulation of the various units of material and/or work. The Architect does not assume any responsibility, either direct or implied, for omissions or duplications by the Contractor due to real or alleged error in the arrangement of matter in the Contract Documents.

1.15 COOPERATION

- A. All work under these specifications shall be accomplished in conjunction with other trades on this project in a manner which will allow each trade adequate time at the proper stage of construction to fulfill his work.
- B. Maintaining contact and being familiar with the progress of the general construction and the timely installation of sleeves and inserts, etc., before concrete is placed shall be the responsibility of this trade as will the installation of the required systems in their several stages, at the proper time to expedite this contract and avoid unnecessary delays in the progress of other contracts.
- C. Should any question arise between trades as to the placing of lines, ducts, conduits, or equipment, or should it appear desirable to remove any general construction which would affect the appearance or strength of the structure, reference shall be made to the Architect for instructions.

1.16 MATERIALS AND EQUIPMENT

- A. All materials purchased for this Project shall be new.
- B. Where specified product is not manufactured, manufacturer's current product meeting specification shall be substituted, subject to written approval of Engineer.
- C. Space allocations in electrical spaces are based on equipment scheduled in each case. Should the Contractor offer equipment of another make, he shall verify that such equipment will fit in the spaces allowed.
- D. Manufacturers' names are listed herein to establish a standard. The products of other manufacturers will be acceptable; if, in the opinion of the Architect, the substitute material is of a quality as good or better than the material specified, and will serve with equal efficiency and dependability, the purpose for which the items specified were intended.
- E. It is fully the Contractor's responsibility to assemble and submit sufficient technical information to fully illustrate that the material or equipment proposed for substitution is equal or superior as the Architect or his Engineer is under no obligation to perform the service for the Contractor. The proposal shall be accompanied by manufacturers' engineering data, specification sheet, and a sample, if practical or if requested. In no event shall a proposal for substitution be cause for delay of work.
- F. Should a substitution be accepted under the above provisions, and should the substitution prove defective or otherwise unsatisfactory for the intended service, within the warranty period, the Contractor shall replace the substitution with the equipment or material specified, and on which the specifications required him to base his proposal.

1.17 STORAGE AND PROTECTION OF MATERIALS

- A. The Contractor shall provide his own storage space for protection and storage of his materials and assume complete responsibility for all losses due to any cause whatsoever. All storage shall be within the property lines of the building site, or as directed by the Owner's representative. In no case shall storage interfere with traffic conditions in any public or project thoroughfare.

- B. All work and material shall be protected at all times. This Contractor shall make good any damage caused, either directly or indirectly, by his workmen. He shall be responsible for safe handling of all electrical equipment and shall replace, without charge, all items damaged prior to acceptance by the Owner.

1.18 SCHEDULE OF WORK

- A. The work under the various sections must be expedited and close coordination will be required in execution of the work. The various Contractors shall perform their work at such times as directed so as to insure meeting scheduled completion dates, and to avoid delaying any other Contractor. The Architect will set up completion dates, schedule the times of work in the various areas involved, etc. This Contractor shall cooperate in establishing these times and locations and shall process his work so as to insure the proper execution of it.

1.19 CONTINUATION OF SERVICES

- A. The Contractor shall realize that the existing building must continue in operation during the construction period, except as the Architect and the Owner may direct otherwise.
- B. Under no conditions shall any work be done in the present building that would interfere with its natural use during the normal hours of occupancy, unless special permission is granted by the Owner. This is particularly applicable where new connections are to be made to present services or items of equipment in the building or where present equipment items in the building are to be relocated or modified in any way.
- C. Existing utility systems shall continue to function with a minimum of interruptions in service. This Contractor shall install any temporary lines, connections, etc., required to place and maintain the electrical systems in operation unless otherwise directed by the Architect.
- D. Arrange for and provide temporary electric and telephone services to the building where new construction conflicts with existing utility locations.

1.20 COMMISSIONING OF EQUIPMENT AND SYSTEMS

- A. The Contractor shall provide qualified personnel, as requested by the Owner and Architect, to assist in all on-site testing and commissioning of all equipment.

1.21 CLEANING UP

- A. The Contractor shall be responsible for cleaning up his work as specified in the General Requirements of these Specifications.

1.22 FINAL OBSERVATION

- A. Schedule: Upon completion of the Contract, there shall be a final observation of the completed installation. Prior to this observation, all work under this Division shall have been completed, tested, and balanced and adjusted in final operating condition and the test report shall have been submitted to and approved by the Owner.
- B. Qualified personnel representing the Contractor must be present during final observation to demonstrate the systems and prove the performance of the equipment.

1.23 CERTIFICATIONS

- A. Before receiving final payment, the Contractor shall certify that all equipment furnished and all work done is in compliance with all applicable codes mentioned in these Specifications.

- B. Furnish, at the completion of the job, a final Inspection Certificate from the local inspecting authority.

1.24 GUARANTEE

- A. The guarantee provision of this specification requires prompt replacement of all defective workmanship and materials occurring within one year of final job acceptance. This includes all work required to remove and replace the defective item and to make all necessary adjustments to restore the entire installation to its original specified operating condition and finish at the time of acceptance. The Contractor shall also guarantee that the performance of all equipment furnished and/or installed under this Division of the specifications shall be at least equal to the performance as called for in the specifications and as stated in the equipment submittals. Should there be indication that the equipment and installation is not producing the intended conditions, the Contractor shall make further tests as the Engineer may direct to demonstrate that the equipment installed meets the specifications. If there is indication that the equipment does not meet the specifications, the Contractor shall, at his expense, institute a program to demonstrate the adequacy of the installation. This program shall include all necessary testing and testing equipment. Should the Contractor not have the equipment or technical skill to perform the tests, it shall be his responsibility to provide recognized experts to perform the tests and shall provide certified laboratory tests, certified factory reports and work sheets, or other certified data to support results of any tests required.
- B. Refer to Division 1 requirements.

PART 2 - PRODUCTS

NOT USED

PART 3 - INSTALLATION

3.1 DEVICE MOUNTING REQUIREMENTS

- A. Mounting heights listed in Drawings shall be defined as measured from the centerline of the device or outlet box to finished floor elevation. Unless specifically noted otherwise on the Drawings. Device heights shall be in accordance with the Texas Accessibility Standards or the Americans with Disabilities Act.
- B. Where devices are grouped together, they shall be mounted at the same height.
- C. Coordinate all mounting dimensions with Owner's requirements and coordinate with architectural elevations and details.

END OF SECTION

SECTION 26 05 01

ELECTRICAL DEMOLITION

PART 1 - GENERAL

1.1 REFERENCED DOCUMENTS

- A. Comply with Division 1- General Requirements and related documents.
- B. All sections of this Specification.

1.2 DESCRIPTION

- A. Contractor shall remove several items of materials and equipment under this section of the specifications. Equipment and materials to be removed shall be as indicated and noted on the Drawings and as required to facilitate the new installations.
- B. Provide labor, materials, equipment, tools and services as required to complete the demolition work indicated.
- C. Refer to Division 1 for "Schedule of Work".

1.3 DISRUPTION OF EXISTING FUNCTIONS

- A. Under no conditions shall any work be done in the present building that would interfere with its natural or intended use unless special permission is granted by the Owner.
- B. Disruptions: Maintain existing lighting, power, telephone, and other systems, and maintain existing functions in service, except for scheduled disruptions as allowed in Division 01, "General Conditions".
- C. Provide all temporary connections as necessary to facilitate the phasing of construction.

1.4 SALVAGE, DEMOLITION, AND RELOCATION

- A. It shall be the responsibility of the Contractor to remove and store those items of existing equipment as indicated on the Drawings to be removed. All items of equipment or fixtures removed shall be protected from damage insofar as is practical.
- B. These items shall be stored on site for a minimum of two (2) weeks unless indicated otherwise by the Owner's representative to allow for inspection by the Owner. Deliver, all items tagged to be retained by the Owner to a designated storage location on site or to the Owner's designated Service Center or Warehouse. All items not retained by the Owner shall be removed from the site by the Contractor at no additional cost to the Owner.
- C. The attendant conduit, hangers, foundations, etc., of those items of existing equipment to be removed, shall also be removed in their entirety. No hangers, etc., shall be abandoned in place.
- D. Relocations:
 - 1. Repair and restore to good functional condition materials and items scheduled for relocation and/or reuse and which are damaged during dismantling or reassembly operations.
 - 2. New materials and items of like design and quality may be substituted for materials and items indicated to be relocated, in lieu of relocation, upon approval of shop drawings, product data and samples.
 - 3. Remove carefully, in reverse to original assembly or placement, items which are to be relocated.
 - 4. Protect items until relocation is complete.

5. Clean and repair and provide new materials, fittings, and appurtenances required to complete the relocation and to restore to good operative order.
6. Perform the relocation work in accordance with pertinent sections of the specifications, utilizing skilled workers.
7. Refer to Drawings for specific requirements of temporary services and relocated equipment and fixtures.
8. Coordinate with the General Contractor repairs required to bring finishes back to their original conditions after demolition and or installation of new equipment.

1.5 CLEAN UP

- A. Remove all debris, rubbish, and materials resulting from cutting, demolition, or patching operations from the work area on a daily basis.
- B. Transport materials and legally dispose of off site.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide materials and equipment for patching and extending work as specified in individual sections or as indicated on the Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Field Conditions: Demolition Drawings are based on non-invasive field observations and existing record documents. Report discrepancies in location, dimensions or quantity to Owner and Architect prior to disturbing existing installation.
- B. Abandoned Wiring: Verify that abandoned wiring and equipment serve only facilities scheduled for demolition.
- C. Existing Conditions: Commencing demolition means Contractor accepts existing conditions.

3.2 PREPARATION

- A. Demolition: Disconnect electrical systems in walls, floors, ceilings and equipment scheduled for removal.
- B. Project Coordination: Coordinate utility service outages with utility companies and schedule work with Facility management and Owner.
- C. Temporary Wiring: Provide temporary wiring and connections as necessary to maintain existing systems in service during construction.
- D. Schedule installation of temporary wiring and connections to eliminate hazard to installing personnel.
 1. When work must be performed on energized circuits or equipment, use qualified personnel experienced in such operations.
 2. Submit "hot work" policy information to Architect for review prior to performing work on any energized circuits.
- E. Electrical Service: Maintain existing system in operation until new system is complete and ready for service. Disable system only to make switchovers and connections. Obtain permission, in writing, from Owner prior to partially or completely disabling system. Minimize outage duration. Make temporary connections as necessary to maintain service to areas unaffected by the scope of Work.

- F. Telephone Service: Maintain existing system in operation until new system is complete and has been accepted. Disable system only to make switchovers and connections. Obtain permission, in writing, from Owner, and notify the utility company, prior to partially or completely disabling system. Minimize outage duration. Make temporary connections as necessary to maintain service to areas unaffected by the scope of Work.
- G. Special Systems: Maintain existing systems in operation until new systems are complete and have been accepted. Disable systems only to make switchovers and connections. Obtain permission, in writing, from Owner prior to partially or completely disabling systems. Minimize outage duration. Make temporary connections as necessary to maintain service to areas unaffected by the scope of Work.
 - 1. The following systems will be affected by the scope of Work:
 - a. Fire Alarm System
 - b. Public Address System
 - c. Security System
 - d. Data System

3.3 DEMOLITION AND EXTENSION OF EXISTING WORK

- A. General: Demolish and extend existing work as indicated or described in the Drawings and Specifications.
 - 1. Lighting fixtures and electrical distribution equipment shall be salvaged for possible re-installation as directed by the Owner and Architect.
- B. Wiring: Remove abandoned wiring and cables to source of supply or termination.
- C. Raceways:
 - 1. Remove exposed abandoned conduits and raceways, including abandoned conduits and raceways above accessible ceilings.
 - 2. Conduits and raceways concealed in existing construction to remain shall be abandoned in place. Cut conduits and raceways such that finished surfaces can be patched smooth.
- D. Wiring Devices: Remove abandoned wiring devices. Provide blank device plate for outlet box not being removed.
- E. Electrical Distribution Equipment: Disconnect and remove abandoned panelboards and electrical distribution equipment.
- F. Lighting Fixtures: Disconnect and remove abandoned lighting fixtures, including brackets stems, hangers and other accessories not indicated to be re-used.
- G. Existing Installations to Remain: Maintain access to existing electrical installations which remain active.
- H. Modify installation or provide access panel as required.
- I. Extension of existing circuits: Extend existing installations as required to maintain service to items to remain using materials and methods, as specified that are compatible with original installation.
- J. Adjacent Construction: Repair adjacent construction and finishes damaged during demolition and extension work.
- K. Dispose of hazardous materials, such as fluorescent and H.I.D. lamps and PCB's in lamp ballasts, in accordance with all Local, State and Federal ordinances and regulations.

3.4 SALVAGED MATERIALS

- A. Salvage existing materials for re-installation as directed by Owner. Coordinate locations for storage of salvaged materials with Owner.

3.5 CLEANING AND REPAIR

- A. Existing Materials: Clean and repair existing materials and equipment which remain or are to be re-used.
- B. Existing Panel boards: Clean exposed surfaces and check tightness of all electrical connections. Replace damaged circuit breakers with units of compatible construction and provide closure plates for vacant positions.
- C. Existing Lighting Fixtures: Where existing lighting fixtures are indicated to remain, clean reflector and lens and replace lamps.
 - 1. Use mild detergent to clean all interior and exterior surfaces; rinse with clean water and wipe dry; allow to dry thoroughly prior to re-installation.
 - 2. Replace lamps and broken electrical components. Replace cracked or broken lenses and louvers with new identical materials.
 - 3. Ballasts: Replace ballasts in all fluorescent lighting fixtures to remain or to be re-used with new ballasts as specified.

END OF SECTION

SECTION 26 05 19

LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 REFERENCED DOCUMENTS

- A. Comply with Division 1 - General Requirements and related documents.
- B. Comply with all other Division 26 sections as applicable.
- C. Refer to other Divisions for coordination of work with other portions of work.

1.2 DESCRIPTION

- A. Provide systems of wires and cables for electric power, signaling and control.
- B. Related work specified in other sections
 - 1. 26 00 00 - Electrical
 - 2. 26 05 20 - Cable Connections
 - 3. 26 05 23 - Control Voltage Electrical Power Cables
 - 4. 26 05 32 - Raceways
 - 5. 26 05 33 - Boxes for Electrical Systems

1.3 QUALITY ASSURANCE

- A. The equipment supplied and installed shall meet the requirements of the National Electrical Code and all applicable local codes and ordinances.
- B. All equipment supplied shall be Underwriter's Laboratories Inc. listed and so labeled.

1.4 REFERENCED STANDARDS

- A. ICEA 5-61-402 Thermoplastic Insulated Wire and Cable
- B. ICEA 5-66-524 Cross Linked Thermosetting Polyethylene Insulated Wires and Cables
- C. ICEA 5-68-516 Ethylene Propylene Rubber Insulated Wire and Cable
- D. ICEA 5-19-81 Rubber Insulated Wire and Cable
- E. ANSI 1581 Standard of Electrical Wires, Cables, and Flexible Cords.
- F. UL 83 Thermoplastic Insulated Wires and Cables
- G. UL 1569 Metal Clad Cables
- H. ASTM B3 Standard Specification for Soft or annealed Copper Wire
- I. ASTM B8 Standard Specification for Concentric Lay Standard Copper Conductors

1.5 SUBMITTALS

- A. Where products are of a manufacturer other than listed as acceptable manufacturers, submit manufacturer's product literature completely describing conductors and cable assemblies and evidence of U.L. Listing.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver conductors and cable assemblies to the project in the manufacturer's standard reels or boxes marked with conductor material, insulation type, conductor size and U.L. Label.
- B. Store conductors and cable assemblies in a clean, dry location to prevent damage from moisture, dust, personnel and equipment.
- C. Handle conductors and cables in a manner to prevent damage to conductor, insulation, jackets, and identifying markings.

1.7 MANUFACTURERS

- A. The material shall be the product of a manufacturer with a minimum of ten years experience in the manufacture of similar material.
- B. Acceptable Manufacturers:
 - 1. AFC Cable Systems.
 - 2. Cerro Wire, Inc.
 - 3. General Cable
 - 4. Southwire Company
 - 5. Okonite Company

1.8 WARRANTY

- A. The material shall be warranted to be free from defect and in proper working order for one year following the date of final acceptance.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- A. Copper Conductors
 - 1. Conductors shall be copper unless specifically noted otherwise on the Drawings.
 - 2. Copper conductors shall be soft drawn annealed copper, minimum conductivity 98% of pure copper per ASTM ASTM-B3.
 - 3. Sizes No. 10 AWG and smaller shall be solid conductor, single strand.
 - 4. Sizes No. 8 AWG and larger shall be concentric lay Class B stranding.
 - 5. Shall conform to the Conductor Properties proscribed in the NEC.
- B. Insulation
 - 1. Type THW: 600 volt moisture and heat resistant thermoplastic rated 75 Deg.C. in wet or dry locations.
 - 2. Type THW-2: 600 volt moisture and heat resistant thermoplastic rated 90 Deg.C. in wet or dry location.
 - 3. Type THWN: 600 volt moisture and heat resistant thermoplastic rated 75 Deg.C. in wet or dry.
 - 4. Type THWN-2: 600 volt moisture and heat resistant thermoplastic rated 90 Deg.C. in wet or dry locations.
 - 5. Type XHHW: 600 volt moisture resistant cross linked polyethylene rated 75 Deg.C. in wet or dry locations.
 - 6. Type XHHW-2: 600 volt moisture resistant cross linked polyethylene rated 90 Deg.C. in wet or dry locations.
- C. Cable Assemblies:
 - 1. Type MC Branch Circuit Cable: 600 volt, Type THHN/THWN conductors size 12 AWG through 10 AWG, including a green insulated grounding conductor, with steel interlocked armor applied over the assembly.

PART 3 - EXECUTION

3.1 USES PERMITTED

- A. Unless specifically noted on the drawings, permitted by the NEC and local codes and ordinances, wiring shall be Types THW-2, THWN-2 or XHHW-2 installed in metal raceways as specified in 26 05 32, Raceways.
- B. Where specifically noted on the drawings, permitted by the NEC and local ordinances, Type UF cable assemblies shall be permitted for underground branch circuit wiring.
- C. Where specifically noted on the drawings, permitted by the NEC and local codes and ordinances, type NM cable assemblies shall be permitted for above ground branch circuit wiring.
- D. For final connections from junction boxes mounted on the building structure to recessed lighting fixtures. Type MC cable assemblies shall be permitted, with the cable assembly length not to exceed six feet and with supports as required by the NEC. Fixture-to-fixture chain wiring is not permitted.
- E. Where specifically noted on the drawings, permitted by the NEC and local ordinances, Type MC Branch Circuit cable shall be permitted for branch circuit wiring and where concealed in stud spaces of dry wall partitions. NEC requirements for supporting from the structure independent of ceiling systems or ceiling support wires will be strictly mandated. All home runs from the first box to the panelboard shall be in EMT.
- F. Where specifically noted on the drawings, permitted by the NEC, Type MC Feeder Cable shall be permitted in exposed unfinished spaces and above ceilings. NEC requirements for supporting from the building structure will be strictly mandated.

3.2 COLOR CODING

- A. Where available, insulation shall be color coded by factory pigmentation for each phase and each voltage system employed on the project.
- B. 120/208 and 120/240 volt systems:
 - 1. Phase A - Black
 - 2. Phase B - Red
 - 3. Phase C - Blue
 - 4. Neutral - White
 - 5. Ground - Green
- C. 277/480 volt systems:
 - 1. Phase A - Brown
 - 2. Phase B - Orange
 - 3. Phase C - Yellow
 - 4. Neutral - Gray
 - 5. Ground - Green
- D. Switch legs, travelers and special systems shall be continuous color scheme throughout the project as selected by the Contractor.
- E. Where factory pigmentation is not available, code conductors with 1-1/2" colored tape band at each terminal and at each pull or junction box.

3.3 GROUNDING CONDUCTORS

- A. All branch circuits and feeders shall include an insulated equipment grounding conductor. Raceway systems shall not be used as the sole equipment grounding path without specific approval.

3.4 MULTIWIRE BRANCH CIRCUITS

- A. Multiwire branch circuits shall not be permitted unless required by the device served, such as for connection to modular furniture systems or track lighting systems.
- B. Where multiwire branch circuits are required, branch circuit breakers shall be two or three pole with common trip and one handle.

3.5 MINIMUM SIZE

- A. Conductors shall be of the minimum size shown on the drawings, lighting and power branch circuit wiring shall be minimum No.12 AWG.
- B. Feeder circuit wiring shall be sized to limit the effect of voltage drop, based on the actual installed conductor length to limit voltage drop to 2% of nominal system voltage.
- C. Branch circuit wiring shall be size to limit the effect of voltage drop, based on the actual installed conductor length, to limit voltage drop to 3% or less of nominal system voltage.
- D. Circuits shall be grouped in raceways and grouped together when passing through enclosures to have phases and neutral grouped together to minimize circuit reactance.

3.6 INSTALLATION

- A. Examine the system in which the conductors are to be installed for defects in equipment and installation which may cause damage to the conductors, insulation, or jackets.
- B. Pull a swab or mandrel through conduit systems immediately before pulling conductors to insure a full bore, clean raceway system.
- C. Do not exceed the conductor manufacturer's maximum pulling force or minimum bending radius.
- D. Use pulling lubricant compound where necessary and recommended by the manufacturer.
- E. Conductors or cables which have insulation or jackets damaged in the pulling process shall be removed and replace with new material.

3.7 FIELD QUALITY CONTROL

- A. Test all wiring insulation with a megohm meter prior to energization:
 - 1. Phase to ground
 - 2. Phase to phase
 - 3. Phase to neutral
 - 4. Neutral to ground
- B. Perform test in accordance with manufacturer's recommendation and to meet manufacturer's published minimum insulation values.
- C. Correct all defects revealed by such tests including replacing material with new as required.

END OF SECTION

SECTION 26 05 20
CABLE CONNECTIONS

PART 1 - GENERAL

1.1 REFERENCED DOCUMENTS

- A. Comply with Division 1- General Requirements and related documents.
- B. All sections of this Specification.

1.2 DESCRIPTION

- A. Work Included: Provide wire connections and devices to be readily identifiable, mechanically and electrically secure wiring system.
- B. Related work specified in other sections:
 - 1. 26 05 19 Low Voltage Electrical Power Conductors and Cables

1.3 QUALITY ASSURANCE

- A. The equipment supplied and installed shall meet the requirements of the National Electrical Code and all applicable local codes and ordinances.
- B. All equipment supplied shall be Underwriter's Laboratories Inc. listed and so labeled.

1.4 SUBMITTALS

- A. Samples: Provide samples upon specific request.
- B. Product Data: If materials are by manufacturers other than those specified, submit product data giving complete description for sizes employed, material types, and electrical ratings.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Connections shall be made in atmospheres that are free from dirt, moisture, and elements which may be damaging.

1.6 MANUFACTURERS

- A. The materials shall be the product of a manufacturer with a minimum ten years experience in the manufacture of similar materials.
- B. Acceptable manufacturers are listed with the products.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Spring Connectors: Ideal "Wingnut" 3M-Scotch, Buchanan, and Thomas and Betts.
- B. Terminal Connectors: O-Z/Gedney, Burndy, and Thomas and Betts.
- C. Splice Connectors: O-Z/Gedney or Burndy with insulating cover.

- D. "T" and Parallel Connectors: O-Z/Gedney or Burndy with insulating cover.
- E. Vinyl Plastic Tape: 3M-Scotch #33 or #88, Plymouth and Okonite.
- F. Rubber Tape: Okonite, 3M-Scotch and Plymouth.
- G. Colored Tape: 3M-Scotch, Plymouth.
- H. Wire Ties: Thomas and Betts "Ty-Rap", Ideal and Panduit.
- I. Tie Mounts, Plates, Anchors: Thomas and Betts, Ideal, and Panduit.
- J. Wire Tags: Self-laminating, cloth, wrap-on type by Thomas and Betts, Ideal, and Brady.
- K. Terminal Strips: Nylon; 600 volt; modular plug-on construction; tubular compression slip-in terminals properly sized; complete with mounting track, end clips, and anchors by Allen-Bradley, Square D, and Buchanan.
- L. Cable and Cord Fittings: Crouse-Hinds with wire mesh grip or Appleton.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine wires to be joined, tapped, spliced, terminated, and their connecting devices for defects which may affect the mechanical and electrical integrity of the connection.
- B. Do not proceed until defects are corrected.

3.2 PREPARATION

- A. Remove proper amount of insulation necessary for connection, clean conductors.

3.3 INSTALLATION

- A. No. 10 Wire and Smaller: Connect with spring connectors, terminate at terminal strips.
- B. No. 8 Wire and Larger: Connect and terminate with above specified tape half-lapped to produce a dielectric value equal to wire insulation.
- C. Train, hold, clamp, and tag wiring in cabinets, pull boxes, panels, and junction boxes with above specified devices.
- D. Splices in feeders and mains may only be made where designated on the drawings and where prior approval is obtained from the Architect.
- E. Install terminal strips in enclosures without means for termination of wiring.
- F. Install cable and cord grips on all cables and cords, entering enclosures. Use wire mesh grips where necessary for strain relief.

3.4 FIELD QUALITY CONTROL

- A. Test: Connections shall be resistance tested with megohm meter as specified for wire.

3.5 ADJUSTMENTS

- A. Assure that wire connections made by others in equipment furnished by others are mechanically and electrically sound prior to energization.

END OF SECTION

SECTION 26 05 23

CONTROL - VOLTAGE ELECTRICAL POWER CABLES

PART 1 - GENERAL

1.1 REFERENCED DOCUMENTS

- A. Comply with Division 1 - General Requirements and related documents.
- B. Comply with all other Division 26 sections as applicable.
- C. Refer to other Divisions for coordination of work with other portions of work.

1.2 DESCRIPTION

- A. Work Included: Provide power wiring, raceways, and connections for items of equipment and control systems.
- B. All wiring for every system shall be installed in metal conduit. Refer to Section 26 05 32 Raceways for conduit types and materials for specific locations and applications.
- C. Related work specified in other sections:
 - 1. 23 09 00 Instrumentation and Controls for HVAC
 - 2. 26 00 00 Electrical
 - 3. 26 05 19 Low Voltage Electrical Power Conductors and Cables
 - 4. 26 05 32 Raceways
 - 5. 26 09 26 Lighting Control Systems
 - 6. 28 31 00 Fire Alarm System

1.3 QUALITY ASSURANCE

- A. The equipment supplied and installed shall meet the requirements of the National Electrical Code and all applicable local codes and ordinances.
- B. All equipment supplied shall be Underwriter's Laboratories Inc. listed and so labeled.

1.4 WARRANTY

- A. The material shall be warranted to be free from defect and in proper working order for one year following the date of final acceptance.

1.5 COORDINATION

- A. For equipment furnished under other Divisions, obtain equipment supply and wiring requirements from the Contractor supplying the equipment.
- B. For equipment furnished under Division 23, obtain complete temperature control system drawings, and power supply and interlock wiring requirements from the Contractor furnishing the systems.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Refer to related work specified in other sections for material requirements.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Work Included: The Electrical Contractor shall provide:
1. Branch circuit and motor feeder circuit conductors, raceway, connections, and overcurrent protection for each motor or item of equipment furnished by the Owner or other Contractors.
 2. Motor Control Centers, where indicated on the drawings.
 3. Installation of motor controllers furnished by the Owner or other Contractors, along with branch circuit and motor feeder circuit conductors, raceway, and connections in accordance with the manufacturer's approved wiring diagrams.
 4. Disconnect switches and combination disconnect switches and motor controllers, where indicated on the drawings or required by codes, except as provided as an integral part of manufactured equipment.
 5. Power supply conductors, raceway, connections, and overcurrent protection for input power to HVAC Temperature Controls, HVAC Automation, and HVAC Energy Management Systems in accordance with approved rough-in and connection diagrams furnished by the system suppliers.
 6. The above represents an outline of the work for the purpose of describing one division of the work which is acceptable to insure that all work is contained within the General Contract. Nothing herein shall be construed to confine the General Contractor from assigning the work to any member or group of contractors deemed best suited to executing the work to effect the contract. Refer to specific bidding instructions of the General Contractor for the actual division of the work. The General Contractor is fully responsible for the installation of complete, operating systems in accordance with the functional intent of the specifications.
- B. Work Not Included: The Mechanical Contractor shall provide:
1. Motors and equipment, erected in place and ready for final connection of power supply wiring, along with manufacturer's approved wiring diagrams.
 2. Motor controllers, in suitable enclosures and of the type and size in accordance with the manufacturer's recommendations and NEMA requirements, along with properly sized overload elements and approved wiring diagrams.
 3. Disconnecting switches or devices which are normally provided as a part of manufactured equipment.
 4. Rough-in and connection diagrams for input power supply and connections for the HVAC Temperature Control, HVAC Automation, and HVAC Energy Management Systems.
 5. Conductors, raceways, devices, and connections for low voltage control, line voltage control, and signaling systems for the HVAC Temperature Control, HVAC Automation, and HVAC Energy Management Systems in accordance with the provisions of Division 26, and approved systems shop drawings to provide complete operating systems in accordance with the functional requirements of the specifications.
 6. The above represents an outline of the work for the purpose of describing one division of the work which is acceptable to insure that all work is contained within the General Contract. Nothing herein shall be construed to confine the General Contractor from assigning the work to any member or group of contractors deemed best suited to executing the work to effect the contract. Refer the specific bidding instructions of the General Contractor for the actual division of work. The General Contractor is fully responsible for the installation of complete, operating systems in accordance with the functional intent of the specifications.
- C. Completely connect all electrical consuming items of mechanical equipment, kitchen equipment, shop equipment, etc., provided by the Owner or other trades. Outlets of various types have been indicated at equipment locations, but no indications or exact location or scope of work is indicated on the accompanying drawings.
- D. Refer to details and information furnished by the Owner and various equipment suppliers for equipment wiring requirements and to the Plumbing and Heating, Ventilating and Air Conditioning Specifications for the scope of the connections to equipment provided under those sections, and determine from the various trades by actual measurements at the site, and by direction from the Owner and the Architect the exact locations of all items. Roughing-in drawings, wiring diagrams, etc., required for the proper installation of the electrical work will be furnished by applicable trades furnishing equipment. Request the drawings and

information required in writing to the equipment supplier in ample time to permit preparation of the drawings and to permit proper installation of all wiring. Obtain from those furnishing equipment the size and type of service required for each motor or piece of electrical equipment and verify that the service to be installed is compatible.

3.2 INSTALLATION

- A. All conduits shall terminate in conduit boxes on motors where possible. When motors are direct-connected, the conduit may continue rigid into the box, but when motors drive through belts and have sliding bases, a piece of flexible liquid tight conduit not less than 12 inches long shall be connected between the rigid conduit and the motor terminal. Where motors are not provided with conduit boxes, terminate the conduit in a conduit at the motor.
- B. Where disconnecting switches are not provided integral with the control equipment for motors, provide and install a disconnect switch in the circuit to each motor where indicated and required by code. Switches shall be installed as close as possible to the motor or controls they serve and they shall be within sight of the motor or control circuit.
- C. Be responsible for installing all conductors and protective devices serving equipment motors furnished by others in strict conformance with all applicable codes, regardless of any discrepancy in plans and/or mechanical equipment sizes variations, unless covered by directives issued by the Architect.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 REFERENCED DOCUMENTS

- A. Comply with Division 1 - General Requirements and related documents.
- B. Comply with all other Division 26 sections as applicable.
- C. Refer to other Divisions for coordination of work with other portions of work.

1.2 DESCRIPTION

- A. Provide a grounding electrode for the facility and a ground electrode conductor system to connect to the electric service main equipment.
- B. Provide supplementary grounding electrodes as specified herein.
 - 1. Provide connections from the grounding electrode system to:
 - 2. The electric power system grounded circuit conductor (neutral).
 - 3. The electric power system non-current carrying enclosures and equipment ground conductors (equipment ground).
- C. Provide connections from the grounding electrode system to auxiliary ground conductors for data and voice communication systems (isolated ground).

1.3 QUALITY ASSURANCE

- A. The equipment supplied and installed shall meet the requirements of the National Electrical Code and all applicable local codes and ordinances.
- B. All equipment supplied shall be Underwriter's Laboratories Inc. listed and so labeled.

1.4 REFERENCED STANDARDS

- A. National Electrical Code, NFPA 70.
- B. EIA/TIA Standard 607
- C. IEEE - Standard 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems.
- D. IEEE Standard 81 - Guide for Measuring Earth Resistivity.

1.5 SUBMITTALS

- A. Where products are of a manufacturer other than listed as acceptable manufacturers, submit manufacturer's product literature completely describing conductors and cable assemblies and evidence of U.L. Listing.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver conductors and cable assemblies to the project in the manufacturer's standard reels or boxes marked with conductor material, insulation type, conductor size and U.L. Label.

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

- B. Store conductors and cable assemblies in a clean, dry location to prevent damage from moisture, dust, personnel and equipment.
- C. Handle conductors and cables in a manner to prevent damage to conductor, insulation, jackets, and identifying markings.

1.7 MANUFACTURERS

- A. The materials shall be the products of a manufacturer with a minimum of ten years experience in the manufacture of similar material.
- B. Acceptable manufacturers shall be as listed with the material descriptions.

1.8 WARRANTY

- A. The material shall be warranted to be free from defect and in proper working order for a period of one year following the date of final acceptance.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- A. Conductors buried in contact with the earth shall be bare copper, solid for sizes up to No. 6 AWG, concentric lay strand for sizes No. 8 AWG and larger.
- B. Conductors for installation below raised access floor systems shall be bare copper, solid for sizes up to No. 6 AWG, concentric lay strand for sizes No. 8 AWG and larger.
- C. All other grounding conductors shall be copper conductor, Type THWN 600 volt 90 Deg.C. thermoplastic insulation, green color where available.

2.2 CONNECTIONS

- A. All connections made below grade, in inaccessible locations, and all connections and splices in the grounding electrode conductor system shall be made by exothermic weld process equal to Cadweld. Provide polyethylene inspection well covers and lids equal to Erico #T416B.
- B. All other connections shall be hydraulically crimped irreversible connectors equal to Thomas and Betts 54000 Series.
- C. Connections to raised access floor system pedestals shall be Thomas and Betts 38268 malleable iron mechanical clamp.
- D. Connections to cable trays shall be Thomas and Betts 10105 malleable iron mechanical clamp.
- E. Connections to domestic cold water piping shall be Thomas and Betts GUV Series copper alloy U-bolt and mechanical clamp.
- F. Connections to building structural steel shall be exothermic weld equal to Cadweld.
- G. Connections which require flexibility for movement, expansion, or vibration shall be made with flexible flat conductor, multiple strands of 30 gauge copper conductors or equivalent circular mil area to the primary ground conductor. Protect ends with copper bolt hole end pieces.

2.3 CONDUITS

- A. Provide malleable iron conduit grounding bushings where:

1. Metallic raceways terminate at metal housings without mechanical and electrical connection to housing.
2. At each end of metallic conductors for grounding conductors where conduits are electrically non-continuous.
3. At the ends of service entrance conduit.

PART 3 - EXECUTION

3.1 EQUIPMENT GROUNDING CONDUCTORS

- A. Bond the non-current carrying parts of the electric power system to the grounding electrode conductor at the service disconnecting means. From this point forward, all non-current carrying parts of the electric power system shall be electrically connected and continuous by means of:
 1. Electrically continuous equipment enclosures, metallic boxes and metallic raceways connected with U.L. Listed connectors and couplings.
 2. Equipment grounding conductors supplementary to metallic raceway systems where shown on the Drawings.
 3. Equipment grounding conductors in non-metallic raceway systems and in flexible metal conduit systems.
 4. Where permitted under other sections of the Specification, the insulated grounding conductor provided in Type MC cable will be considered an acceptable equipment grounding conductor.
 5. Uninsulated grounding strips and spiral wrap provided in Type AC cable is not an acceptable grounding conductor.

3.2 TESTING

- A. Grounding Electrode:
 1. The earth resistance of the main ground electrode shall be not more than 5 ohms.
 2. Perform a measurement of ground resistance by one of the means described in IEEE Standard 81, Guide for Measuring Earth Resistivity.
 3. Provide written certification of the ground resistance measurements upon request.
- B. Grounding Continuity:
 1. Provide continuity tests and checks of equipment grounding and isolated grounding conductor systems to insure electrical continuity.
 2. Provide written certification of continuity checks upon requests.

END OF SECTION

SECTION 26 05 29

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 REFERENCED DOCUMENTS

- A. Comply with Division 1- General Requirements and related documents.
- B. All sections of this Specification.

1.2 DESCRIPTION

- A. Work Included: Provide miscellaneous materials for the supporting of electrical material and equipment.
- B. Related work specified in other sections:
 - 1. 26 00 00 - Electrical
 - 2. 26 05 32 - Raceways
 - 3. 26 27 16 - Electrical Cabinets and Enclosures
 - 4. 26 05 33 - Boxes for Electrical Systems

1.3 QUALITY ASSURANCE

- A. The equipment supplied and installed shall meet the requirements of the National Electrical Code and all applicable local codes and ordinances.
- B. All equipment supplied shall be Underwriter's Laboratories Inc. listed and so labeled.

1.4 SUBMITTALS

- A. Product Data: If materials are by manufacturers other than specified, submit product data giving complete description.

1.5 MANUFACTURERS

- A. Listed with Materials.
- B. Acceptable Manufacturers
 - 1. Kindorf
 - 2. Unistrut
 - 3. Caddy

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Continuous Slotted Channel: #12 gauge steel, electrogalvanized, with zinc chromate, bases and dimensions as required for application.
- B. Hanger Rods: Continuous thread, electrogalvanized, with zinc chromate, sizes as required for loads imposed.
- C. Hex Head Cap Screws and Nuts: No. H-113 and No. H-114, respectively.

- D. One-Hole Pipe Straps: Series HS-100, galvanized steel
- E. Single Bolt Channel Pipe Straps: Steel, with machine screws and nut, Series C-105 and Series C-106.
- F. Lay-In Pipe Hanger: Series C-149.
- G. Conduit and Pipe Hanger: Series 6H.
- H. Beam Clamps: Series 500, RC, EC, and PC for applications.
- I. Concrete Inserts, Spot: Series D-256 or No. D-255.
- J. Concrete Inserts, Channel: Series D-980 or Series D-986.
- K. Riser Clamps: Series C-210.
- L. Cable Supports: O-Z/Gedney Type S.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Carefully lay out and provide concrete inserts.
- B. Securely fasten and support conduits and raceways to the building structure.
- C. Suspend horizontal runs of conduit and raceways from the floor and roof construction by rod hangers spaced 10 feet on less on centers for sizes 2-1/2 inches and greater and 9 feet or less on centers for sizes 2 inch and smaller.
- D. Fasten single runs of conduit to the structure with one-hole pipe straps and beam clamps or hang on rod hangers.
- E. Support multiple runs of conduit and raceways from continuous channel inserts or from trapeze hangers constructed of rod hangers and channels.
- F. Fasten single conduits to rod hangers with adjustable lay-in pipe hangers or for 2 inches and smaller conduits with Series 6H pipe hangers.
- G. Fasten conduits to channels with pipe channel straps.
- H. Support conduits and raceways within 3 feet of each end of each bend, of each termination, and at other intervals to maintain horizontal and vertical alignment without sag and deformation.
- I. Do not use cable, strap, and wire hangers as fasteners.
- J. Provide riser clamps for conduits at floor lines. Provide wire and cable supports in pull boxes for risers in accordance with NEC Section 300-19 and Table 300-19 (a).
- K. Install supports to permit equally distributed expansion and contraction of conduits and raceways with expansion joints. Use guides or saddles and U-bolts and anchors designed for equal effectiveness for both longitudinal and transverse thrusts.
- L. Do not support conduits and raceways for equipment connections.
- M. Provide special supports with vibration dampers to minimize transmission of vibrations and noises.
- N. Provide trapeze hangers for conduits and raceways where routing interferes with ducts

- O. Provide hangers, racks, cable cleats and supports for wires and cables in cable chambers and other locations to make a neat and substantial installation.
- P. Provide angle iron and channel supports to the floor and structure for panelboards, cabinets, pull and junction boxes. Support independently from entering conduits and raceways. Provide supports as specified for conduits and raceways for outlet boxes and pull boxes 100 cubic inches and smaller.
- Q. Provide supports sized for the ultimate loads to be imposed.

3.2 CLEANING

- A. Clean surfaces to be painted.

END OF SECTION

SECTION 26 05 32

RACEWAYS

PART 1 - GENERAL

1.1 REFERENCED DOCUMENTS

- A. Comply with Division 1 - General Requirements and related documents.
- B. Comply with all other Division 26 sections as applicable.
- C. Refer to other Divisions for coordination of work with other portions of work.

1.2 DESCRIPTION

- A. Work Included: Provide a mechanically and electrically complete conduit system.
- B. Related work specified in other sections:
 - 1. 26 00 00 - Electrical
 - 2. 26 05 19 - Low Voltage Electrical Power Conductors and Cables
 - 3. 26 05 29 - Hangers and Supports for Electrical Systems
 - 4. 26 05 23 - Control Voltage Electrical Power Cables

1.3 QUALITY ASSURANCE

- A. The equipment supplied and installed shall meet the requirements of the National Electrical Code and all applicable local codes and ordinances.
- B. All equipment supplied shall be Underwriter's Laboratories Inc. listed and so labeled.

1.4 SUBMITTALS

- A. Samples: Provide samples upon specific request.
- B. Product Data: If materials are by manufacturers other than those specified, submit product data giving complete description for sizes employed, material types, and installation methods.
- C. Certificates:
 - 1. Labels of Underwriters' Laboratories, Inc. affixed to each item of material.
 - 2. If materials are by manufacturers other than those specified submit certification that material meets applicable Underwriters' Laboratories, Inc. Standards.
 - 3. Labels of ETL Verified PVC-001 affixed to each PVC Coated Galvanized Rigid Conduit.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Protect conduits and finishes from damage.

1.6 MANUFACTURER

- A. The materials shall be the products of a manufacturer with a minimum of ten years experience in the manufacture of similar equipment.
- B. Acceptable Manufacturers
 - 1. Metallic Conduits: Allied, and Wheatland.
 - 2. Nonmetallic Conduits: Cantex, and SEDCO.

3. PVC Coated Metallic Conduits: Plastibond, Permacote, and Korkap.
4. Others: As listed with products.

1.7 WARRANTY

- A. The materials shall be warranted to be in proper working condition for a period of one year following the date of final acceptance.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Rigid Metal Electrical Conduit: Hot-dipped galvanized steel with zinc coated threads and an outer coating of zinc bichromate, complete with one coupling and one end thread protector. Intermediate metal conduit (IMC) is not allowed.
- B. Electrical Metallic Tubing: Welded, electro-galvanized thin wall steel tubing.
 1. Conduit for power wiring shall be natural electro galvanized.
 2. Conduit for other systems shall be color coded in accordance with Section 26 05 23 - Control Voltage Electrical Power Cables.
- C. Flexible Metal Electrical Conduit: Hot-dipped galvanized steel strip core with integral copper ground wire on sizes 1-1/4" and smaller.
- D. Liquidtight Flexible Metal Electrical Conduit: Hot-dipped galvanized steel strip core with extruded polyvinyl jacket.
- E. Rigid Nonmetallic Electrical Conduit: Schedule 40 heavy wall polyvinylchloride, high impact resistant.
- F. PVC Coated Galvanized Rigid Conduit: The PVC coated galvanized rigid conduit must be UL Listed. The PVC coating must have been investigated by UL as providing the primary corrosion protection for the rigid metal conduit. Ferrous fittings for general service locations must be UL Listed with PVC as the primary corrosion protection. Hazardous location fittings, prior to plastic coating must be UL listed. All conduit and fittings must be new, unused material. Applicable UL standard may include: UL 6 Standard for Safety, Rigid Metal Conduit, UL514B Standard for Safety, Fittings for Conduit and Outlet Boxes.
- G. Elbows and Bends:
 1. All Types: Size 1-1/4 inch and larger shall be factory manufactured.
- H. Bushings:
 1. 1-1/4" and Smaller: Same material as the conduit with which they are installed.
 2. 1-1/2" and Larger: Hot-dipped galvanized with thermosetting phenolic insulation, 150 Deg.C.
- I. Locknuts:
 1. 1-1/2" and Smaller: Zinc plated heavy stuck steel, O-Z/Gedney.
 2. 2" and Larger: Cadmium plated malleable iron, O-Z/Gedney.
- J. Hubs: Cadmium plated malleable iron, tapered threads, neoprene "O" ring, insulated throat, O-Z/Gedney.
- K. E.M.T. Compression Connectors: Gland compression type, zinc plated steel body, cadmium plated, malleable iron nut, insulated throat, O-Z/Gedney.
- L. E.M.T. Compression Couplings: Gland compression type, zinc plated steel body, cadmium plated malleable iron nut, O-Z/Gedney.
- M. Liquidtight Conduit Connectors: Cadmium plated malleable iron body and nut, cadmium plated steel ferrule, insulated throat, integrally cast external ground lug, O-Z/Gedney.

- N. Seals for Watertight Wall and Floor Penetrations: Malleable iron body, oversize sleeve, sealing ring, pressure clamp and rings and sealing grommet, hex head cap screws, O-Z/Gedney.
- O. Seals for Penetrations through Existing Walls: Thunderline Corporation Link-Seal watertight sleeves, complete with wall and casing seals.
- P. Fire Seals: Galvanized iron pipe sleeves sealed with approved foam type fireproofing.
- Q. Expansion Fittings: Hot-dipped galvanized malleable iron with bonding jumpers selected for linear or linear with deflection, as required.
- R. Escutcheons: Chrome plated sectional floor and ceiling plates, Crane No. 10.
- S. Accessories: Reducers, bushings, washers, etc., shall be cadmium plated malleable iron on the forms and dimensions best suited for the application.
- T. Identifying Tape for Underground Conduits: Polyethylene tape, 6 inches wide, with continuous printing along length, Brady Identoline:
 - 1. For Electric Power Conduits: Yellow with black letters.
 - 2. For Other Services: Green with black letters.
- U. Sleeves: 22 gauge galvanized steel sleeves where conduits pass through walls and floors. Standard galvanized steel pipe where conduits pass through beams, outside walls, or structural members.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine surfaces to which conduits are to be secured for:
 - 1. Defects which will adversely affect the execution and quality of work.
 - 2. Deviations from allowable tolerances for the building material.
- B. Do not start work until defects and deviations are corrected.

3.2 INSTALLATION

- A. Size conduits as indicated on the drawings and as required by the NEC for the number and sizes of wires to be drawn into conduit. Do not use conduit sized less than 3/4" unless specified otherwise.
- B. Conceal conduits from view in all areas except mechanical and electrical equipment rooms and crawl spaces. Should it appear necessary to expose any conduit:
 - 1. Bring to the attention of the Architect, immediately, and
 - 2. Rearrange the work to facilitate an approved installation.
- C. Install all conduits at elevations and locations to avoid interference with grading of other work, the structure, finished ceilings, walls. Avoid causing cutting of masonry units.
- D. To prevent displacement, securely support and hold in place all conduits installed in advance of other work and to be concealed in the building structure.
- E. Carefully lay out conduits run within the structure, such as floors, beams, walls, to avoid densities excessive for the construction. Relocate those conduits when excessive densities occur.
- F. Ream, remove burrs, and swab inside conduits before conductors are pulled in.
- G. Cap or plug conduits with standard manufactured accessories as soon as the conduits have been permanently installed in place.

- H. Bends and offsets in 1" and smaller conduits may be done with approved bending devices. Do not install conduits which have had their walls crushed and deformed and their surface finish damaged due to bending.
- I. Where space conditions prohibit the use of standard ells, elbows, and conduits, use cast ferrous alloy fittings of such forms and dimensions as best required for the application.
- J. Make all conduit joints mechanically tight, electrically continuous, and watertight. Pitch conduits in a manner to avoid creating moisture traps.
- K. Install insulated throat threaded hubs on conduits entering enclosures without threaded hubs where exposed to damp or wet locations.
- L. Connect and couple E.M.T. with compression type fittings. Do not use indenter and set screw fittings.
- M. Install and neatly rack exposed conduits parallel with and perpendicular to the building walls. Do not install exposed diagonal conduit runs.
- N. Route and suspend conduits crossing expansion joints to permit expansion, contraction, and deflection utilizing approved fittings to prevent damage to the building, conduits, and supporting devices in accordance with the National Electrical Code.
- O. Do not run conduits exposed on the roof unless approval is obtained prior to installation.
- P. Do not place conduits in close proximity to equipment, systems, and service lines, such as hot water supply and return lines, which could be detrimental to the conduit and its contents. Maintain a minimum 3" separation, except in crossing, which shall be a minimum 1".
- Q. Connect motors, equipment containing motors, equipment mounted on an isolated foundation, and other equipment and devices which are subject to vibration and which require adjustment with flexible metallic conduit from the device to the conduit serving it. Size the flexible conduit length more than 12 diameters, but less than 18 diameters. Rigidly support the points of attachment on each side of the connection.
- R. Install escutcheons on all exposed conduits passing through interior floors, walls, or ceilings. Install fire sealing materials on all conduits passing through fire rated partitions. Install wall and floor fire seals on all conduits passing through exterior walls and floors.
- S. Conduit sleeves shall be sized to permit insertion of conduit with adequate clearance for movement due to expansion and contraction. Where conduits pass through outside walls, watertight fittings, as specified herein, shall be used.
- T. Provide pullstring in each empty conduit. Label pullstring when conduit termination is not obvious.
- U. All stubups of PVC conduit runs shall be made with rigid galvanized steel conduit with protective wrapping. Provide corrosion resistant protective wrapping from where the galvanized conduit begins to 4" above the finished floor.

3.3 USES PERMITTED

- A. Rigid Metal Conduit:
 - 1. Exterior conditions above grade.
 - 2. Interior wet or damp locations.
 - 3. Hazardous locations.
 - 4. Central utility plant and mechanical equipment rooms.
 - a. Sizes 2" and larger.
 - 5. Lower Level of the building.
 - a. Sizes 2" and larger.

- B. Schedule 40 PVC with concrete encasement:
 - 1. Below grade exterior to the building.
 - a. Electric Services.
 - b. Communications Services.
 - c. Sizes 2" and larger.
- C. Schedule 40 PVC without concrete encasement:
 - 1. Below grade interior to the building.
 - a. Electric services below floor slab.
 - b. Communications services below floor slab.
 - 2. Below grade exterior to the building.
 - a. Sizes 1-1/2" and smaller.
- D. Electrical Metallic Tubing:
 - 1. All uses above grade interior to the building, except as limited elsewhere in this section.
- E. Steel Armor Clad Cable:
 - 1. Concealed in walls and above ceilings.
 - 2. Final connection from junction boxes on structure to individual light fixtures. Fixture-to-fixture wiring not permitted.
 - 3. Home runs from first junction box to panelboards shall be EMT.
- F. Flexible Metal Conduit:
 - 1. Final connection to vibrating or adjustable equipment.
 - 2. Connection to vibrating equipment shall contain one 90 degree bend.
- G. Liquid tight Flexible Metal Conduit:
 - 1. All uses permitted for flexible metal conduit.
 - a. In damp or wet locations.
 - b. Exterior to the building.
 - c. Food service areas.
 - d. Central plant equipment rooms.

END OF SECTION

SECTION 26 05 33

BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 REFERENCE DOCUMENTS

- A. Comply with Division 1 - General Requirements and related documents.
- B. Comply with all of the Division 26 sections as applicable.
- C. Refer to other Divisions for coordination of work with other portions of work.

1.2 DESCRIPTION

- A. Work Included: Provide outlet boxes for the installation of wiring devices, lighting fixtures, and power and control connections.
- B. Related work specified in other section:
 - 1. 26 00 00 - Electrical
 - 2. 26 27 26 - Wiring Devices
 - 3. 26 51 01 - Interior Lighting
 - 4. 26 05 23 - Control-Voltage Electrical Power Cables

1.3 QUALITY ASSURANCE

- A. The equipment supplied and installed shall meet the requirements of the National Electrical Code and all applicable local codes and ordinances.
- B. All equipment supplied shall be Underwriter's Laboratories Inc. listed and so labeled.

1.4 SUBMITTALS

- A. Samples: Provide samples upon specific request.
- B. Product Data: If materials are by manufacturers other than those specified, submit product data giving complete description for sizes employed, material types, and electrical ratings.

1.5 MANUFACTURERS

- A. Listed with Materials.
 - 1. Appleton Electric Company
 - 2. Raco
 - 3. Steel City
 - 4. Crouse Hinds
 - 5. Hubbell
 - 6. Raceway Components
 - 7. Walker

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Flush Mounted Outlet Boxes: Standard, stamped galvanized steel with factory conduit knockouts, one piece and welded construction:
 - 1. Series 4S and 4S0 square boxes with covers.
 - 2. Series M1, M2, M3 - 250 and Series M1, M2, M3 - 350 masonry boxes with covers.
 - 3. Series 2G and GC-5075 switch boxes with covers.
 - 4. Series OCR concrete rings with Series OCP and OCP-3/8 back plates.
 - 5. Series 40 and 40D octagonal boxes with raised covers.
 - 6. Series SX expandable bar hangers.
- B. Surface Mounted Outlet Boxes: Cast metal with threaded hubs. Type FS and FD of form suited to the application.
- C. Fire Rated, Flush, Poke-Thru Outlets: Raceway Components, Inc. #RC-700A.
- D. Fire Rated, Flush, Poke-Thru Outlets with Conduit Adapter: Raceway Components, Inc. #RC-700-6-A.
- E. Floor Outlet Boxes: Hubbell cast flush floor boxes, fully adjustable with flush service fitting, and carpet flange (if required).

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine building structure to which outlet boxes are to be secured for defects which affect the execution and quality of work.
- B. Do not start work until defects are corrected.

3.2 PREPARATION

- A. Carefully measure and lay out exact locations in conference with the Construction Manager.
- B. Owner may change outlet box locations a distance of 5 feet before rough-in without additional cost.

3.3 INSTALLATION

- A. In dry walls for single and two gang outlet provide 4S and 4D boxes; for 3 or more outlets use masonry boxes.
- B. In poured concrete floors, provide cast flush floor boxes complete with service fittings and carpet flanges (if required).
- C. In existing concrete floors, provide fire-rated poke-thru outlets complete with wiring devices and other accessories (if required).
- D. In block and masonry walls provide masonry boxes of depths required for wall thickness.
- E. In poured concrete and plastered walls provide 4S and 4D boxes for single gauge outlets and 2G and 3G-5075 boxes for multiple ganged outlets.
- F. In concrete ceiling provide OCR rings.
- G. In other ceilings provide 40 and 40D boxes. Omit covers if standard canopy and device plates entirely cover the ceiling opening.

- H. In exposed work, exterior of the building, in wet locations, and flush in non-waterproofed walls below grade provide FS and FD boxes.
- I. Submit for approval special boxes for special devices and applications. Size according to device and application in accordance with NEC.
- J. Install outlet boxes finished to within 1/8 inch of finished surfaces.
- K. Install center of box at heights above finished floor:
 - 1. Wall Switches: 45 Inches
 - 2. Convenience Outlets: 18 Inches
 - 3. Telephone/Data Outlets: 18 Inches
 - 4. Wall Telephone Outlets: 45 Inches
 - 5. Boxes Indicated Above Counters: 4 Inches above backsplash and trim, unless otherwise indicated.
- L. Install wall switch outlet boxes on the strike side of doors as finally hung.
- M. Group outlet on circuits with homeruns as indicated on the Drawings.
- N. Do not provide through-the-wall and back-to-back boxes unless specifically noted on the drawings.
- O. Provide standard manufactured plugs in unused openings of boxes.
- P. Provide boxes at the terminal of conduit runs to outlets and devices.
- Q. Provide plaster rings and covers where required by the building structure.
- R. In brick finished walls, locate to work brick in a brick course where possible, and to permit conduits and raceways to enter from the rear without cutting brick, where possible.
- S. Provide 3/8 inch studs and lighting fixture outlet boxes where shop drawings of fixtures require and elsewhere as may be required for fixtures.
- T. Rigidly attach to structure and ceiling supporting members in suspended ceilings to avoid cutting mechanical ceiling members.
- U. Center outlet in paneling and in other Architectural features.
- V. Locate light fixture outlets in uniform relation with ceiling tiles.
- W. Label all junction boxes with circuit information as to its use for special system equipment. Use an indelible marker to mark information on cover.

3.4 CLEANING

- A. Clean surfaces to be painted.

END OF SECTION

SECTION 26 05 53

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 REFERENCE DOCUMENTS

- A. Comply with Division 1 - General Requirements and related documents.
- B. Comply with all of the Division 26 sections as applicable.
- C. Refer to other Divisions for coordination of work with other portions of work.

1.2 DESCRIPTION

- A. Provide identification of electrical equipment.
- B. Provide identification of over current devices.
- C. Provide identification of branch circuits, outlets, and wiring devices.
- D. Provide identification of required clear working spaces for electrical equipment.
- E. Provide identification of rooms and spaces for access by qualified personnel.
- F. Related work specified in other section:
 - 1. 26 05 33 - Boxes for Electrical Systems.
 - 2. 26 22 13 - Low Voltage Distribution Transformers.
 - 3. 26 24 13 - Circuit Breaker Distribution Switchboards.
 - 4. 26 24 16 - Panelboards.

1.3 QUALITY ASSURANCE

- A. Signs and placards shall meet the requirements by OSHA.

1.4 SUBMITTALS

- A. Submit literature describing all signage and marking materials to the Architect for approval prior to installation.

PART 2 - PRODUCTS

2.1 LABELS

- A. Labels shall be typewritten, adhesive backed printed labels. Lettering shall be minimum 18 point type in basic black font.

2.2 MARKING MATERIALS

- A. Materials for marking of required working clearance shall be adhesive backed yellow tape, equal to 3M Company 471 Series. Clean and prepare floor surface in accordance with manufacturer's instructions.

PART 3 - EXECUTION

3.1 EQUIPMENT

- A. Provide other electrical and mechanical equipment with placards identifying.
 - 1. The name of the equipment.
 - 2. The name of the supply source equipment.
 - 3. The circuit number of the overcurrent device supplying the equipment.

3.2 OUTLET BOXES, JUNCTION BOXES AND WIRING DEVICES

- A. Provide labels affixed to the inside cover for each outlet box, junction box, and wiring device identifying the panel name and branch circuit numbers for the overcurrent devices supply the circuits.

END OF SECTION

SECTION 26 51 01

INTERIOR LIGHTING

PART 1 - GENERAL

1.1 REFERENCED DOCUMENTS

- A. Comply with Division 1 - General Requirements and related documents.
- B. Comply with all other Division 26 sections as applicable.
- C. Refer to other Divisions for coordination of work with other portions of work.

1.2 DESCRIPTION

- A. Work Included: Provide LED lighting fixtures and accessories for interior illumination of the building.
- B. Related work specified in other Sections:
 - 1. 26 00 01 General Provisions
 - 2. 26 05 19 Low Voltage Electrical Power Conductors and Cables
 - 3. 26 05 29 Hangars and Supports for Electrical Systems
 - 4. 26 05 32 Raceways
 - 5. 26 05 33 Boxes for Electrical Systems
 - 6. 26 51 05 Lighting Controls

1.3 QUALITY ASSURANCE

- A. The equipment supplied and installed shall meet the requirements of the National Electrical Code and all applicable local codes and ordinances.
- B. All equipment supplied shall be Underwriter's Laboratories Inc. listed and so labeled.
- C. Laboratory Testing: Photometric testing shall be by Independent Testing Laboratories, Inc., based on Illuminating Engineering Society published procedures, and shall include candlepower distribution tabulation and zonal cavity coefficient of utilization tabulation.

1.4 REFERENCE STANDARDS

- A. Underwriters' Laboratories No. 57 - Fixtures, Electric Lighting.
- B. Underwriters' Laboratories No. 924 - Emergency Lighting and Power Equipment.
- C. Underwriters' Laboratories No. 1598 - Luminaires
- D. Underwriters' Laboratories No. 2043 - Standard for Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces

1.5 SUBMITTALS

- A. Submit manufacturer's literature giving materials, finishes, dimensions, coefficients of utilization, and lamp types for each fixture which is the product of one of the listed acceptable manufacturers.
- B. Submit large scale shop drawings and copies of independent testing laboratory test report, along with manufacturer's literature for each fixture which is the product of any manufacturer not listed as acceptable.

- C. Submit samples of fixtures upon specific request.
- D. Certificates: Labels of Underwriters' Laboratories, Inc.; affixed to each item of material.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Equipment shall be included and off loaded in accordance with the manufacturer's published instructions.
- B. Upon arrival, inspect equipment for damage incurred in shipping.
- C. Store in a clean, dry environment. Maintain factory packaging and, if required, provide an additional heavy canvas or heavy plastic cover to protect enclosure(s) from dirt, water, construction debris, and traffic.

1.7 MANUFACTURER

- A. The equipment shall be the product of a manufacturer with a minimum of ten years' experience with the manufacturer of similar equipment.
- B. Listed in schedule and with materials.

1.8 WARRANTY

- A. The equipment shall be warranted to be in proper working order for a period of one year following the date of final acceptance.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Lighting Fixtures:
 - 1. Fixtures shall be of the lighting fixture types scheduled on the drawings according to the letter type designations on the plans.
 - 2. If letter type designation is omitted from any fixture shown on the plans, provide the same fixture type as employed in rooms of similar usage.
 - 3. Where manufacturer's model numbers are used to describe fixtures, the intent is to establish the kind and quality of the fixture. The Contractor is responsible for examining the drawings to establish correct ordering information for each fixture including but not limited to voltage for the branch circuit supply, ceiling trim and mounting means for the ceiling material.
- B. Exit Signs:
 - 1. Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.
 - 2. Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.
 - a. Battery: Sealed, maintenance-free, nickel-cadmium type.
 - b. Charger: Fully automatic, solid-state type with sealed transfer relay.
 - c. Operation: Relay automatically energizes lamp from battery when circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
 - d. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
 - e. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
 - f. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and flashing red LED.

C. LED Source Package Lamps:

1. LED fixtures, source packages, arrays or modules and power supplies shall be UL 1598 and 2043 listed.
2. LED source packages, arrays or modules and power supplies shall be tested in accordance with LM-79/LM80.
3. LED light source packages, arrays or modules shall be tested in accordance with LM-80 depreciation test and L70 rated life result shall be a minimum of 50,000 hours.
4. LED lamp color temperature of 4000K with minimum 80% CRI is required for LED lamps. Lamp lumen minimum values as scheduled.
5. Luminaire power factor shall be minimum 90%.
6. LED fixtures, source packages, arrays or modules and power supplies shall be Design Lights Consortium (DLC) qualified.

D. LED Power Supplies/Drivers:

1. LED power supplies shall operate LEDs within the current limit specification of the manufacturer.
2. Shall operate from 60 Hz input source and have input power factor >90% and a minimum efficiency of 70% at full rate load of the driver.
3. Shall have short circuit and overload protection.
4. Shall have a minimum starting temperature of 0°F and a maximum case temperature rating of at least 70°F.
5. Power supply output shall be regulated to ±5% across published load range.
6. Shall have as Class A sound rating.
7. Shall comply with the requirements of the Federal Communications Commission (FCC) rules and regulations, Title 47CFR part 15, non-consumer (Class A) for EMI/RFI.
8. Shall contain no PCBs.
9. Shall carry a five (5) year minimum warranty from date of manufacturer against defects in materials or workmanship, including a replacement for operation at or below the maximum case temperature specification. For LED lamps and internal power regulation components for defects resulting in a fixture lumen depreciation >30%.
10. Dimmable power supplies shall allow the light output to be maintained at the lowest control setting (prior to off) without dropping out.

E. Emergency Lighting Units with Battery Packs:

1. Self-contained units complying with UL 924.
 - a. Battery: Sealed, maintenance-free, lead-acid type.
 - b. Charger: Fully automatic, solid-state type with sealed transfer relay.
 - c. Operation: Relay automatically turns lamp on when power supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
 - d. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
 - e. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
 - f. Remote Test: Switch in hand-held remote device aimed in direction of tested unit initiates coded infrared signal. Signal reception by factory-installed infrared receiver in tested unit triggers simulation of loss of its normal power supply, providing visual confirmation of either proper or failed emergency response.
 - g. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and flashing red LED.

F. LED Source Package Lamps:

1. LED fixtures, source packages, arrays or modules and power supplies shall be UL 1598 and 2043 listed.
2. LED source packages, arrays or modules

G. Lighting Fixture Support Components:

1. Comply with Division 26 Section "Hangers and Supports for Electrical Systems" for channel- and angle-iron supports and nonmetallic channel and angle supports.
2. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.
3. Twin-Stem Hangers: Two, 1/2-inch steel tubes with single canopy designed to mount a single fixture. Finish same as fixture.
4. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage.
5. Wires for Humid Spaces: ASTM A 580/A 580M, Composition 302 or 304, annealed stainless steel, 12 gage.
6. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.
7. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

- H. Accessories: Manufacturers' standard mounting ring, trim flanges, hanger bars, spacers, supports, plaster frames of non-ferrous material or cadmium plated steel. Do not use painted steel plaster frames.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Inspect Architectural drawings and specifications, including ceiling alternates, to determine ceiling material to be installed.
- B. Inspect Architectural reflected ceiling plans.
- C. Inspect installed ceiling components and pole bases for defects affecting the quality and execution of work.

3.2 PREPARATION

- A. Verify ceiling material, type, support method and alignment.
- B. Layout exact locations of fixtures in accordance with reflected ceiling plans, fixtures' and switches' outlet boxes and supports, and poles and standard bases.
- C. Provide specified outlet boxes and conduit system for the light fixtures including conduit support system.
- D. All lighting fixtures shall be supported from building structure. Do not support lighting fixtures from the ceiling system. Fixtures shall be supported by supplementary hangars located within 6 inches of each corner, or supported independently from the structure. Do not support lighting fixtures from other building systems located above the ceiling such as fire sprinkler piping, HVAC piping, plumbing piping, equipment or ductwork.

3.3 INSTALLATION

- A. Provide lighting fixtures, control systems and wiring.
- B. If designation omitted on drawings, provide same type fixtures employed in rooms of similar usage.
- C. Provide spacers for fixtures mounted on low density ceiling material.
- D. Provide plaster frames for recessed fixtures in plaster or gypboard ceilings.
- E. Install fixtures in and on acoustical tile ceilings in alignment with tile joints.
- F. Install fixtures in gypsum board ceilings to recess in the space available between structural members where the ceiling is installed tight against the structure.

- G. Install in accordance with manufacturer's instructions, submittal data, and details on the drawings.

3.4 ADJUSTMENT AND CLEANING

- A. Adjustment: Adjust lamp positions for desired effects. Align fixtures with building walls and tile joints.
- B. Cleaning: Remove dirt, grease, and foreign materials from fixtures. Remove fingerprints, smudges, and dirt from fixture's lenses and lamps.

3.5 LIGHTING FIXTURE SCHEDULE

- A. Reference drawings for Lighting Fixture Schedule.

END OF SECTION

SECTION 26 51 05

LIGHTING CONTROLS

PART 1 - GENERAL

1.1 REFERENCED DOCUMENTS

- A. Comply with Division 1 - General Requirements and related documents.
- B. Comply with all other Division 26 sections as applicable.
- C. Refer to other Divisions for coordination of work with other portions of work.

1.2 DESCRIPTION

- A. Work Included: Provide a distributed, low voltage lighting control system with networked devices.

- B. Related work specified in other Sections:

- 1. 26 00 00 Electrical
- 2. 26 05 19 Low Voltage Electrical Power Conductors and Cables
- 3. 26 95 32 Raceways
- 4. 26 05 33 Boxes for Electrical Systems
- 5. 26 51 01 Interior Lighting

1.3 QUALITY ASSURANCE

- A. Factory Assembly: All system components shall arrive at the job site completely pre-wired and ready for installation, requiring only the connection of lighting circuits and network terminations. All connections shall be made to clearly and permanently labeled termination points. Systems that require field assembly shall not be acceptable.
- B. Component Testing: All system components and assemblies shall be individually tested prior to assembly. Once assembled, all finished products shall be tested for proper operation of all control functions per specifications prior to shipment.
- C. NEC Compliance: All system components shall comply with all applicable sections of the National Electrical Code (NEC) as required.
- D. NEMA Compliance: All system components shall comply with all applicable portions of NEMA standards pertaining to types of electrical equipment and enclosures.
- E. UL Approval: All applicable equipment shall be tested to and listed under UL standard 508 and shall bare labels to indicate compliance. Lighting control relays shall be tested to UL standard 508 for both safety and endurance. System listed other ETL or other UL sections shall provide documentation proving compliance with UL standard 508.

1.4 SUBMITTALS

- A. Submittals shall include, but not be limited to, the following:
 - 1. Product data on all lighting control system components and accessories.
 - 2. Reflected ceiling plan drawings showing specific locations of occupancy sensors for lighting control including lines delineating sensor effective range, with and without furniture system partitions, sensor type, sensor mounting, and other pertinent data to allow evaluation of the proposed system.
 - 3. Wiring diagrams for occupancy sensors, related control units, and override switches including an overall system riser diagram.

4. Make submittals in accordance with Division 01.
5. Submit factory approved lighting controls layout showing all devices and proposed devices locations.

1.5 DELIVERY STORAGE AND HANDLING

- A. Deliver devices and cover plates in manufacturer's sealed unopened packages and protect from the introduction of dust and moisture.
- B. Do not install sensors and cover plate until adjacent finishes are complete and the area has been cleaned to a dust free dry environment.

1.6 MANUFACTURER

- A. The equipment shall be the product of a manufacturer with a minimum of ten years experience with the manufacture of similar equipment.
- B. Acceptable Manufacturer
 1. Acuity
 2. Hubbell
 3. Lutron
 4. Siemens
 5. Wattstopper

1.7 WARRANTY

- A. Provide a five year parts and one year labor warranty. Warranty coverage shall begin at the time of Project Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Summary:
 1. The lighting control system specified in this section shall occupancy sensor-based and manual lighting control
 2. The system shall be capable of turning lighting loads on/off as well as dimming lights (if lighting load is capable of being dimmed). Specific dimmers will be capable of "dimming lights to off".
 3. The system architecture shall be capable of enabling stand-alone groups (rooms) of devices to function independently.
 4. The system shall not require any centrally hardwired switching equipment.
- B. System Requirements:
 1. System must interface directly with intelligent LED luminaires such that only plenum rated CAT-5 cabling is required to interconnect luminaires with control components such as sensors and switches (see Networked LED Luminaire section).
 2. Intelligent lighting control devices shall communicate digitally, require <7 mA of current to function (Graphic wall stations excluded), and possess RJ-45 style connectors.
 3. Lighting control zones shall consist of one or more intelligent lighting control components, be capable of stand-alone operation, and be capable of being connected to a higher level network backbone.
 4. Devices within a lighting control zone shall be connected with plenum rated CAT-5e low voltage cabling in any order.

2.2 Digital Room Controller

- A. As indicated and where shown on the plans, install room controllers to control the quantity of lighting and plug loads required.
- B. Room controllers shall provide 0 - 10 volt dimming capability for the required number of lighting loads.
- C. Room controllers shall integrate the functionality of connected control components including wall switch stations, occupancy sensors and daylight sensors to provide the required sequence of operation for the space.
- D. Room controllers and associated room control components shall operate in a totally stand alone mode and not require the use of a network, software, computer or server for local control and time based functions.
- E. Functional:
 - 1. Provide an integral pushbutton and LED indicator for each load for status and to allow operation of the relays and dimmers for testing and verification without requiring other control devices to be connected.
 - 2. The room controller shall have a default operation providing an automatic logical sequence of operation for each load as the room control devices are plugged into the Smart Port connectors.
 - 3. Default operation for occupancy sensors shall be automatic on, automatic off for all loads.
 - 4. Upon connection of a switch, the operation shall automatically change to manual on, automatic off (vacancy) mode for all loads.
 - 5. Provide capability to convert each load independently to automatic on or vacancy mode using only the integral push buttons and LED indicators on the room controller.
 - 6. When in vacancy mode, provide a 30 second grace period after an off during which automatic on shall be temporarily enabled.
 - 7. It shall be possible to connect up to eight (8) room controllers together using Cat5 patch cables to provide configurations up to 16 switched and dimmed loads operating as a single zone.
 - 8. Provide the following set up and configuration functions without the need for additional devices or software:
 - a. Assign/reassign relays for control by wall switch station buttons
 - b. Configure relays for occupancy or vacancy operation
 - c. Assign/reassign dimmers to raise/lower switches
 - d. Assign dimming channels for response to daylight sensor control
 - e. Auto calibrate default daylight sensor sequence of operation
 - f. Save preset scenes

2.3 Low Voltage Switch Stations

- A. Low voltage digital wall switch stations shall be of the programmable type using plenum rated Cat5 cabling for connection to system smart port.
- B. Stations shall have one to six buttons and provide lighting control functions as called out and shown on the plans.
- C. All switches shall be single gang and be of the generic decorator style allowing easy ganging and use of a wide array of standard wall switch plate options.
- D. Provide two RJ-45 ports per switch to allow for daisy chain connection of up to eight switches to each smart port.
- E. Switch station color shall be white with white cover plates.

2.4 Occupancy / Vacancy Sensors

- A. Occupancy sensors shall be ceiling or wall mounted and use dual technology (ultrasonic and passive infrared), ultrasonic and/or passive infrared (model specific) sensing technology as indicated.
- B. Sensors shall be Class 2 and connect to any room controller smart port using a wiring adaptor and standard Cat5 patch cable.
- C. Occupancy sensors shall be self adaptive and not require manual calibration after installation. Digital circuitry and logic shall automatically make adjustments to the sensitivity and time delay based on learned occupancy patterns and the environment in which the sensor is installed.
- D. Sensors using both ultrasonic and passive infrared (dual technology) shall operate such that detection by both technologies is required to initiate occupancy and continued detection by either technology will maintain occupancy.
- E. Up to four occupancy sensors may be connected to one room controller.

2.5 Emergency Lighting Interface

- A. Where emergency lighting is to be controlled by the lighting control system, provide UL924 listed load control relays as necessary to insure that emergency lights are automatically turned full on upon loss of normal power to the area.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install lighting controls as required and where indicated, in accordance with manufacturer's written instructions and project shop drawings, applicable requirements of NEC, and recognized industry practices to ensure that products serve intended function.
- B. Sensor Design and Layout:
 - 1. It shall be the equipment manufacturers'/ contractors' responsibility to provide the quantity of sensors required for complete and proper coverage without gaps within the range of coverage of controlled areas. Rooms shall have 100% coverage to completely cover the controlled area to accommodate all occupancy habits of single or multiple occupants at any location within the room. The locations and minimum quantities of sensors shown on the Drawings are diagrammatic and indicate only rooms which are to be provided with sensors. The equipment manufacturer/contractor shall provide additional sensors if required to properly and completely cover the respective room. Proper judgment must be exercised in executing the work so as to ensure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structural components.
 - 2. Exact locations of control unit hardware boxes shall be based on observing good installation practice and shall be coordinated with other elements of the reflected ceiling plan. Control unit hardware shall be fully concealed.
- C. Box Condition: Install low voltage lighting control devices only in electrical boxes which are clean, free from excess building material, debris, and similar matter.
- D. Wiring:
 - 1. All branch circuit wiring shall be installed in an approved raceway.
 - 2. Low voltage wiring shall be installed in an approved raceway where concealed in inaccessible locations or exposed. Where low voltage wiring is concealed in accessible ceiling plenums, it may, with pre-approval from the Owner and Engineer, be routed without a raceway using air plenum rated cable.
 - 3. All low voltage wiring shall be color coded and identified or tagged at terminals to assist with future maintenance.

- E. Sensor Testing and Adjustment: At the time each sensor is installed, it shall be adjusted as follows:
1. Sensitivity shall be adjusted for proper occupant detection appropriate to the usage of the room.
 2. Set time delay at approximately 6 minutes after setting in 30 second test to verify sensor/control unit operation.
 3. Check indicator light of each sensor to verify that occupancy is being detected in the range desired.
 4. Sensor operating frequencies shall be selected to select interference with other units in the vicinity as required.
 5. Ensure that there are no obstructions which could block proper sensor coverage, thereby minimizing the sensor detection zone.
 6. Occupancy sensors may be affected by various conditions in the room. It may be necessary for the Contractor to make adjustments, change the location or type of sensor to obtain proper operation in a specific room. The Contractor/equipment manufacturer shall have final responsibility for proper operation and coverage of the system in each room and should therefore make labor allowance for such changes and adjustments. The Contractor is also responsible for acquiring approval from Engineer for any changes or deviations from project specifications.

3.2 SPARES

- A. Provide 10% spare sensors and switch packs of each type used on the project.
- B. Deliver spares to the Owner at completion of project.

3.3 SYSTEM COMMISSIONING

- A. The contractor shall provide lighting system functional testing per C408.3.1 of the 2015 International Energy Conservation Code. A lighting control system manufacturer's representative shall be on site to assist the contractor during testing. Any deficiencies in the system's performance shall be corrected immediately prior to issuing a final report.
- B. All occupancy sensors shall be tested for location and functional acceptability.
- C. Time switch controls shall be tested for the correct time, date and owners control schedule. Lighting on time switch controls shall be tested for on / off / dimming status.
- D. Daylight responsive controls shall be tested for location and functional acceptability.
- E. All building management system software, graphics, reporting and remote control shall be tested and accepted by the Owner prior to issuing the functional testing final report.
- F. A final report certifying that the installed lighting controls meet documented performance criteria of section C405 of the 2015 International Energy Conservation Code shall be submitted to the Owner, Architect and Engineer for approval within 90 days from the date of receipt of the Certificate of Occupancy.

3.4 DEMONSTRATION/TRAINING

- A. Upon completion of testing and adjustment, the Contractor shall demonstrate operation of the system to representatives of the Owner and Engineer.
- B. The Contractors shall provide eight hours of instruction the Owner's personnel in proper maintenance, adjustment, and operation of the occupancy sensor lighting controls.

3.5 Project Closeout Documentation

- A. Provide a factory published manual
 1. Warranty
 2. Technical support contact

Controlled Entry at 15 Campuses
Birdville ISD
North Richland Hills, Haltom City, Hurst and Watauga, Texas

3. Electronic manual

END OF SECTION

SECTION 28 10 10

BUILDING CARD ACCESS AND ENTRY MANAGEMENT SYSTEM

PART 1 - GENERAL

1.1 RELATED SECTIONS

- A. Basic Electrical Requirements - Section 26 05 00.
- B. Cable Management - Section 27 11 23.

1.2 SCOPE OF WORK

- A. The General Provisions of the Contract, including General and Supplementary Conditions, apply to the work specified in this Section.
- B. Provide all equipment, materials, labor, supervision, and services necessary for or incidental to the installation of a complete building access system as shown or indicated on the drawings and/or specified as well as provide Unit Pricing for all items incorporated as well as other products / systems / components available to provide additional coverage or options.
- C. Provide necessary electrical for operation of all equipment indicated within project documents, and as shown on plans.
- D. CARD ACCESS SYSTEM:
 - 1. Installation of the Card Access system components included all required wiring to fully interface with the OSSI Intelli-Site software system that is operated at the districts NOC. The system will provide full access control of door locations indicated. The system will provide proprietary software and password protection to prevent unauthorized modification or use of this system. Contractor does not provide Intelli-Site software for the server.
 - 2. The systems shall be installed at location as shown on the plans. The installer will provide all system programming for the system and designated components.
 - 3. The system shall be complete with all wiring, equipment enclosures, conduit and power supplies required for a fully operational system including door locking hardware (strike or magnetic). All wiring will conform to methods and materials described in these specifications and comply with all applicable NEC, state and local codes.
 - 4. Contractor must coordinate all door hardware requirements with door hardware schedule and must review door hardware submittals.
 - 5. The access system shall operate using a proximity sensors compatible with existing Birdville ISD system. The security system shall monitor security contact points continuously or by selected time periods. The television surveillance system shall consist of television cameras, switching devices, recorders and television monitor.
 - 6. Acceptable manufacturers:
 - a. OSSI USA
 - 1) Intelli-Site Software ES Series

1.3 CODES AND REGULATIONS

- A. NFPA 70, National Electrical Code
- B. NFPA 71, National Fire Alarm Code
- C. Americans with Disabilities Act
- D. Texas Accessibility Standards

- E. International / Uniform Building Codes (IBC/UBC)
- F. Local and State Building Codes
- G. All requirements of the local Authority Having Jurisdiction (AHJ) 1.04 SUBMITTALS
- H. Quality Assurance Submittals:
 - 1. Letter from manufacturer stating that the Contractor is an Authorized Factory Distributor for the area where the project is located.
 - 2. Current copy of the Contractor's Certificate of License as a Security Services Contractor -Alarm Systems issued by the State Board of Private Investigators and Private Security Agencies.
- I. Product data:
 - 1. Drawing locating all components of the security system and indicating circuit routing, cable type, and gauge.
 - 2. Equipment list and data sheets on all security system devices, riser diagrams, special boxes, wire, modules, and other material as requested by the Architect including:
 - a. Manufacturer.
 - b. Model number.
 - c. Indication of all options and accessories.
 - d. Catalog data sheets with photograph.
 - 3. Submit complete submittal package within 30 calendar days after award of this work for approval. Equipment is not to be ordered without approval.

1.4 QUALIFICATIONS

- A. Proposers who do not currently possess the necessary qualifications, trained and experienced personnel, financial capacity, required current licenses, and meet the other requirements herein described will be disqualified.
 - 1. Contractor shall provide their current OSSI Interi-Site dealer/installer certification with their proposal.
- B. The Contractor shall be currently licensed by the State Board Private Security Agencies to sell, install, and service security alarm systems.
- C. The Contractor, as a business entity, shall be an authorized and designated representative of the security panel manufacturer, with full warranty privileges, and shall have been actively engaged in the business of selling, installing, and servicing alarm systems for a period of at least 5 years.
- D. Recently formed companies are acceptable only if specified pre-approval is requested, and granted by the Architect/Engineer, based on experience of key personnel, current and completed projects, and all licensing requirements are met 10 working days prior to the proposal date.
- E. All employees working on the project must be registered alarm installers. The Contractor shall factory-trained technicians capable of supporting the maintenance of the system. No contract employees are allowed unless they have been to the factory service school within the last 18 months. A certificate of this training shall be provided with the Contractor's submittal.
- F. The Contractor shall have an office within 150 miles of the job site staffed with trained technicians who are qualified and licensed to supervise the installation, to be responsible that the system is installed as submitted, to conduct system start-up and perform a 100 percent operation audit of all installed devices, to instruct the Owner's representatives and the local AHJ in the proper operation of the system, and to provide service throughout the warranty period. The Contractor shall be capable of dispatching technicians to repair a system within six hours of a service request.

- G. The Owner may make such investigations as he deems necessary to determine the ability of the Contractor to perform the work, and the Contractor shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any proposal if the evidence submitted by, or investigation of, such Contractor fails to satisfy the Owner that such Contractor is properly qualified to carry out the obligations of the contract and to complete the work contemplated therein. Conditional proposals will not be accepted.
- H. The Contractor shall be fully experience in the design and installation of systems herein specified, and shall furnish with the proposal an itemized list of the installations of the type specified herein. The list shall include the name of the project, date of completion, the amount of the contract, the name, and telephone number of the person to contact for reference. This list must contain at least two (2) projects within 50-mile radius of the school district to allow school administration officials to visit the job site for review of the system installation and service. Each reference project must utilize an alarm panel by the same manufacturer as the proposed system.
- I. The Contractor shall not have any grievances or complaints of record regarding workmanship, code compliance, or service response. A Contractor that has any prior finding(s) of a license violation or has any litigation in process is unacceptable.
- J. The Contractor shall employ full-time local technicians and installers. The manufacturer shall maintain a full-time factory employed service staff for product support and service.
- K. The Owner reserves the right to reject any proposal if the evidence submitted by, or investigation of, such contractor fails to satisfy the Owner that the contractor and/or any subcontractor he proposed can properly qualify to carry out the obligation of any part of the contract, and to complete the work contemplated therein.
- L. The ability of any contractor to obtain plans and provide a performance bond shall not be regarded as the sole qualification of such contractor's competency and responsibility to meet the requirements and obligations of the contract.
- M. The Owner reserves the right to reject the proposal of any contractor who has previously failed to perform properly, or complete on time, contracts of a similar nature.

PART 2 - PRODUCTS

2.1 PROXIMITY READER

- A. The reader shall be proximity type. It shall read the encoded data from the access card when presented to the surface of the reader without physical contact and transmit the data back to the host panel, giving an audible and visual indication of a properly read card.
- B. Readers shall support 125kHz proximity technology.
- C. For aluminum storefront frame mounting:
 - 1. OSSI OS 300 RFID Reader
- D. For all other locations:
 - 1. OSSI OS 500 RFID Reader
- E. Intelligent reader modules (IRM) shall be OSSI CMP-IRM.
 - 1. Provide quantity as required to adequately serve all doors indicated to be access controlled on the plans.

2.2 DOOR POSITION SWITCHES

- A. Provide door position switches only where indicated on floor plans with conduit run to a nearby, accessible, junction box located above ceiling.
- B. Aluminum doors or frames (non-ferrous) flush mount: Provide recessed magnetic contact door switches - Sentrol, Inc. 107CW as required or equivalent.
- C. Steel doors or frames (ferrous) flush mount: Provide recessed magnetic contact door switches - Sentrol, Inc. 1073 series as required or equivalent.
- D. Doors surface mount, standard duty: Provide magnetic contact door switches - Sentrol 1285T series as required or equivalent.
- E. Doors surface mount, heavy duty armored: Provide magnetic contact door switches - Sentrol, Inc. 2500 series as required or equivalent.
- F. For overhead doors provide Sentrol, Inc. 2202A series as required or equivalent.
- G. Coordinate rough in requirements with door and door hardware provider, prior to rough-in.

PART 3 - EXECUTION

3.1 TESTING, WARRANTY, SERVICE

- A. A factory-trained representative of the manufacturer shall supervise the final connections and testing of the system and it shall be subject to the final acceptance of the Architect/Engineer and Owner.
- B. The Security System Contractor shall make a thorough inspection and test of the complete installed security system including all components such as motion detectors, and controls, to ensure the following:
 - 1. Complete and functional system.
 - 2. Installed in accordance with manufacturer's instructions.
 - 3. Confirm at the panel, with an ohmmeter, that each zone has an end of line resistor properly installed.
 - 4. Each of the alarm conditions that the system is required to detect should be introduced on the system, including disconnection from the telephone line.
 - 5. A walk test to confirm that each detector is located and properly aimed for the intended coverage area.
 - 6. Verify that all tripped devices display the correct zone identification at the keypads.
 - 7. Verify the proper processing of the signal at the panel and the correct activation of local alarms and the digital communicator.
- C. The contractor shall provide a warranty of the installed system against defects in material or workmanship for a period of one (1) year from the date of substantial completion. Any equipment or wiring shown to be defective shall be replaced, repaired, or adjusted free of charge. All labor and materials shall be provided at no expense to the Owner. All equipment will carry a one-year warranty or manufacturer's warranty, whichever is greater.
- D. DRAWINGS, MANUALS, AND TRAINING
- E. Upon completion of the installation and prior to final inspection, this contractor shall furnish five (5) copies of as-built drawings. Provide with electronic copies in PDF format. In addition, this contractor shall furnish four (4) copies of a manual giving complete instructions for the operation, inspection, testing, and maintenance of the system including wiring diagrams. Include copies of all programming sheets used to program the system.
- F. Formal on-site training sessions shall be conducted by the security system contractor. It shall be the responsibility of the contractor to coordinate time and location of training sessions with the Owner. Provided documented general instruction as follows.

- G. Provide instruction to the maintenance personnel to include location, inspection, maintenance, testing, and operation of all system components. Provide a minimum of four (4) hours - two 2-hour sessions separated by a minimum of two weeks.
- H. Provide instruction to designated personnel on the functions and operation of the security system including zoning, capabilities, limitations, monitoring, and the meaning of status messages. State the proper procedure for testing, routine maintenance, and request for service. Provide detailed instruction on the operation of the keypad including arming, disarming, adding users, deleting users, and changing passwords. Provide a minimum of four (4) hours - two 2-hour sessions separated by a minimum of two weeks.

3.2 INSTALLATION

- A. This contractor shall provide and install new and unused ASTM bare stranded copper wire per ANSI/NEMA codes. Follow the manufacturer's instructions. All wire shall be recommended by the manufacturer for security system applications.
- B. 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. R0175 Rite-On labels and Part No. FTP1 nylon marking pens or equivalent.
- C. All wiring for sensor circuits shall be West Penn Wire No. 221, 22 AWG stranded, NEC type CMR, two-conductor cable.
- D. All wiring for signal circuits shall be West Pen Wire N. 226, 14 AWG stranded, NEC type CMR, two-conductor cable.
- E. All wiring for power/alarm circuits shall be West Penn Wire No. 244, 18 AWG stranded, NEC type CMR, two-conductor cable.
- F. All wiring for keypad circuits shall be West Penn Wire No. 440, 18 AWG stranded, NEC type CMR, two individually shielded pairs, cable.
- G. Equivalent products by Belden or Carol.
- H. Conceal wiring in walls, floors, chases, under floors, underground and above ceilings.
- I. All necessary cutting of walls, floors, partitions, ceilings, etc., as required for the proper installation of the work under this Contract shall be done in a neat and workmanlike manner, and as approved by the Owner/Architect/Engineer.
- J. Patching of openings and/or alterations shall be provided in an approved manner.
- K. No joists, beams, girders or columns shall be cut by any Contractor without first obtaining written permission of the Owner/Architect/Engineer.
- L. All openings in firewalls and floors shall be completely sealed after installation for a completely airtight installation. Sealing material shall be non-combustible and UL approved. The installed sealing assembly shall not cause the fire rating of the penetrated structure to be decreased.
- M. All openings in exterior walls shall be sealed watertight.
- N. Seal voids around conduits penetrating fire-rated assemblies and partitions using fire stopping materials and methods in accordance with NFPA and local codes.
- O. Use methods and lubricating compounds on cables and wires to prevent damage during pulling. Provide compounds that are not injurious to the cable and wire jackets and do not harden or become adhesive.

Controlled Entry at 15 Campuses
Birdville ISD
North Richland Hills, Haltom City, Hurst and Watauga, Texas

- P. Make the cable splices in tamper-resistive, accessible, junction boxes.

END OF SECTION

SECTION 28 31 10

FIRE DETECTION AND ALARM - EXPANSION OF EXISTING SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION OF THE WORK

- A. The contractor shall utilize all existing current campus room identification for programming of fire alarm zones. Rooms shall be labeled with room names, numbers or both as directed by the owner.
- B. Sub-contracting of the fire alarm system or system components is not allowed. Responding proposer shall provide approved manufacturers certification with proposal.
- C. **Provide for the design and installation of the fire alarm system in renovation and areas, with suggested minimum device coverage as indicated. Existing devices may be reused where possible. Additional devices may be required for NFPA approved coverage based on existing conditions not known at the time of issue. Utilize Audio notification device type based on the existing campus system. Provide voice notification speakers for campuses with voice evacuation notification.**
- D. **Provide for the expansion of the existing Fire Alarm system as required for the renovation spaces as shown on the plans. The existing Fire Alarm shall be expanded to include the required zone coverage for the added building zones included within this project. Include additional expansion modules, power supplies, cable and all other materials as required.**
 - 1. Existing Fire Alarm Systems;
 - a. Academy at C. F. Thomas - Farenhyte IFP-1000
 - b. Foster Village ES - Farenhyte IFP-1000
 - c. Grace Hardeman - Farenhyte IFP-1000
 - d. Green Valley ES - Farenhyte IFP-1000
 - e. Holiday Heights ES - Farenhyte IFP-1000
 - f. J.D.Spicer - Farenhyte IFP-1000
 - g. Mullendore ES - Farenhyte IFP-1000
 - h. North Ridge ES - Farenhyte IFP-1000
 - i. North Oaks MS - Farenhyte IFP-1000ECS (Voice Evacuation)
 - j. North Ridge MS - Farenhyte IFP-1000ECS (Voice Evacuation)
 - k. Smithfield MS - Farenhyte IFP-1000
 - l. Snow Heights ES - Farenhyte IFP-1000
 - m. WA Porter - Farenhyte IFP-2000
 - n. Watauga MS - Farenhyte IFP-1000
 - o. WT Francisco - Farenhyte IFP-2000
- E. Provide Surge Protection Devices (SPDs) / TVSS surge suppression as required by NFPA 72 for all underground circuits (where underground circuits are required).
- F. Required system features:
 - 1. The fire alarm system shall comply with requirements of NFPA Standard No. 72 for protected premises signaling systems except as modified and supplemented by this specification. The system shall be supervised either electrically or by software-directed polling of field devices. The system shall also be listed by Underwriter's Laboratories under the category of Control Unit System (UOJZ) and Control Unit Accessories (UOXX).
 - 2. Multiplex communication conductors.
 - 3. Control of auxiliary devices, such as fan shut down, etc.
 - 4. Battery standby system - 24 hour.

5. Remote station annunciator contacts.
 6. Microprocessor based monitoring and control system.
 7. Multiplex communication conductors. (Class A)
 8. Remote station annunciator, refer to drawings for location(s)
 9. The system shall be 100% field programmable without the need for external computers or PROM programmers, and shall not require the replacement of memory IC's.
- G. Fire alarm system shall be expandable by the addition of the required modules to the basic system.
- H. Each zone shall consist of not more than eight manual or automatic devices.
- I. 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.
- J. 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.
- K. Contractor to design and provide all equipment, accessories, and materials in accordance with the contract documents to provide a complete and operating system.
- L. Conduits, boxes and other raceways required for the Fire Alarm system should be provided by the Fire Alarm Contractor, as required for a compliant design, including any revisions following the approved drawings by the Fire Alarm Contractor.
- M. Building is to be designed to the code minimum but also to include the additional devices / requirements stipulated within this specification. If additional devices indicated require additional design requirements to be code compliant, that is to be taken into account during bidding and designing in order to design and build a fully compliant system.
- N. **Review and possible changes to design are subject to review by the local Fire Marshal (or authority having jurisdiction), up to Final Testing and Acceptance by AHJ.**
- O. This section of the specification includes the furnishing, installation, connection and testing of the microprocessor controlled, analog addressable intelligent fire alarm equipment required to form a complete, operative, coordinated 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. The extent of fire alarm system work is shown on drawings and in schedules, and is hereby defined to include furnishing and installing of a system with the following sequence of operation:
1. Either manual activation of a fire alarm station or activation of an automatic initiating device energizes fire alarm signaling devices, sounding a non-coded alarm, providing zone identification at the fire alarm control panel and annunciator panels.
- P. **Design Criteria – In addition to designing/providing the code required minimums, the following shall be incorporated into the design utilizing the requirements of the code regarding spacing, location, additional required coverage area, within the renovation areas only:**
1. Strobes – each room is to provide a minimum of 1 visual strobe. The location of audio notification Horn and Visual combo strobes to be determined by designer based on Db level requirement of the code.
 2. Heat Detectors - in addition to spaces required by code, provide at the following rooms: Electrical, mechanical.
 3. Provide 212deg F heads for the elevator machine room.

- Q. **Fire Alarm contractor shall provide all duct smoke detectors as shown on mechanical plans, coordinate with mechanical contractor for installation on all units scheduled to be rated at over 2000cfm.**
1. Fire Alarm Contractor shall subcontract with a mechanical contractor for all required work related to air handler fan shut-down.
 2. Fire Alarm Contractor shall provide all duct detector devices, enclosures; the Fire Alarm Contractor's mechanical sub-contractor shall install the duct detectors on the existing systems, and provide fan shut down.
- R. 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.

1.2 PERFORMANCE

- A. Alarm and trouble signals shall be digitally encoded by listed electronic devices onto an NFPA Style 6 looped multiplex communication system.
- B. Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded onto NFPA Style 6 Signaling Line Circuits.
- C. Initiation Device Circuits (IDC) shall be wired Class A (NFPA Style D).
- D. Notification Appliance Circuits (NAC) shall be wired Class B (NFPA Style Y).
- E. Power for initiating devices and notification appliances must be from the main fire alarm control panel to which they are connected.
- F. A single ground or open on any system signaling line circuit, initiating device circuit, or notification appliance circuit shall not cause system malfunction, loss of operating power or the ability to report an alarm.
- G. Alarm signals arriving at the main FACP shall not be lost following a power failure (or outage) until the alarm signal is processed and recorded.
- H. Horn circuits and control equipment shall be arranged such that loss of any one (1) horn circuit will not cause the loss of any other horn circuit in the system.

1.3 SYSTEM OPERATION

- A. When a fire alarm condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:
 1. The System Alarm LED shall flash.
 2. A local piezo-electric signal in the control panel shall sound.
 3. The 80-character 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.
 4. All system output programs assigned via control-by-event equations to be activated by the particular point in alarm shall be executed, and the associated system outputs (alarm notification appliances and/or relays) shall be activated.
 5. The audio portion of the system shall sound the proper signal to the appropriate zones.

1.4 QUALITY ASSURANCE

- A. The National Fire Protection Association publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. Use current locally adopted editions of the standards.

Controlled Entry at 15 Campuses
Birdville ISD
North Richland Hills, Haltom City, Hurst and Watauga, Texas

1. No. 72A Local Protective Signaling Systems.
 2. No. 72D Proprietary Protective Signaling Systems.
 3. No. 72E Automatic Fire Detectors.
 4. No. 90A Installation of air conditioning and ventilating systems.
 5. No. 101 Life Safety Code.
- B. The contractor furnishing and installing the equipment shall show satisfactory evidence with the shop drawings that they maintain stocks of replacement parts, and maintain a service department which is fully capable of maintaining the equipment.
- C. Fire alarm systems shall be installed by an agent having a current certificate of registration with the State Fire Marshal's Office of the Texas State Board of Insurance, in accordance with state law. A "Fire Alarm Installation Certificate" shall be provided as required by the Office of the State Fire Marshall.
- D. Warranty:
1. The Contractor shall warrant his work against defective materials and workmanship for a period of one year from the date of acceptance of the entire project, unless specific longer term is specified with Individual System Specification.
 2. Neither Final Payment nor any provisions in Contract Documents shall relieve the Contractor of the responsibility for faulty materials or workmanship.
 3. Contractor shall remedy any defects due thereto, and pay for any damage to other work resulting therefrom, which shall appear within a period of five years from the date of acceptance of the entire project (substantial completion).
 4. The Owner shall give notice of observed defects with reasonable promptness.
 5. This Guarantee shall not be construed to include the normal maintenance of the various components of the system covered by these specifications.
- E. Project Record Documents:
1. The Contractor shall keep a set of plans on the job, noting daily all changes made in connection with the final installation including exact dimensioned locations of all new and uncovered existing utility piping outside the Building.
 2. Upon submitting request for Final Payment, Contractor shall turn over to the Architect-Engineer, for subsequent transmittal to the Owner, clean, neatly marked set of reproducible plans showing "as installed" work.
 3. In addition to the above, the Contractor shall accumulate during the Job's progress the following data, in multiple duplication (three each), prepared in 3-ring binders of sufficient size, black in color, neat in appearance and turned over to the Architect-Engineer for checking and subsequent delivery to the Owner:
 - a. All warranties, guarantees and manufacturer's direction on equipment and material covered by the Contract
 - b. Approved fixture/equipment brochures
 - c. Copies of approved Shop Drawings
 - d. Set of operating instructions. Operating instructions shall also include recommended maintenance and seasonal changeover procedures.
 - e. Any and all data and/or plans required during construction.
 - f. Repair parts lists of all major items and equipment including name, address and telephone number of the local supplier or agent.
 - g. The first page or pages shall have the name, addresses and telephone numbers of the following; General Contractor and all sub-contractors, Major Equipment Suppliers.
- F. Training:
1. Upon completion of the work and at a time designated by the Owner's representative, provide a formal training session for the Owner's operating personnel to include location, operation and maintenance of all the mechanical, electrical and plumbing equipment and systems.
 2. Before proceeding with instruction, prepare a typed outline in triplicate listing the subjects that will be covered. Submit the outline for review by the Owner's representative one week prior to training session.

3. At the conclusion of the instruction, obtain signatures of the attendees on each copy of the outline to signify that they have proper understanding of the operation and maintenance of the systems. Submit the signed outlines to the Owner's representative and Engineer as a condition of final acceptance.

G. Plans and Specifications:

1. The plans show diagrammatically the locations of the various lines, ducts, conduits, fixtures and equipment and the method of connecting and controlling them. It is not intended to show every connection in detail and all fittings required for a complete system.
2. The Systems shall include, but are not limited to, the items shown on the plans.
3. Exact locations of these items shall be determined by reference to the general plans and measurements of the Building and in cooperation with other Contractors, and in all instances, shall be subject to the approval of the Architect-Engineer.
4. The Architect-Engineer reserves the right to make any reasonable change in the location of any part this work without additional cost to the Owner.

H. Utilities, Locations and Elevations:

1. Locations and elevations of the various utilities within this scope of work have been obtained from the City, Owner and/or other substantially reliable sources and are offered separately from the Contract Documents, as a general guide only, without any guarantees as to the accuracy.
2. **The Contractor shall examine the site, shall verify to his own satisfaction the locations, elevations and the availability / characteristics (voltage/phase/pressure/capacity) of all utilities and services required, and shall adequately inform himself as to their relation to the work; the submission of bids or proposals shall be deemed evidence thereof.**
3. The Contractor shall coordinate all services with the respective Utility Company or Agency during construction; coordinate changes made by Utility Companies or Agencies to the design of the project, and coordinate with the Owner, Architect-Engineer, and Utility the scheduling of any shutdowns or delays that may occur in providing service.
4. The Contractor shall verify location / depth / direction of flow, conduct all necessary tests, inspections, coordinate with Owner's representatives and Utilities, and check for existing underground utilities before ditching / trenching / drilling.
5. The Contractor shall be responsible for repair of any cut of damaged lines or utilities he uncovers and disrupts. There are lines and utilities that may not be shown on the plans.

1.5 SUBMITTALS

A. 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 and main control panel module layout, configurations and terminations.

B. 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 item of equipment and the interconnections between the items of equipment.
3. Provide a clear and concise description of operation which 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.

C. Software Modifications

1. 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.

D. Certifications:

1. Together with the shop drawing submittal, submit a certification from the major equipment manufacturer indicating that the proposed supervisor of installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include names and addresses in the certification.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- 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.
- B. 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.
- C. 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.
- D. The main 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.

2.2 MAIN FIRE ALARM CONTROL PANEL AND FIRE COMMAND CENTER:

- A. Existing to be Reused.
- B. Speakers: Provide manufacturer's standard construction fire alarm speaker, System Sensor Spectr- Alert Advance. UL listed to Standard 1971 and shall meet the following criteria:
 1. Ceiling Mount:
 - a. Indoor - System Sensor SPCW(V) Dual voltage (25/70.7 Vrms) with high volume dB sound output where required for coverage.
 2. Wall Mount Mount:
 - a. Indoor - System Sensor SPW(V) Dual voltage (25/70.7 Vrms) with high volume dB sound output where required.
 - b. Outdoor- System Sensor SPW(K) Dual voltage (25/70.7 Vrms) with high volume dB sound output where required for coverage.
- C. Speaker Strobes: Provide manufacturer's standard construction fire alarm speaker / strobe, System Sensor Spectr- Alert Advance. UL listed to Standard 1971. . Strobe lights shall meet the requirements of the ADA, UL Standard 1971 and shall meet the following criteria:
 1. Ceiling Mount:

- a. Indoor - System Sensor Advance Speaker Strobe SPCR Dual voltage (25/70.7 Vrms) with high volume dB sound output, and candela setting as required for coverage.
2. Wall Mount Mount:
 - a. Indoor - System Sensor SPSR Dual voltage (25/70.7 Vrms) with high volume dB sound output, and candela setting as required for coverage.
 - b. Outdoor - System Sensor SPSRK Dual voltage (25/70.7 Vrms) with high volume dB sound output, and candela setting as required for coverage.
- D. Visual Devices: Provide manufacturer's standard construction fire alarm strobe, Silent Knight 5865 Series with flashing xenon light visual signal. UL listed to Standard 1971. Strobe lights shall meet the requirements of the ADA, UL Standard 1971 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. Addressable Devices – General
 1. Addressable devices shall provide an address-setting means using rotary decimal switches.
 2. Addressable devices shall use simple to install and maintain decade (numbered 0 to 9) 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.
 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 (PHOTO, THERMAL).
- F. Addressable Pull Box (Pullstation): Provide manufacturer's standard construction, red enclosure, manual fire alarm stations, double action semi flush mounting, Silent Knight SD500-PS, Addressable.
 1. Addressable pull 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 stations 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" or larger. Provide "Stopper II" with local audible alarm at each pullstation location. Provide "Weather Stopper II" with local audible alarm at exterior locations. (Verify with Each Authority Having Jurisdiction on

acceptance of audible alarm on pull station covers.) Where allowed by Local Authority. Provide without audible alarm where audible alarm is not allowed.

- G. Intelligent Photoelectric Smoke Detector: Provide manufacturer's standard construction automatic photoelectric type smoke detector, Silent Knight SD505-APS.
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.
- H. Intelligent Thermal Detectors (Heat Detector)
1. Thermal detectors shall be intelligent addressable devices rated at 135°F and have a rate-of-rise element rated at 15° F per minute. It shall connect via 2 wires to the fire alarm control panel signaling line circuit, Silent Knight SD505-AHS.
- I. Door Holders and Closers:
1. Door holders, flush mounted standard hardware depth. Silent Knight FM998-120 or equal. Refer to electrical drawings for additional information and mounting locations.
- J. Intelligent Duct Smoke Detector: (Duct Detector) Provide manufacturer's standard construction automatic smoke detectors, duct type, with sampling tubes, Silent Knight SD505-ADHR/DTS or equal, with auxiliary contacts for fan shut down as required. (Provided and installed by Fire Alarm Contractor, Addressable Device.)
1. The in-duct smoke detector housing shall accommodate either an intelligent ionization detector or an 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.
- K. Addressable Dry Contact Monitor Module
1. Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional alarm initiating devices (any N.O. dry contact device) to one of the fire alarm control panel SLC loops. Silent Knight SD500-AIM or SD500-MIM.
 2. The monitor module shall mount in a 4" square, 2" deep electrical box.
 3. The IDC zone shall be suitable for Style D or Style B operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.
 4. For difficult to reach areas, the monitor module shall be available in a miniature package and shall be no larger than 2" x 1-3" x 2". This version need not include Style D or an LED.
- L. 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. For fan shutdown and other auxiliary control functions, the control module may be set to operate as a dry contract relay. Silent Knight Sd500-ANM.
 2. The control module shall mount in a standard 4" square, 2" deep electrical box, or to a surface mounted backbox.
 3. The control module NAC may be wired for Style Z or Style Y (Class A/B) with up to 1 amp of inductive A/V signal, or 2 amps of resistive A/V signal operation, or as a dry contact (FormC) relay. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to insure that 100% of all auxiliary relay or NACs may be energized at the same time on the same pair of wires.
 4. Audio/visual power shall be provided by a separate supervised power loop from the main fire alarm control panel or from a supervised, UL listed remote power supply.
 5. The control module shall be suitable for pilot duty applications and rated for a minimum of 0.6 amps at 30 VDC.

M. Isolator Module

1. Isolator modules shall be provided to automatically isolate wire-to-wire short circuits on an SLC loop. 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. At least one isolator module shall be provided for each floor or protected zone of the building. Silent Knight SD500-LIM.
2. If a wire-to-wire short occurs, the isolator module shall automatically open-circuit (disconnect) the SLC loop. When the short circuit condition is corrected, the isolator module shall automatically reconnect the isolated section.
3. The isolator module shall not require any 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 mount in a standard 4" deep electrical box or in a surface mounted backbox. It 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.

N. Cable

1. **All cable shall be color red.**

2.3 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 24 hours plus 5 minutes of alarm upon a normal AC power failure.
3. The batteries are to be completely maintenance free.
4. Final battery size to be calculated & confirmed by system installer based on actual system loads.
5. External, physical dimension shall allow for placement within system enclosure.

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-volt 60 hertz source.
2. Shall be rated for fully charging a completely discharged battery within 60 hours while simultaneously supplying any loads connected to the battery.
3. Shall have protection to prevent discharge through the charger.
4. Shall have protection for overloads and short circuits on both AC and DC sides.
5. Final battery charger characteristics to be calculated & confirmed by system installer based on actual system loads.

C. Microprocessor based monitoring and control system.

1. The monitoring and control system shall consist of a central processing unit, (CPU), Display Interface Assembly DIA, Remote Annunciator Panels. The system shall be of modular construction, with components connected together using multiplex wiring techniques to provide Fire Detection and Evacuation signals. System shall be Silent Knight IFP-1000 ESC Intelligent, Addressable, and Analog Multiplex Life Alarm or approved equal. CPU shall be surface or flush wall mounted control units where shown. Unit shall have all necessary components to completely supervise and operate the system. Power wiring shall be for single phase operation. Unit shall include the following functional equivalents, as required:
 - a. Zone modules.
 - b. Power supplies.
 - c. Emergency battery for 60 hour backup.
 - d. Battery charging circuit.
 - e. Auxiliary relays.
 - f. Common module.
 - g. Controls: System reset, acknowledge, lamp test, trouble, silence.
 - h. Indicators: Common alarm, common trouble, AC power failure, low battery, and power on.
 - i. Other equipment and components as required for system operation.

2. System shall provide LCD annunciation to indicate system monitor point status, and toggle switches to allow operation of the system control points. Unit shall function as a zone annunciator and control center to initiate alarm or building evacuation function. Control center and Remote Annunciator shall be wall mounted, located as shown, with battery backup, self-contained power supply supplied by 120 volt emergency power if available or by dedicated 120 volt normal power circuit.
- D. Provide fire alarm system products in sizes and capacities indicated, complying with manufacturer's published product information on standard materials and components designed and constructed for applications indicated.
- E. Provide required basic wiring materials as specified in Division 26 sections. Comply with manufacturer's instructions and recommendations.
- F. Tamper switches and water flow alarms, when furnished with sprinkler system, shall be connected to Fire Alarm System.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install system and materials in accordance with manufacturer's instructions and roughing in drawings, and details on the drawings. Install electrical work and use electrical products complying with requirements of applicable Division 16 sections of these specifications.
- B. The term "wiring" is defined to include the providing of wire, conduit and miscellaneous materials as required for mounting and connecting the electrical devices. All wiring and devices shall be fully concealed unless otherwise approved by Engineer.
- C. Install a complete wiring system as required by the local authority for fire alarm system. Conductor shall be two twisted pair fire alarm cable in a separate conduit system. Provide multi-conductor instrument harness bundle in place of single conductors where a number of conductors can be run along a common path. Fasten flexible conductors bridging cabinets and doors neatly along hinge side, and protect against abrasion. Tie and support conductors neatly.
- D. Install a flashing light and horn where required by the Local Authority Having Jurisdiction.
- E. Manual stations are to be set 48" above finished floor. Alarm devices are to be set at 80" aff maximum. Alarm devices in Activity rooms, Gymnasiums and other similar use areas shall be suitably protected with substantial wire guards, not less than 11 gauge, and 1" x 2" mesh.
- F. Number code or color code conductors, appropriately and permanently for identification and servicing of system.
- G. 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.
- H. 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.
- I. 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.

3.2 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 horn circuits.
2. Actuate strobe units until the panel is reset.
3. Light the associated indicators corresponding to active horn circuits.
4. Release all magnetic door holders, Stage Draft doors and Fire doors to adjacent zones on the floor from which 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, on valve tamper switch, shall cause a system supervisory alarm indication.

3.3 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.
 1. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.
 2. Close each sprinkler system flow valve and verify proper supervisory alarm at the FACP.
 3. Verify activation of all flow switches.
 4. Open initiating device circuits and verify that the trouble signal actuates.
 5. Open signaling line circuits and verify that the trouble signal actuates.
 6. Open and short notification appliance circuits and verify that trouble signal actuates.
 7. Ground initiating device circuits and verify response of trouble signals.
 8. Ground signaling line circuits and verify response of trouble signals.
 9. Ground notification appliance circuits and verify response of trouble signals.
 10. Check installation, supervision, and operation of all intelligent smoke detectors using walk test.
 11. 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.
- B. The entire fire alarm system shall be tested in accordance with NFPA standards and other applicable standards. Results of such testing shall be recorded on forms approved for the purpose, certified and submitted to the Owner's representative with final documents.

3.4 FINAL INSPECTION:

- A. At the final inspection a factory trained representative of the manufacturer of the major equipment shall demonstrate that the complete, expanded is function properly in every respect.

3.5 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."

Controlled Entry at 15 Campuses
Birdville ISD
North Richland Hills, Haltom City, Hurst and Watauga, Texas

3.6 ZONES

- A. Zones shall be identified and scheduled on the Shop Drawing Submittal using current building designations, room names and numbers.

END OF SECTION

V L K A R C H I T E C T S . C O M

