



PROJECT MANUAL FOR:

OCS – SPECIAL EDUCATION AND ANNEX BUILDING REMODELS

OGDEN, UTAH

PROJECT NUMBER: 2150

DATE: 10.26.22



STUDIO 333 ARCHITECTS

333 24TH STREET
OGDEN, UT 84401
801.394.3033

STUDIO333ARCHITECTS.COM



ARCHITECT STUDIO 333 ARCHITECTS
333 24TH STREET
OGDEN, UTAH 84401
801.394.3033

ELECTRICAL COLVIN ENGINEERING ASSOCIATES
505 E. SOUTH TEMPLE STE. 100
SALT LAKE CITY, UTAH 84102
801.505.5414

STRUCTURAL ARW ENGINEERS
1594 W PARK CIRCLE
OGDEN, UTAH 84404
801.782.6008

MECHANICAL OLSEN & PETERSON ENGINEERING
14 E 2700 S
SALT LAKE CITY, UTAH 84115
801.699.8549

ARCHITECT'S SEAL:

**1950 MONROE BLVD.
OGDEN, UTAH**



OCS – SPECIAL EDUCATION AND ANNEX BUILDING REMODELS

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**Special Education & Annex Building Remodel Project
Ogden School District
1950 Monroe Blvd
Ogden UT, 84401**

RFP 23-007

***Drawings and Project Specifications will be added to this*
*RFP October 28th 2022***

**Project Date: November 28th, 2022 - July 28th, 2023
Bid Due: November 14th, 2022 @ 2:00pm**

Project:

**Special Education Building #8
Annex Building #6
1950 Monroe Blvd
Ogden UT, 84401**

NOTICE TO BIDDERS

Drawings and Project Specifications will be added to this

RFP October 28th 2022

Electronic bids will be received by the Board of Education of the Ogden School District, for the Special Education & Annex Building Remodel Project. Bids will be in accordance with these specifications.

A Pre-bid walk through will be held Wednesday November 2nd 2022 at 1950 Monroe Blvd Building #8 Ogden, Utah at 1:00pm. **Attendance at the bid walk is mandatory to qualify contractors to bid this project.**

The Office of the Director of Support Services will receive electronic bids until the hour of 2:00pm November 14th 2022. **Bids must be submitted on Scquest.com**

A bid bond of the amount of (5%) of the bid, made payable to the Board of Education of the Ogden School District, shall accompany the bid. If a certified check is used in lieu of the bid bond, a certificate from an approved surety company guaranteeing execution of 100% performance bond, and 100% payment bond must accompany the bid.

The Ogden School District Board of Education reserves the right to accept or reject any or all bids, or to waive any informality or technicality in any bid in the interest of the District.

If bidders have questions or need to seek clarification during this bidding process, then questions must be received in writing through Scquest.com by no later than November 10th, 2022 at 12:00pm.

BOARD OF EDUCATION OF THE OGDEN SCHOOL DISTRICT
KEN CRAWFORD, DIRECTOR OF SUPPORT SERVICES



BID FORM RFP 23-007

Name of Bidder _____ Date _____

Address of Bidder _____

To the Board of Education of the Ogden City School District

1950 Monroe Blvd Ogden, UT 84401

RFP23-007 Project Dates: November 28th 2022 - July 28th 2023

The undersigned, in compliance with your invitation for bids for the Special Education & Annex Building Remodel Project having examined the drawings, specifications and related documents, and the site of the proposed work and being familiar with all of the conditions surrounding the construction of the proposed project, including the availability of labor, do hereby propose to furnish all labor, materials and supplies as required for the work in accordance with the Contract Documents as specified and within the time set forth and at the price stated below.

I/We acknowledge receipt of the following addenda if applicable:

#1 _____ Date _____

#2 _____ Date _____

#3 _____ Date _____

Base Bid Project: This base bid shall include all work in the construction documents for RFP 23-007 Special Education & Annex Building Remodel Project . I/We agree to perform this work for the sum of:

_____ Dollars (\$ _____)

(In case of discrepancy, written amount shall govern)

Bid Alternate #1: This alternate bid shall include all work in the Bid Alternate #1 portion in the construction documents for RFP 23-007 Special Education & Annex Building Remodel Project.

_____ Dollars (\$ _____)

(In case of discrepancy, written amount shall govern)

Bid Alternate #2: This alternate bid shall include all work in the Bid Alternate #2 portion in the construction documents for RFP 23-007 Special Education & Annex Building Remodel Project.

_____ Dollars (\$ _____)

(In case of discrepancy, written amount shall govern)



BID BOND

I/We guarantee to complete the work as defined in the Drawings and specifications.

Enclosed is _____ for bid security as required in the sum \$ _____

The undersigned Contractors license number for Utah is _____ and my bid limit is \$ _____

Upon receipt of Notice of Acceptance of this bid, the undersigned agrees to execute the Contract and within five (5) days deliver Owners Protective Bonds in the prescribed form in the amount of 100% of the General Construction Contract Price for faithful performance of the contract. The Certified Check, Cashier's Check or Bid Bond attached, in the amount not less than five percent (5%) of the Body shall become the property of the Board of Education of the Ogden City School District in the event that the Contract is not negotiated and/or the Owner's Protective Bonds delivered within the time set forth, as liquidated damages for the delay and additional expense caused thereby.

Respectfully Submitted,

Name of Bidder _____

Authorized Signature _____

Phone Number _____

Email Address _____

STANDARD CONTRACT TERMS AND CONDITIONS

1. **AUTHORITY:** Provisions of this contract are pursuant to the authority set forth in Utah Code §§ 63G - 6a Utah Procurement Code; as amended, Utah Administrative Code R33.

Administrative Services, Purchasing and General Services; and/or Ogden School District's Purchasing and Procurement Policy; and related statutes which govern DISTRICT'S purchase of goods and services.

2. **CONTRACT JURISDICTION, CHOICE OF LAW, & VENUE:** Provisions of this contract shall be governed by the laws of the State of Utah. The parties will submit to the jurisdiction of the courts of the State of Utah for any dispute arising out of this contract or breach thereof. Venue shall be in Ogden City, in the Judicial Court for Weber County.

3. **LAWS AND REGULATIONS:** CONTRACTOR and any and all supplies, services and equipment furnished under this contract will comply fully with all applicable Federal and State laws and regulations, including licensure and certification requirements.

4. **RECORDS ADMINISTRATION:** CONTRACTOR shall maintain, or supervise the maintenance of all records necessary to properly account for payments made to CONTRACTOR for costs authorized by this contract. These records shall be retained by CONTRACTOR for at least four years after the contract terminates, or until all audits initiated within the four years, have been completed, whichever is later. CONTRACTOR agrees to allow DISTRICT, State, and Federal auditors and DISTRICT staff, access to all records to this contract for audit, inspection, and monitoring of services. Such access will be during normal business hours, or by appointment.

5. **CERTIFY REGISTRATION AND USE OF EMPLOYMENT "STATUS VERIFICATION SYSTEM":** The Status Verification System, also referred to as "E- Verify", only applies to contracts issued through a Request for Proposal process, and to sole sources that are included within a Request for Proposal. It does not apply to Invitation for Bids or to the Multiple Stage Bid.

5.1 Status Verification System

1. Each offeror and each person signing on behalf of any offeror certifies as to its own entity, under penalty of perjury, that the named CONTRACTOR has registered and is participating in the Status Verification System to verify the work eligibility status of the CONTRACTOR'S new employees that are employed in the State of Utah in accordance with applicable immigration laws including UCA § 63G-12-302.

2. CONTRACTOR shall require that the following provision be placed in each subcontract at every tier: "The subcontractor shall certify to the main (prime or general) contractor by affidavit that the subcontractor has verified through the Status Verification System the employment status of each new employee of the respective subcontractor, all in accordance with applicable immigration laws including UCA § 63G -12- 302 and to comply with all applicable employee status verification laws. Such affidavit must be provided prior to the notice to proceed for the subcontractor to perform the work."

3. DISTRICT will not consider a proposal for award, nor make any award where there has not been compliance with this section.

4. Manually or electronically signing the Proposal is deemed CONTRACTOR'S certification of compliance with all provisions of this employment status verification certification required by all applicable status verification laws including UCA § 63G-12-302.

5.2 Indemnity Clause for Status Verification System

1. CONTRACTOR (includes, but is not limited to any Contractor, Design Professional, Designer or Consultant) shall protect, indemnify and hold harmless, DISTRICT and its officers, employees, agents, representatives and anyone the DISTRICT may be liable to, against any claim, damages or liability arising out of or resulting from violations of Section 5 of this Contract whether violated by employees, agents, or contractors of the following: (a) CONTRACTOR; (b) Subcontractor at any tier; and/or (c) any entity or person for whom the CONTRACTOR or Subcontractor may be liable.

2. Notwithstanding Section 5.2.1. above, Design Professionals or Designers under direct contract with DISTRICT shall only be required to indemnify DISTRICT for a liability claim that arises out of the Design Professional's services, unless the liability claim arises from the Design Professional's negligent act, wrongful act, error or omission, or other liability imposed by law except that the Design Professional shall be required to indemnify the DISTRICT in regard to subcontractors or sub consultants at any tier that are under the direct or indirect control or responsibility of the Design Professional, and includes all independent contractors, agents, employees or anyone else for whom the Design Professional may be liable at any tier.

6. CONFLICT OF INTEREST: CONTRACTOR represents that none of its officers or employees are officers or employees of the DISTRICT, unless disclosure has been made in accordance with U.C.A. § 67 -16 -8.

7. CONTRACTOR, AN INDEPENDENT CONTRACTOR: CONTRACTOR shall be an independent contractor, and as such, shall have no authorization, express or implied, to bind DISTRICT to any agreements, settlements, liability or understanding whatsoever, and agrees not to perform any acts as agent for DISTRICT, except as herein expressly set forth. Compensation stated herein shall be the total amount payable to CONTRACTOR by DISTRICT. CONTRACTOR shall be responsible for the payment of all income tax and social security amounts due as a result of payments received from DISTRICT for these contract services. Persons employed by DISTRICT and acting under the direction of DISTRICT shall not be deemed to be employees or agents of CONTRACTOR.

8. INDEMNITY CLAUSE: CONTRACTOR agrees to indemnify, save harmless, and release DISTRICT, and all its officers, agents, volunteers, and employees from and against any and all loss, damages, injury, liability, suits, and proceedings arising out of the performance of this contract which are caused in whole or in part by the acts or negligence of CONTRACTOR'S officers, agents, volunteers, or employees, but not for claims arising from DISTRICT'S sole

negligence. The parties agree that if there are any Limitations of CONTRACTOR'S Liability, including a limitation of liability for anyone for whom CONTRACTOR is responsible, such Limitations of Liability will not apply to injuries to persons, including death, or to damages to property.

9. EMPLOYMENT PRACTICES CLAUSE: CONTRACTOR agrees to abide by the provisions of Title VI and VII of the Civil Rights Act of 1964 (42USC 2000e) which prohibits discrimination against any employee or applicant for employment or any applicant or recipient of services, on the basis of race, religion, color, or national origin; and further agrees to abide by Executive Order No. 11246, as amended, which prohibits discrimination on the basis of sex; 45 CFR 90 which prohibits discrimination on the basis of age; and Section 504 of the Rehabilitation Act of 1973, or the Americans with Disabilities Act of 1990 which prohibits discrimination on the basis of disabilities. Also, CONTRACTOR agrees to abide by Utah's Executive Order, dated December 13, 2006, which prohibits sexual harassment in the work place.

10. SEPARABILITY CLAUSE: A declaration by any court, or any other binding legal source, that any provision of this contract is illegal and void shall not affect the legality and enforceability of any other provision of this contract, unless the provisions are mutually dependent.

11. RENEGOTIATION OR MODIFICATIONS: This contract may be amended, modified, or supplemented only by written amendment to the contract, executed by authorized parties hereto, and attached to the original signed copy of the contract. Automatic renewals will not apply to this contract.

12. DEBARMENT: CONTRACTOR certifies that neither it nor its principals are presently nor have ever been debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction (contract), by any governmental department or agency. If CONTRACTOR cannot certify this statement, attach a written explanation for review by the DISTRICT. CONTRACTOR must notify the District Director of Purchasing within 30 days if debarred by any governmental entity during the contract period.

13. TERMINATION: Unless otherwise stated in the Special Terms and Conditions, this contract may be terminated, for cause by either party, in advance of the specified termination date, upon written notice being given the other party. The party in violation will be given ten (10) working days after notification to correct and cease the violations, after which the contract may be terminated for cause. This contract may be terminated without cause, in advance of the specified expiration date, by either party, upon sixty (60) days prior written notice being given the other party. On termination of this contract, all accounts and payments will be processed according to the financial arrangements set forth herein for approved services rendered to date of termination.

14. NON -APPROPRIATION OF FUNDS: CONTRACTOR acknowledges that DISTRICT cannot contract for the payment of funds not yet appropriated by the Utah State Legislature, Utah State Board of Education or District Board of Education (BOARD). If the DISTRICT becomes subjected to a legislative change, revocation of statutory authority, lack of appropriated funds or

availability of funds which would render CONTRACTOR'S delivery or performance under the contract impossible, or unnecessary, this contract will be terminated, either in whole or in part. If funding to DISTRICT is reduced due to an order by the Legislature or Governor, or is required by State law, or if federal funding (when applicable) is not provided, or requires any return or "give-back" of funds required for DISTRICT to continue payments, or if the BOARD mandates any cuts or holdbacks in spending, DISTRICT may terminate this contract or proportionately reduce the services and purchases of obligations and the amount due from DISTRICT upon 30 days written notice. Where funding is controlled entirely by DISTRICT, before discontinuing funding, DISTRICT, at its discretion, will make efforts to; a) identify other goods/services that perform substantially the same functions; b) identify if any funding is available through a reallocation or reprogramming of other appropriated or non -appropriated funds, and c) make its best efforts to request and secure such funds from the appropriate entities (collectively, a "Non-Appropriation"). If a Non -Appropriation occurs, DISTRICT shall remit all amounts due to CONTRACTOR through the date of termination. DISTRICT shall not be in default under this contract for nonpayment and will not be liable for any future commitments, penalties, or liquidated damages.

15. SALES TAX EXEMPTION: DISTRICT's sales and use tax exemption number is 12057251 -002 -STC. The tangible personal property or services being purchased are being paid from DISTRICT funds and used in the exercise of that entity's essential functions. If the items being purchased are construction materials, they will be converted into real property by employees of DISTRICT, unless otherwise stated in the contract.

16. WARRANTY (This paragraph is NOT applicable to architect, engineering, and construction service providers): CONTRACTOR agrees to warrant and assume responsibility for all products (including hardware, firmware, and/or software products) that it licenses, contracts, or sells to DISTRICT under this contract for a period of one (1) year, unless otherwise specified and mutually agreed upon elsewhere in this contract. CONTRACTOR acknowledges that all warranties granted to the buyer by the Uniform Commercial Code of the State of Utah apply to this contract. Product liability disclaimers and/or warranty disclaimers from the seller are not applicable to this contract unless otherwise specified and mutually agreed upon elsewhere in this contract. In general, CONTRACTOR warrants that: 1) the product will do what the salesperson said it would do, 2) the product will live up to all specific claims that the manufacturer makes in their advertisements, 3) the product will be suitable for the ordinary purposes for which such product is used, 4) the product will be suitable for any special purposes that DISTRICT has relied on CONTRACTOR'S skill or judgment to consider when it advised DISTRICT about the product, 5) the product has been properly designed and manufactured, and 6) the product is free of significant defects or unusual problems about which DISTRICT has not been warned. Remedies available to DISTRICT include the following: CONTRACTOR will repair or replace (at no charge to DISTRICT) the product whose nonconformance is discovered and made known to CONTRACTOR in writing. If the repair and/or replaced product prove to be inadequate, or fails of its essential purpose, CONTRACTOR will refund the full amount of any payments that have been made. Nothing in this warranty will be construed to limit any rights or remedies DISTRICT may otherwise have under this contract.

17. **INSURANCE:** CONTRACTOR must carry insurance with policy limits no less than \$1,000,000 per incident and \$3,000,000 in aggregate. CONTRACTOR must provide proof of insurance to DISTRICT and must add DISTRICT as an additional insured with notice of cancellation.

18. **PUBLIC INFORMATION:** CONTRACTOR agrees that the contract and related Sales Orders and Invoices will be public documents, and may be available for distribution. CONTRACTOR gives DISTRICT express permission to make copies of the contract, related Sales Orders and Invoices in accordance with the State of Utah Government Records Access and Management Act (GRAMA). Except as for sections identified in writing and expressly approved by DISTRICT'S Purchasing department, CONTRACTOR also agrees that CONTRACTOR's response to the solicitation will be a public document, and copies may be given to the public under GRAMA laws. Permission to make copies as noted will take precedence over any statements of confidentiality, proprietary information, copyright information, or similar notation.

19. **DELIVERY:** Unless otherwise specified in this contract, all deliveries will be F.O.B. destination with all transportation and handling charges paid by CONTRACTOR. Responsibility and liability for loss or damage will remain with CONTRACTOR until final inspection and acceptance when responsibility will pass to DISTRICT except as to latent defects, fraud and CONTRACTOR's warranty obligations.

20. **ORDERING AND INVOICING:** All orders will be shipped promptly in accordance with the delivery schedule. CONTRACTOR will promptly submit invoices (within 30 days of shipment or delivery of services) to DISTRICT. DISTRICT contract number and/or release number shall be listed on all invoices, freight tickets, and correspondence relating to the contract order. Prices paid by DISTRICT will be those prices listed in the contract. DISTRICT has the right to adjust or return any invoice reflecting incorrect pricing or upon which DISTRICT contract number and/or release number is not listed.

21. **PROMPT PAYMENT DISCOUNT:** Offeror may quote a prompt payment discount based upon early payment; however, discounts offered for less than 30 days will not be considered in making the award. CONTRACTOR shall list payment discount terms on invoices. The prompt payment discount will apply to payments made with DISTRICT Purchasing or Travel Card (major credit card); and checks. The date from which discount time is calculated will be the date a correct invoice is received or receipt of shipment, whichever is later; except that if testing is performed, the date will be the date of acceptance of the merchandise.

22. **PAYMENT:** Payments are normally made within 30 days following the date the order is delivered or the date a correct invoice is received, whichever is later. After 60 days from the date a corrected invoice is received by the appropriate DISTRICT official, CONTRACTOR may assess interest on overdue, undisputed account charges up to a maximum of the interest rate paid by the IRS on taxpayer refund claims, plus 2%, computed similarly as the requirements of U.C.A. § 15-6-3. The IRS rate is adjusted quarterly, and is applied on a per annual basis, on the invoice amount that is overdue. All payments to CONTRACTOR will be remitted by mail, electronic funds transfer, or DISTRICT Purchasing Card (major credit card).

23. PATENTS, COPYRIGHTS, ETC.: CONTRACTOR will release, indemnify and hold DISTRICT, its officers, agents and employees harmless from liability of any kind or nature, including CONTRACTOR 's use of any copyrighted or un -copyrighted composition, secret process, patented or un -patented invention or appliance furnished or used in the performance of this contract.

24. ASSIGNMENT/SUBCONTRACT: Contractor will not assign, sell, transfer, subcontract or sublet rights, or delegate responsibilities under this contract, in whole or in part, without the prior written approval of DISTRICT.

25. DEFAULT AND REMEDIES: Any of the following events will constitute cause for DISTRICT to declare CONTRACTOR in default of this contract: 1) nonperformance of contractual requirements; 2) material breach of any term or condition of this contract. DISTRICT will issue a written notice of default providing a ten (10) day period in which CONTRACTOR will have an opportunity to cure. Time allowed for cure will not diminish or eliminate CONTRACTOR's liability for damages. If the default remains, after CONTRACTOR has been provided the opportunity to cure, DISTRICT may do one or more of the following: 1) exercise any remedy provided by law; 2) terminate this contract and any related contracts or portions thereof; 3) impose liquidated damages, if liquidated damages are listed in the contract; 4) suspend CONTRACTOR from receiving future solicitations.

26. FORCE MAJEURE: Neither party to this contract will be held responsible for delay or default caused by fire, riot, acts of God and/or war which is beyond that party's reasonable control. DISTRICT may terminate this contract after determining such delay or default will reasonably prevent successful performance of the contract.

27. PROCUREMENT ETHICS: CONTRACTOR understands that a person who is interested in any way in the sale of any supplies, services, construction, or insurance to the DISTRICT is violating the law if the person gives or offers to give any compensation, gratuity, contribution, loan or reward, or any promise thereof to any person acting as a procurement officer on behalf of the DISTRICT, or who in any official capacity participates in the procurement of such supplies, services, construction, or insurance, whether it is given for their own use or for the use or benefit of any other person or organization. (U.C.A. § 63G-6a-2304.5).

28. CONFLICT OF TERMS: CONTRACTOR Terms and Conditions that apply must be in writing and attached to the contract. No other Terms and Conditions will apply to this contract including terms listed or referenced on CONTRACTOR 'S website, terms listed in a CONTRACTOR quotation/sales order, etc. In the event of any conflict in the contract Terms and Conditions, the order of precedence shall be: 1) Attachment A: District Standard Contract Terms and Conditions; 2) District Contract Signature page(s), 3) District Special Terms and Conditions; 4) Contractor Terms and Conditions.

29. ENTIRE AGREEMENT: This agreement, including all Attachments and documents incorporated hereunder, and the related DISTRICT solicitation constitutes the entire agreement between the parties with respect to the subject matter, and supersedes any and all other prior and contemporaneous agreements and understandings between the parties, whether oral or written.

The terms of this Agreement shall supersede any additional or conflicting terms or provisions that may be set forth or printed on CONTRACTOR 'S work plans, cost estimate forms, receiving tickets, or any other related standard forms or documents that may subsequently be used to implement, record, or invoice services hereunder from time to time, even if such standard forms or documents have been signed or initialed by a representative of DISTRICT. The parties agree that the terms of this Agreement shall prevail in any dispute between the terms of this Agreement and the terms printed on any such standard forms or documents, and such standard forms or documents shall not be considered written amendments of this Agreement.

Revision date: November 6, 2017

DIVISION 01 – GENERAL REQUIREMENTS

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SECTION 01 1000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Work covered by the Contract Documents.
 - 2. Type of Contract.
 - 3. Products ordered in advance.
 - 4. Owner-furnished products.
 - 5. Use of premises.
 - 6. Owner's occupancy requirements.
 - 7. Work restrictions.
- B. Related Sections include the following:
 - 1. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: OCS – Special Needs and Annex Building Remodel
 - 1. Project Location: 1950 Monroe Blvd., Ogden, Utah
- B. Owner: Ogden City School District.
 - 1. Owner's Representative: Jared Cherry
 - a. Phone: 801.430.1293
 - b. E-mail: Cherryj@ogdensd.org
 - c. Architect: Studio 333 Architects, 333 24th Street, Ogden, Utah 84401
 - 1) Architect's Representative: Tony Pantone
 - a) Phone: 801.394.3033
 - b) E-mail: tony@studio333architects.com
- C. The Work consists of the following:
 - 1. The Work includes, but is not limited to the following:
- D. The existing Special Needs Building is approximately 31,500 s.f. and is a single-story building with mechanical tunnels below. The Annex Building is approximately 8,344 s.f. and is a single-story building with a basement. Both buildings will include updated finishes throughout. Plumbing and mechanical upgrades are the main priority. The existing waste and supply piping will be replaced throughout both buildings. The existing HVAC systems will be replaced with new mechanical systems. Electrical circuiting will be upgraded as required for the new mechanical system upgrade. A new fire

alarm system will be designed for each building including CO2 detection. Architectural finishes will be patched and repaired as required due to mechanical, plumbing and electrical work. Required structural upgrades to roof framing will be provided as required.

1.4 PROJECT SCHEDULE

- A. Notice to Proceed will be issued by the Owner upon Owner's receipt from the Contractor of signed documents required by Division 1 of the Project Manual.
- B. The Contractor will prepare and submit a Project schedule showing key dates and a critical path bar chart type format indicating the scheduled work.

1.5 WORK SEQUENCE

- A. The Contractor will sequence the work to insure economy of time and money.

1.6 TYPE OF CONTRACT

- A. Project will be constructed under single prime contract.

1.7 WORK UNDER SEPARATE CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract. Coordinate the Work of this Contract with work performed under separate contracts.
 - 1. Work under other contracts is defined to be work by others conducted concurrent to work under the prime contract between the Owner and the General Contractor and is awarded and contracted separately by the Owner.
 - 2. Cost for work under other contracts as indicated in this section will be contracted by the Owner and unless noted otherwise, will not be included in the General Contractor's base bid.
- B. Concurrent Work: Owner has awarded separate contract(s) for the following construction operations at Project site. These contract(s) will be paid out by the Owner and shall not be included in the Contractor's base bid. The Contractor shall be responsible to coordinate all work awarded under separate contracts and those operations will be conducted simultaneously with work under this Contract.

1.8 OWNER-FURNISHED PRODUCTS

- A. Owner will furnish products indicated. The Work includes providing support systems to receive Owner's equipment and making plumbing, mechanical, and electrical connections.
 - 1. Owner will arrange for and deliver Shop Drawings, Product Data, and Samples to Contractor of Owner-furnished items according to Contractor's Construction Schedule.
 - 2. Owner will arrange and pay for delivery of Owner-furnished items according to Contractor's Construction Schedule.
 - 3. After delivery, Owner will inspect delivered items for damage. Contractor shall be present for and assist in Owner's inspection.
 - 4. If Owner-furnished items are damaged, defective, or missing, Owner will arrange for replacement.
 - 5. Owner will arrange for manufacturer's field services and for delivery of manufacturer's warranties to Contractor.
 - 6. Owner will furnish Contractor the earliest possible delivery date for Owner-furnished products. Using Owner-furnished earliest possible delivery dates, Contractor shall designate delivery dates of Owner-furnished items in Contractor's Construction Schedule.
 - 7. Contractor shall review Shop Drawings, Product Data, and Samples and return them to Architect and Owner's Representative noting discrepancies or anticipated problems in use of product.
 - 8. Contractor is responsible for receiving, unloading, and handling Owner-furnished items at Project site.

9. Contractor is responsible for protecting Owner-furnished items from damage during storage and handling, including damage from exposure to the elements.
10. If Owner-furnished items are damaged as a result of Contractor's operations, Contractor shall repair or replace items to meet Owner's satisfaction.
11. Owner agrees to install and otherwise incorporate Owner-furnished items into the Work unless otherwise directed by the Owner's representative.

B. Owner-Furnished Products:

1. Restroom accessories as noted in Construction Documents.

1.9 USE OF PREMISES

- A. General: The project site and facility will not be occupied by the owner during construction. The contractor shall be responsible for planning and phasing the project in order to provide functional and safe operation for the facility.
- B. Use of Site: Limit use of premises to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 1. Owner Occupancy: Allow for Owner occupancy of Project site.
 2. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.10 WORK RESTRICTIONS

- A. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet (8 m) of entrances, operable windows, or outdoor air intakes.

1.11 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 33-division format and CSI/CSC's "MasterFormat" numbering system.
 1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
 2. Division 01: Sections in Division 01 govern the execution of the Work of all Sections in the Specifications.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

- a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 1000

SECTION 01 2600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
 - 1. Section 01 6000 "Product Requirements" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on Architect's Standard Form.

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request or not more than 14 days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - e. Quotation Form: Use forms acceptable to Architect.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Include costs of labor and supervision directly attributable to the change.

5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 6. Comply with requirements in Section 01 2500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
- C. Proposal Request Form: Use AIA Document G709 for Proposal Requests.

1.5 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Changes Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 2600

SECTION 01 2900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Section 01 2600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Contractor's Construction Schedule.
 - 2. Submit the Schedule of Values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Submit draft of AIA Document G703 Continuation Sheets.
 - 3. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.

- d. Name of manufacturer or fabricator.
- e. Name of supplier.
- f. Change Orders (numbers) that affect value.
- g. Dollar value.

1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

- 4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents.
- 5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
- 6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
- 7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
- 8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
- 9. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 - 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Times: Progress payments shall be submitted to Architect by the first of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
- D. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 - 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 - 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of Values.
 3. Contractor's Construction Schedule (preliminary if not final).
 4. Products list.
 5. Schedule of unit prices.
 6. Submittals Schedule (preliminary if not final).
 7. List of Contractor's staff assignments.
 8. List of Contractor's principal consultants.
 9. Copies of building permits.
 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 11. Initial progress report.
 12. Report of preconstruction conference.
 13. Certificates of insurance and insurance policies.
 14. Performance and payment bonds.
 15. Data needed to acquire Owner's insurance.
 16. Initial settlement survey and damage report if required.
- I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 6. AIA Document G707, "Consent of Surety to Final Payment."
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 2900

SECTION 01 3100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Administrative and supervisory personnel.
 - 3. Coordination drawings.
 - 4. Requests for Information (RFIs).
 - 5. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Requirements:
 - 1. Section 01 3200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
 - 2. Section 01 7000 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Section 01 7700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

- A. RFI: Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.

1.5 GENERAL COORDINATION PROCEDURES

- A. Coordination: Each Contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each Contractor shall coordinate its operations with operations included in different Sections, that depend on each other for proper installation, connection and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's construction schedule.
 2. Preparation of the schedule of values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Preinstallation conferences.
 7. Project closeout activities.
 8. Startup and adjustment of systems.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

1.6 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
 - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - f. Indicate required installation sequences.
 - g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

2. Sheet Size: At least 8-1/2 by 11 inches but no larger than 30 by 40 inches.
 3. Number of Copies: Submit two opaque copies of each submittal. Architect will return one copy.
 - a. Submit five copies where Coordination Drawings are required for operation and maintenance manuals. Architect will retain two copies; remainder will be returned.
 4. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.7 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.
1. Include special personnel required for coordination of operations with other contractors.

1.8 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
1. Conduct the conference to review responsibilities and personnel assignments.
 2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Critical work sequencing and long-lead items.
 - c. Designation of key personnel and their duties.
 - d. Procedures for processing field decisions and Change Orders.
 - e. Procedures for RFIs.
 - f. Procedures for testing and inspecting.
 - g. Procedures for processing Applications for Payment.
 - h. Distribution of the Contract Documents.
 - i. Submittal procedures.
 - j. Preparation of record documents.
 - k. Use of premises.
 - l. Work restrictions.
 - m. Owner's occupancy requirements.

- n. Responsibility for temporary facilities and controls.
 - o. Construction waste management and recycling.
 - p. Parking availability.
 - q. Office, work, and storage areas.
 - r. Equipment deliveries and priorities.
 - s. First aid.
 - t. Security.
 - u. Progress cleaning.
 - v. Working hours.
4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
- 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect, and Owner's Commissioning Authority of scheduled meeting dates.
 - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Review of mockups.
 - i. Possible conflicts.
 - j. Compatibility requirements.
 - k. Time schedules.
 - l. Weather limitations.
 - m. Manufacturer's written instructions.
 - n. Warranty requirements.
 - o. Compatibility of materials.
 - p. Acceptability of substrates.
 - q. Temporary facilities and controls.
 - r. Space and access limitations.
 - s. Regulations of authorities having jurisdiction.
 - t. Testing and inspecting requirements.
 - u. Installation procedures.
 - v. Coordination with other work.
 - w. Required performance results.
 - x. Protection of adjacent work.
 - y. Protection of construction and personnel.
 - 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 - 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 - 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Conduct progress meetings at weekly intervals.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner, Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Status of correction of deficient items.
 - 14) Field observations.
 - 15) Status of RFIs.
 - 16) Status of proposal requests.
 - 17) Pending changes.
 - 18) Status of Change Orders.
 - 19) Pending claims and disputes.
 - 20) Documentation of information for payment requests.
4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
 - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

1.9 REQUESTS FOR INTERPRETATION (RFIs)

- A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.
 1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:

1. Project name.
2. Date.
3. Name of Contractor.
4. Name of Architect.
5. RFI number, numbered sequentially.
6. Specification Section number and title and related paragraphs, as appropriate.
7. Drawing number and detail references, as appropriate.
8. Field dimensions and conditions, as appropriate.
9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
10. Contractor's signature.
11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.

- a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.

C. Hard-Copy RFIs: CSI Form 13.2A.

1. Identify each page of attachments with the RFI number and sequential page number.

D. Architect's Action: Architect will review each RFI, determine action required, and return it. Allow seven working days for Architect's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.

1. The following RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for coordination information already indicated in the Contract Documents.
 - d. Requests for adjustments in the Contract Time or the Contract Sum.
 - e. Requests for interpretation of Architect's actions on submittals.
 - f. Incomplete RFIs or RFIs with numerous errors.
2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01
 - a. Section "Contract Modification Procedures."

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 3100

SECTION 01 3200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Preliminary Construction Schedule.
 - 2. Contractor's construction schedule.
 - 3. Submittal Schedule.
 - 4. Daily construction reports.
 - 5. Material location reports.
 - 6. Field condition reports.
 - 7. Site condition reports.
- B. Related Requirements:
 - 1. Division 01 Section "Payment Procedures" for submitting the Schedule of Values.
 - 2. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
 - 3. Section 01 3300 "Submittal Procedures" for submitting schedules and reports.
 - 4. Section 01 4000 "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum unless otherwise approved by Architect.
- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- E. Event: The starting or ending point of an activity.
- F. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- G. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.
- H. Major Area: A story of construction, a separate building, or a similar significant construction element.
- I. Milestone: A key or critical point in time for reference or measurement.
- J. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.
- K. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.4 SUBMITTALS

- A. Qualification Data: For scheduling consultant.
- B. Submittals Schedule: Submit three copies of schedule. Arrange the following information in a tabular format:
1. Scheduled date for first submittal.
 2. Specification Section number and title.
 3. Submittal category (action or informational).
 4. Name of subcontractor.
 5. Description of the Work covered.
 6. Scheduled date for Architect's final release or approval.
- C. Preliminary Construction Schedule: Submit two opaque copies.
1. Approval of cost-loaded preliminary construction schedule will not constitute approval of Schedule of Values for cost-loaded activities.
- D. Contractor's Construction Schedule: Submit two opaque copies of initial schedule, large enough to show entire schedule for entire construction period.
1. Submit an electronic copy of schedule, using software indicated, on CD-R, and labeled to comply with requirements for submittals. Include type of schedule (Initial or Updated) and date on label.
- E. CPM Reports: Concurrent with CPM schedule, submit three copies of each of the following computer-generated reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
 2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
 3. Total Float Report: List of all activities sorted in ascending order of total float.
 4. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment.
- F. Daily Construction Reports: Submit two copies at weekly intervals.
- G. Material Location Reports: Submit two copies at weekly intervals.

- H. Field Condition Reports: Submit two copies at time of discovery of differing conditions.

1.5 QUALITY ASSURANCE

- A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Architect's request.
- B. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to the Preliminary Construction Schedule and Contractor's Construction Schedule, including, but not limited to, the following:
 - 1. Review software limitations and content and format for reports.
 - 2. Verify availability of qualified personnel needed to develop and update schedule.
 - 3. Discuss constraints, including work stages and interim milestones.
 - 4. Review delivery dates for Owner-furnished products.
 - 5. Review schedule for work of Owner's separate contracts.
 - 6. Review time required for review of submittals and resubmittals.
 - 7. Review requirements for tests and inspections by independent testing and inspecting agencies.
 - 8. Review time required for completion and startup procedures.
 - 9. Review and finalize list of construction activities to be included in schedule.
 - 10. Review submittal requirements and procedures.
 - 11. Review procedures for updating schedule.

1.6 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's construction schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from entities involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for commencement of the Work to date of final completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.
- C. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
 - 1. Unresolved issues.
 - 2. Unanswered Requests for Information.
 - 3. Rejected or unreturned submittals.
 - 4. Notations on returned submittals.
 - 5. Pending modifications affecting the Work and Contract Time.

- D. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's construction schedule within 30 days of date established for commencement of the Work. Base schedule on the startup construction schedule and additional information received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
 - 1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

2.3 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
 - 1. List of subcontractors at Project site.
 - 2. List of separate contractors at Project site.
 - 3. Approximate count of personnel at Project site.
 - 4. Equipment at Project site.
 - 5. Material deliveries.
 - 6. High and low temperatures and general weather conditions, including presence of rain or snow.
 - 7. Accidents.
 - 8. Meetings and significant decisions.
 - 9. Unusual events (see special reports).
 - 10. Stoppages, delays, shortages, and losses.
 - 11. Meter readings and similar recordings.
 - 12. Emergency procedures.
 - 13. Orders and requests of authorities having jurisdiction.
 - 14. Change Orders received and implemented.
 - 15. Construction Change Directives received and implemented.
 - 16. Services connected and disconnected.
 - 17. Equipment or system tests and startups.
 - 18. Partial completions and occupancies.
 - 19. Substantial Completions authorized.
- B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.

2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 3. As the Work progresses, indicate final completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 01 3200

SECTION 01 3300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections include the following:
 - 1. Division 01 Section "Payment Procedures" for submitting Applications for Payment and the schedule of Values.
 - 2. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes and for submitting Coordination Drawings.
 - 3. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.
 - 4. Division 01 Section "Quality Requirements" for submitting test and inspection reports and for mockup requirements.
 - 5. Division 01 Section "Closeout Procedures" for submitting warranties.
 - 6. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 7. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 - 8. Divisions 02 through 49 Sections for specific requirements for submittals in those Sections.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action.
- B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

- A. General: Architect will not provide electronic copies of CAD Drawings of the Contract Drawings for Contractor's use in preparing submittals.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Submittals Schedule: Comply with requirements in Division 01 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.

- D. Processing Time: Allow enough 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 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 15 days for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
 5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
 - a. Division 22 – Plumbing
 - b. Division 23 – HVAC
 - c. Division 26 – Electrical
- E. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
- F. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.
- G. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
 2. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.
- H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.
1. Transmittal Form: Use AIA Document G810.
 2. Transmittal Form: Provide locations on form for the following information:

- a. Project name.
 - b. Date.
 - c. Destination (To:).
 - d. Source (From:).
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Specification Section number and title.
 - i. Drawing number and detail references, as appropriate.
 - j. Transmittal number, numbered consecutively.
 - k. Submittal and transmittal distribution record.
 - l. Remarks.
 - m. Signature of transmitter.
3. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.
- I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked "Reviewed."
 - J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
 - K. Use for Construction: Use only final submittals with mark indicating "Reviewed" taken by Architect.

1.5 CONTRACTOR'S USE OF ARCHITECT'S CAD FILES

- A. General: At Contractor's written request, copies of Architect's CAD files will be provided to Contractor for Contractor's use in connection with Project, subject to the following conditions:
 1. Coordinate with the Architect at the time of Contractor's request.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
 1. Submit electronic submittals directly to extranet specifically established for Project.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.

- c. Manufacturer's installation instructions.
 - d. Standard color charts.
 - e. Manufacturer's catalog cuts.
 - f. Wiring diagrams showing factory-installed wiring.
 - g. Printed performance curves.
 - h. Operational range diagrams.
 - i. Mill reports.
 - j. Standard product operation and maintenance manuals.
 - k. Compliance with specified referenced standards.
 - l. Testing by recognized testing agency.
 - m. Application of testing agency labels and seals.
 - n. Notation of coordination requirements.
- 4. Submit Product Data before or concurrent with Samples.
 - 5. Number of Copies: Submit five copies of Product Data, unless otherwise indicated. Architect will return three copies. Mark up and retain one returned copy as a Project Record Document.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
- 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - l. Notation of dimensions established by field measurement.
 - m. Relationship to adjoining construction clearly indicated.
 - n. Seal and signature of professional engineer if specified.
 - o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 - 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 40 inches.
 - 3. Number of Copies: Submit five opaque copies of each submittal, unless copies are required for operation and maintenance manuals. Submit five copies where copies are required for operation and maintenance manuals. Architect will retain two copies; remainder will be returned. Mark up and retain one returned copy as a Project Record Drawing.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
- 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 - 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.

- d. Number and title of appropriate Specification Section.
3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect, through Construction Manager, will return submittal with options selected.
5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. 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.
 - a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project Record Sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 1. Type of product. Include unique identifier for each product.
 2. Number and name of room or space.
 3. Location within room or space.
 4. Number of Copies: Submit three copies of product schedule or list, unless otherwise indicated. Architect will return two copies.
 - a. Mark up and retain one returned copy as a Project Record Document.
- F. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation" for Construction Manager's action.
- G. Submittals Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."
- H. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."
- I. Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."
- J. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Use CSI Form 1.5A. Include the following information in tabular form:
 1. Name, address, and telephone number of entity performing subcontract or supplying products.

2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.
4. Number of Copies: Submit three copies of subcontractor list, unless otherwise indicated. Architect will return two copies.
 - a. Mark up and retain one returned copy as a Project Record Document.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
 1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Architect will not return copies.
 2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 3. Test and Inspection Reports: Comply with requirements specified in Division 01 Section "Quality Requirements."
- B. Coordination Drawings: Comply with requirements specified in Division 01 Section "Project Management and Coordination."
- C. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."
- D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- H. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- I. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- J. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- K. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- L. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 1. Name of evaluation organization.
 2. Date of evaluation.
 3. Time period when report is in effect.

4. Product and manufacturers' names.
 5. Description of product.
 6. Test procedures and results.
 7. Limitations of use.
- M. Schedule of Tests and Inspections: Comply with requirements specified in Division 01 Section "Quality Requirements."
- N. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- O. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- P. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- Q. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."
- R. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- S. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
1. Preparation of substrates.
 2. Required substrate tolerances.
 3. Sequence of installation or erection.
 4. Required installation tolerances.
 5. Required adjustments.
 6. Recommendations for cleaning and protection.
- T. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
1. Name, address, and telephone number of factory-authorized service representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- U. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- V. Material Safety Data Sheets (MSDSs): Submit information directly to Owner; do not submit to Architect.

1. Architect will not review submittals that include MSDSs and will return the entire submittal for resubmittal.

2.3 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit three copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S / ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 1. "Rejected" or "Reviewed."
- C. Informational Submittals: Architect will review each submittal and will not return it or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Partial submittals are not acceptable, will be considered non-responsive, and will be returned without review.
- A. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 01 3300

SECTION 01 3300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections include the following:
 - 1. Division 01 Section "Payment Procedures" for submitting Applications for Payment and the schedule of Values.
 - 2. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes and for submitting Coordination Drawings.
 - 3. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.
 - 4. Division 01 Section "Quality Requirements" for submitting test and inspection reports and for mockup requirements.
 - 5. Division 01 Section "Closeout Procedures" for submitting warranties.
 - 6. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 7. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 - 8. Divisions 02 through 49 Sections for specific requirements for submittals in those Sections.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action.
- B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

- A. General: Architect will not provide electronic copies of CAD Drawings of the Contract Drawings for Contractor's use in preparing submittals.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Submittals Schedule: Comply with requirements in Division 01 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.

- D. Processing Time: Allow enough 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 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 15 days for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
 5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
 - a. Division 22 – Plumbing
 - b. Division 23 – HVAC
 - c. Division 26 – Electrical
- E. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
- F. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.
- G. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
 2. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.
- H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.
1. Transmittal Form: Use AIA Document G810.
 2. Transmittal Form: Provide locations on form for the following information:

- a. Project name.
 - b. Date.
 - c. Destination (To:).
 - d. Source (From:).
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Specification Section number and title.
 - i. Drawing number and detail references, as appropriate.
 - j. Transmittal number, numbered consecutively.
 - k. Submittal and transmittal distribution record.
 - l. Remarks.
 - m. Signature of transmitter.
3. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.
- I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked "Reviewed."
 - J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
 - K. Use for Construction: Use only final submittals with mark indicating "Reviewed" taken by Architect.

1.5 CONTRACTOR'S USE OF ARCHITECT'S CAD FILES

- A. General: At Contractor's written request, copies of Architect's CAD files will be provided to Contractor for Contractor's use in connection with Project, subject to the following conditions:
 1. Coordinate with the Architect at the time of Contractor's request.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
 1. Submit electronic submittals directly to extranet specifically established for Project.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.

- c. Manufacturer's installation instructions.
 - d. Standard color charts.
 - e. Manufacturer's catalog cuts.
 - f. Wiring diagrams showing factory-installed wiring.
 - g. Printed performance curves.
 - h. Operational range diagrams.
 - i. Mill reports.
 - j. Standard product operation and maintenance manuals.
 - k. Compliance with specified referenced standards.
 - l. Testing by recognized testing agency.
 - m. Application of testing agency labels and seals.
 - n. Notation of coordination requirements.
4. Submit Product Data before or concurrent with Samples.
 5. Number of Copies: Submit five copies of Product Data, unless otherwise indicated. Architect will return three copies. Mark up and retain one returned copy as a Project Record Document.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - l. Notation of dimensions established by field measurement.
 - m. Relationship to adjoining construction clearly indicated.
 - n. Seal and signature of professional engineer if specified.
 - o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 40 inches.
 3. Number of Copies: Submit five opaque copies of each submittal, unless copies are required for operation and maintenance manuals. Submit five copies where copies are required for operation and maintenance manuals. Architect will retain two copies; remainder will be returned. Mark up and retain one returned copy as a Project Record Drawing.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.

- d. Number and title of appropriate Specification Section.
- 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
- 4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect, through Construction Manager, will return submittal with options selected.
- 5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. 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.
 - a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project Record Sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 - 1. Type of product. Include unique identifier for each product.
 - 2. Number and name of room or space.
 - 3. Location within room or space.
 - 4. Number of Copies: Submit three copies of product schedule or list, unless otherwise indicated. Architect will return two copies.
 - a. Mark up and retain one returned copy as a Project Record Document.
- F. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation" for Construction Manager's action.
- G. Submittals Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."
- H. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."
- I. Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."
- J. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Use CSI Form 1.5A. Include the following information in tabular form:
 - 1. Name, address, and telephone number of entity performing subcontract or supplying products.

2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.
4. Number of Copies: Submit three copies of subcontractor list, unless otherwise indicated. Architect will return two copies.
 - a. Mark up and retain one returned copy as a Project Record Document.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
 1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Architect will not return copies.
 2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 3. Test and Inspection Reports: Comply with requirements specified in Division 01 Section "Quality Requirements."
- B. Coordination Drawings: Comply with requirements specified in Division 01 Section "Project Management and Coordination."
- C. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."
- D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- H. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- I. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- J. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- K. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- L. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 1. Name of evaluation organization.
 2. Date of evaluation.
 3. Time period when report is in effect.

4. Product and manufacturers' names.
 5. Description of product.
 6. Test procedures and results.
 7. Limitations of use.
- M. Schedule of Tests and Inspections: Comply with requirements specified in Division 01 Section "Quality Requirements."
- N. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- O. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- P. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- Q. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."
- R. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- S. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
1. Preparation of substrates.
 2. Required substrate tolerances.
 3. Sequence of installation or erection.
 4. Required installation tolerances.
 5. Required adjustments.
 6. Recommendations for cleaning and protection.
- T. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
1. Name, address, and telephone number of factory-authorized service representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- U. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- V. Material Safety Data Sheets (MSDSs): Submit information directly to Owner; do not submit to Architect.

1. Architect will not review submittals that include MSDSs and will return the entire submittal for resubmittal.

2.3 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit three copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S / ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 1. "Rejected" or "Reviewed."
- C. Informational Submittals: Architect will review each submittal and will not return it or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Partial submittals are not acceptable, will be considered non-responsive, and will be returned without review.
- A. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 01 3300

SECTION 01 4000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections include the following:
 - 1. Division 1 Section "Allowances" for testing and inspecting allowances.
 - 2. Division 1 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
 - 3. Division 1 Section "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.
 - 4. Divisions 2 through 33 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
- D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.

- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades people of the corresponding generic name.
- J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

- A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Description of test and inspection.
 - 3. Identification of applicable standards.
 - 4. Identification of test and inspection methods.
 - 5. Number of tests and inspections required.
 - 6. Time schedule or time span for tests and inspections.
 - 7. Entity responsible for performing tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.
- C. Reports: Prepare and submit certified written reports that include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.

6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

- A. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.6 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 1. Requirement for specialists shall not supersede building codes and regulations governing the Work.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 1. Contractor responsibilities include the following:

- a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - f. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.
2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
 2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 6. Demolish and remove mockups when directed, unless otherwise indicated.
- K. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Sections in Divisions 2 through 16.

1.7 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
 3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor and the Contract Sum will be adjusted by Change Order.
- B. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform additional quality-control activities required of Contractor by authorities having jurisdiction, whether specified or not.
1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- A. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 3300 "Submittal Procedures."
- B. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- C. Testing Agency Responsibilities: Cooperate with Architect, Commissioning Authority and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 1. Notify Architect, Commissioning Authority, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.
- D. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- E. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- F. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality control services required by the Contract Documents. Submit schedule within 30 days of date established for the Notice to Proceed.
 1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.8 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:
 1. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 2. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect and Commissioning Authority with copy to Contractor and to authorities having jurisdiction.

3. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
4. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 1. Date test or inspection was conducted.
 2. Description of the Work tested or inspected.
 3. Date test or inspection results were transmitted to Architect.
 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 7300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 4000

SECTION 01 4200 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the Thomson Gale's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S.". This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
 - 1. AABC - Associated Air Balance Council; www.aabc.com.
 - 2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
 - 3. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.

4. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
5. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
6. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org.
7. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
8. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
9. AF&PA - American Forest & Paper Association; www.afandpa.org.
10. AGA - American Gas Association; www.aga.org.
11. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
12. AI - Asphalt Institute; www.asphaltinstitute.org.
13. AIA - American Institute of Architects (The); www.aia.org.
14. AISC - American Institute of Steel Construction; www.aisc.org.
15. AISI - American Iron and Steel Institute; www.steel.org.
16. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
17. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
18. ANSI - American National Standards Institute; www.ansi.org.
19. APA - APA - The Engineered Wood Association; www.apawood.org.
20. APA - Architectural Precast Association; www.archprecast.org.
21. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
22. ARI - American Refrigeration Institute; (See AHRI).
23. ASCE - American Society of Civil Engineers; www.asce.org.
24. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
25. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
26. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
27. ASSE - American Society of Safety Engineers (The); www.asse.org.
28. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
29. ASTM - ASTM International; (American Society for Testing and Materials International); www.astm.org.
30. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
31. AWI - Architectural Woodwork Institute; www.awinet.org.
32. AWP - American Wood Protection Association; (Formerly: American Wood-Preservers' Association); www.awpa.com.
33. AWS - American Welding Society; www.aws.org.
34. AWWA - American Water Works Association; www.awwa.org.
35. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
36. BOCA - BOCA; (Building Officials and Code Administrators International Inc.); (See ICC).
37. CDA - Copper Development Association; www.copper.org.
38. CEA - Consumer Electronics Association; www.ce.org.
39. CFFA - Chemical Fabrics & Film Association, Inc.; www.chemicalfabricsandfilm.com.
40. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
41. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
42. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
43. CPA - Composite Panel Association; www.pbmdf.com.
44. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
45. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
46. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
47. CSI - Construction Specifications Institute (The); www.csinet.org.
48. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
49. CWC - Composite Wood Council; (See CPA).
50. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
51. DHI - Door and Hardware Institute; www.dhi.org.
52. ECA - Electronic Components Association; www.ec-central.org.
53. ECAMA - Electronic Components Assemblies & Materials Association; (See ECA).
54. EIA - Electronic Industries Alliance; (See TIA).
55. EIMA - EIFS Industry Members Association; www.eima.com.
56. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
57. EVO - Efficiency Valuation Organization; www.evo-world.org.
58. FM Approvals - FM Approvals LLC; www.fmglobal.com.
59. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.

60. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridarooft.com.
61. FSA - Fluid Sealing Association; www.fluidsealing.com.
62. FSC - Forest Stewardship Council U.S.; www.fscus.org.
63. GA - Gypsum Association; www.gypsum.org.
64. GANA - Glass Association of North America; www.glasswebsite.com.
65. GS - Green Seal; www.greenseal.org.
66. HI - Hydraulic Institute; www.pumps.org.
67. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
68. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
69. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
70. IAS - International Approval Services; (See CSA).
71. ICBO - International Conference of Building Officials; (See ICC).
72. ICC - International Code Council; www.iccsafe.org.
73. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
74. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
75. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
76. IEC - International Electrotechnical Commission; www.iec.ch.
77. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
78. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
79. IESNA - Illuminating Engineering Society of North America; (See IES).
80. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
81. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
82. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
83. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
84. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
85. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
86. ISO - International Organization for Standardization; www.iso.org.
87. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
88. ITU - International Telecommunication Union; www.itu.int/home.
89. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
90. LMA - Laminating Materials Association; (See CPA).
91. LPI - Lightning Protection Institute; www.lightning.org.
92. MBMA - Metal Building Manufacturers Association; www.mbma.com.
93. MCA - Metal Construction Association; www.metalconstruction.org.
94. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
95. MHIA - Material Handling Industry of America; www.mhia.org.
96. MIA - Marble Institute of America; www.marble-institute.com.
97. MMPA - Moulding & Millwork Producers Association; (Formerly: Wood Moulding & Millwork Producers Association); www.wmmpa.com.
98. MPI - Master Painters Institute; www.paintinfo.com.
99. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
100. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
101. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
102. NADCA - National Air Duct Cleaners Association; www.nadca.com.
103. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
104. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
105. NCMA - National Concrete Masonry Association; www.ncma.org.
106. NEBB - National Environmental Balancing Bureau; www.nebb.org.
107. NECA - National Electrical Contractors Association; www.necanet.org.
108. NelMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
109. NEMA - National Electrical Manufacturers Association; www.nema.org.
110. NETA - InterNational Electrical Testing Association; www.netaworld.org.
111. NFHS - National Federation of State High School Associations; www.nfhs.org.
112. NFPA - NFPA; (National Fire Protection Association); www.nfpa.org.

113. NFPA - NFPA International; (See NFPA).
114. NFRC - National Fenestration Rating Council; www.nfrc.org.
115. NHLA - National Hardwood Lumber Association; www.nhla.com.
116. NLGA - National Lumber Grades Authority; www.nlga.org.
117. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
118. NRCA - National Roofing Contractors Association; www.nrca.net.
119. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
120. NSF - NSF International; (National Sanitation Foundation International); www.nsf.org.
121. NSPE - National Society of Professional Engineers; www.nspe.org.
122. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
123. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
124. PDI - Plumbing & Drainage Institute; www.pdionline.org.
125. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); www.plasa.org.
126. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
127. RFCI - Resilient Floor Covering Institute; www.rfci.com.
128. RIS - Redwood Inspection Service; www.redwoodinspection.com.
129. SAE - SAE International; (Society of Automotive Engineers); www.sae.org.
130. SDI - Steel Door Institute; www.steeldoor.org.
131. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
132. SIA - Security Industry Association; www.siaonline.org.
133. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
134. SPIB - Southern Pine Inspection Bureau; www.spib.org.
135. SSINA - Specialty Steel Industry of North America; www.ssina.com.
136. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
137. TCNA - Tile Council of North America, Inc.; (Formerly: Tile Council of America); www.tileusa.com.
138. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
139. TMS - The Masonry Society; www.masonrysociety.org.
140. TPI - Truss Plate Institute; www.tpinst.org.
141. TPI - Turfgrass Producers International; www.turfgrassod.org.
142. UBC - Uniform Building Code; (See ICC).
143. UL - Underwriters Laboratories Inc.; www.ul.com.
144. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
145. USGBC - U.S. Green Building Council; www.usgbc.org.
146. WASTEC - Waste Equipment Technology Association; www.wastec.org.
147. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
148. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
149. WDMA - Window & Door Manufacturers Association; www.wdma.com.
150. WI - Woodwork Institute; (Formerly: WIC - Woodwork Institute of California); www.wicnet.org.
151. WMPMA - Wood Moulding & Millwork Producers Association; (See MPPA).
152. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
153. WPA - Western Wood Products Association; www.wwpa.org.

- 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. This information is believed to be accurate as of the date of the Contract Documents.

1. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
2. ICC - International Code Council; www.iccsafe.org.
3. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

- 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. Information is subject to change and is up-to-date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.

4. DOD - Department of Defense; <http://dodssp.daps.dla.mil>.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FG - Federal Government Publications; www.gpo.gov.
8. GSA - General Services Administration; www.gsa.gov.
9. HUD - Department of Housing and Urban Development; www.hud.gov.
10. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; <http://eetd.lbl.gov>.
11. OSHA - Occupational Safety & Health Administration; www.osha.gov.
12. SD - Department of State; www.state.gov.
13. TRB - Transportation Research Board; National Cooperative Highway Research Program; www.trb.org.
14. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
15. USDJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
16. USP - U.S. Pharmacopeia; www.usp.org.
17. USPS - United States Postal Service; www.usps.com.

D. 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. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
2. DOD - Department of Defense; Military Specifications and Standards; Available from Department of Defense Single Stock Point; <http://dodssp.daps.dla.mil>.
3. DSCC - Defense Supply Center Columbus; (See FS).
4. FED-STD - Federal Standard; (See FS).
5. FS - Federal Specification; Available from Department of Defense Single Stock Point; <http://dodssp.daps.dla.mil>.
 - a. Available from Defense Standardization Program; www.dsp.dla.mil.
 - b. Available from General Services Administration; www.gsa.gov.
 - c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.
6. MILSPEC - Military Specification and Standards; (See DOD).
7. USAB - United States Access Board; www.access-board.gov.
8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 4200

SECTION 01 5000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
 - 1. Section 01 1000 "Summary" for work restrictions and limitations on utility interruptions.
 - 2. Division 1 Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
 - 3. Division 1 Section "Execution Requirements" for progress cleaning requirements.
 - 4. Divisions 2 through 16 Sections for temporary heat, ventilation, and humidity requirements for products in those Sections.
 - 5. Division 32 Section "Hot-Mix Asphalt Paving" for construction and maintenance of asphalt paving for temporary roads and paved areas.

1.3 DEFINITIONS

- 1. Permanent Enclosure: As determined by Architect, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.4 USE CHARGES

- A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to Architect, testing agencies, and authorities having jurisdiction.
- B. Sewer Service: Pay sewer service use charges for sewer usage by all entities for construction operations.
- C. Water Service: Pay water service use charges for water used by all entities for construction operations.
- D. Electric Power Service: Pay electric power service use charges for electricity used by all entities for construction operations.

1.5 SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

1.6 QUALITY ASSURANCE

- A. Electric Service Connections: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service connections. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.7 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Portable Chain-Link Fencing: Minimum 2-inch, 9-gage, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch OD line posts and 2-7/8-inch OD corner and pull posts, with 1-5/8-inch OD top and bottom rails. Provide galvanized steel bases for supporting posts.
- B. Lumber and Plywood: Comply with requirements in Division 6 Section "Rough Carpentry."
- C. Gypsum Board: Minimum 1/2 inch (12.7 mm) thick by 48 inches (1219 mm) wide by maximum available lengths; regular-type panels with tapered edges. Comply with ASTM C 36/C 36M.
- D. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.
- E. Paint: Comply with requirements in Division 9 painting Sections.

2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Common-Use Field Office: Of sufficient size to accommodate needs of construction personnel. Keep office clean and orderly. Furnish and equip offices as follows:
 - 1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
 - 2. Conference room of sufficient size to accommodate meetings of 6 individuals. Provide electrical power service and 120-V ac duplex receptacles, with not less than 1 receptacle on each wall. Furnish room with conference table, chairs, and 4-foot square tack board.
 - 3. Drinking water.
 - 4. Coffee machine and supplies.
 - 5. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
 - 6. Lighting fixtures capable of maintaining average illumination of 20 fc (215 lx) at desk height.
- C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
 - 1. Store combustible materials apart from building.

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.

2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction and marked for intended location and application.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
 1. Connect temporary sewers to systems as directed by authorities having jurisdiction.
- C. Water Service: Install water distribution piping in sizes and pressures adequate for construction.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- F. Electric Power Service: Provide electric power distribution system of sufficient size, capacity, and power characteristics required for construction operations.
- G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- H. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line(s) for each field office.
 1. Provide additional telephone lines for the following:
 - a. Provide a dedicated telephone line for each facsimile machine and computer in each field office.
 2. At each telephone, post a list of important telephone numbers.
 - a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's home office.
 - d. Contractor's emergency after-hours telephone number.

- e. Architect's office.
- f. Engineers' offices.
- g. Owner's office.
- h. Principal subcontractors' field and home offices.

3. Provide superintendent with cellular telephone for use when away from field office.

I. Electronic Communication Service: Provide temporary electronic communication service, including electronic mail, in common-use facilities.

1. Provide DSL or T-1 line in primary field office.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

- 1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
- 2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Traffic Controls: Comply with requirements of authorities having jurisdiction.

- 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
- 2. Maintain access for fire-fighting equipment and access to fire hydrants.

C. Parking: Provide temporary parking areas for construction personnel.

D. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

- 1. 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
- 2. Remove snow and ice as required to minimize accumulations.

E. Project Signs: Provide Project Identification sign. Unauthorized signs are not permitted.

- 1. Identification Sign: Architect will provide sign design.
- 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

a. Provide temporary, directional signs for construction personnel and visitors.

3. Maintain and touchup signs so they are legible at all times.

F. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 1 Section "Execution Requirements" for progress cleaning requirements.

G. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

- 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements on site and adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
 - 1. Comply with work restrictions specified in Section 01 1000 "Summary."
- C. Temporary Erosion and Sedimentation Control: Comply with requirements specified in Division 2 Section "Site Clearing."
- D. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
 - 1. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
- E. Stormwater Control: Comply with authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- A. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Obtain extended warranty for Owner. Perform control operations lawfully, using environmentally safe materials.
- B. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- C. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- D. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
 - 1. Prohibit smoking in construction areas.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 - 3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 7700 "Closeout Procedures."

END OF SECTION 01 5000

SECTION 01 6000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
 - 1. Section 01 2500 "Substitution Procedures" for requests for substitutions.
 - 2. Section 01 4200 "References" for applicable industry standards for products specified.
 - 3. Section 01 7700 "Closeout Procedures" for submitting warranties for Contract Closeout.

1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, equipment and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 ACTION SUBMITTALS

- A. Product List: Submit a list, in tabular form, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.
 - 1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
 - 2. Form: Tabulate information for each product under the following column headings:
 - a. Specification Section number and title.
 - b. Generic name used in the Contract Documents.
 - c. Proprietary name, model number, and similar designations.
 - d. Manufacturer's name and address.

- e. Supplier's name and address.
 - f. Installer's name and address.
 - g. Projected delivery date or time span of delivery period.
 - h. Identification of items that require early submittal approval for scheduled delivery date.
 - 3. Initial Submittal: Within 30 days after date of commencement of the Work, submit 3 copies of initial product list. Include a written explanation for omissions of data and for variations from Contract requirements.
 - a. At Contractor's option, initial submittal may be limited to product selections and designations that must be established early in Contract period.
 - 4. Completed List: Within 30 days after date of commencement of the Work, submit 3 copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
 - 5. Architect's Action: Architect will respond in writing to Contractor within 15 days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.
- B. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
- 1. Substitution Request Form: Use CSI Form 13.1A.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified material or product cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
 - i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 - l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
 - 3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - a. Form of Acceptance: Change Order.

- b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.
- C. Comparable Product Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Division 1 Section "Submittal Procedures."
 - b. Use product specified if Architect cannot make a decision on use of a comparable product request within time allocated.
- D. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
 - 1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 - 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C. Storage:
 - 1. Store products to allow for inspection and measurement of quantity or counting of units.
 - 2. Store materials in a manner that will not endanger Project structure.
 - 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 - 4. Store cementitious products and materials on elevated platforms.
 - 5. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 - 6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 - 7. Protect stored products from damage and liquids from freezing.

8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 01 7700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Architect will make selection.
 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
 1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 3. Products:
 - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.

4. Manufacturers:
 - a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
8. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
 - a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.
10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
 - a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
 - b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
 1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 6000

SECTION 01 6310 - SUBSTITUTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for handling requests for substitutions made after award of the Contract.
- B. Related Sections: The following Sections contain requirements that relate to this Section: 1.
 - 1. Division 1 Section "Reference Standards and Definitions" specifies the applicability of industry standards to products specified.
 - 2. Division 1 Section "Submittals" specifies requirements for submitting the Contractor's Construction Schedule and the Submittal Schedule.
 - 3. Division 1 Section "Product Requirements" specifies requirements governing the Contractor's selection of products and product options.

1.3 DEFINITIONS

- A. Definitions in this Article do not change or modify the meaning of other terms used in the Contract Documents.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed by the Contractor after award of the Contract are considered to be requests for substitutions. The following are not considered to be requests for substitutions:
 - 1. Substitutions requested during the bidding period, and accepted by Addendum prior to award of the Contract, are included in the Contract Documents and are not subject to requirements specified in this Section for substitutions.
 - 2. Revisions to the Contract Documents requested by the Owner or Architect.
 - 3. Specified options of products and construction methods included in the Contract Documents.
 - 4. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.4 SUBMITTALS

- A. Substitution Request Submittal: The Architect will consider requests for substitution if received within 30 days after commencement of the Work. Requests received more than 30 days after commencement of the Work may be considered or rejected at the discretion of the Architect. If the Architect approves a substitution request it will be forwarded to the owner's representative for approval. No substitution can be approved without specific written approval of the Owner.
 - 1. Submit 3 copies of each request for substitution for consideration. Submit requests in the form and according to procedures required for change-order proposals.
 - 2. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.
 - 3. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
 - a. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate contractors, that will be necessary to accommodate the proposed substitution.

- b. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements, such as performance, weight, size, durability, and visual effect.
 - c. Product Data, including Drawings and descriptions of products and fabrication and installation procedures.
 - d. Samples, where applicable or requested.
 - e. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
 - f. Cost information, including a proposal of the net change, if any in the Contract Sum.
 - g. The Contractor's certification that the proposed substitution conforms to requirements in the Contract Documents in every respect and is appropriate for the applications indicated.
 - h. The Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.
4. Architect's Action: If necessary, the Architect will request additional information or documentation for evaluation within one week of receipt of a request for substitution. The Architect will notify the Contractor of acceptance or rejection of the substitution within 2 weeks of receipt of the request, or one week of receipt of additional information or documentation, whichever is later. Acceptance will be in the form of a change order.
- a. Use the product specified if the Architect cannot make a decision on the use of a proposed substitute within the time allocated.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Conditions: The Architect will receive and consider the Contractor's request for substitution when one or more of the following conditions are satisfied, as determined by the Architect. If the following conditions are not satisfied, the Architect will return the requests without action except to record noncompliance with these requirements.
- 1. Extensive revisions to the Contract Documents are not required.
 - 2. Proposed changes are in keeping with the general intent of the Contract Documents.
 - 3. The request is timely, fully documented, and properly submitted.
 - 4. The specified product or method of construction cannot be provided within the Contract Time. The Architect will not consider the request if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly. It is the contractor's responsibility to evaluate the exact time required for each product specified and schedule delivery in adequate time for the timely incorporation of the work. Failure to do so shall not constitute justification for substitutions.
 - 5. The request is directly related to an "or-equal" clause or similar language in the Contract Documents.
 - 6. The requested substitution offers the Owner a substantial advantage, in cost, time, energy conservation, or other considerations, after deducting additional responsibilities the Owner must assume. The Owner's additional responsibilities may include compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner, and similar considerations.
 - 7. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
 - 8. The specified product or method of construction cannot be provided in a manner that is compatible with other materials and where the Contractor certifies that the substitution will overcome the incompatibility.
 - 9. The specified product or method of construction cannot be coordinated with other materials and where the Contractor certifies that the proposed substitution can be coordinated.
 - 10. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provides the required warranty.
 - 11. Where a proposed substitution involves more than one prime contractor, each contractor shall cooperate with the other contractors involved to coordinate the Work, provide uniformity and consistency, and assure compatibility of products.

- B. The Contractor's submittal and the Architect's acceptance of Shop Drawings, Product Data, or Samples for construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.
- C. Pre-bid Requests: As follows:
1. Time limitation: To obtain acceptance of unspecified products, the bidders shall submit requests at least 10 calendar days prior to opening of proposals. No faxed substitution requests will be considered without prior approval by the Architect or Engineer.
 2. Acceptance: If the bidder complies with the requirements of this Section and in the Owner's And Architect's opinion, the proposed product is acceptable in lieu of the one or more specified, the Architect will include it in an addendum which will be issued to all bidders.
 3. Last Addenda: Any questions after the last Addenda has been issued will not be answered when it would have an effect on the Bids by giving any advantage to a Bidder. An Addenda may be issued during the last 5 days only for the extension of the Bid date and will be faxed to Plan Centers and the registered General Contractors holding plans
- D. After Award of Contract Request: In addition to the procedure outlined in paragraphs 1.4 and 2.1 use the following:
1. Normally, requests for substitutions after the contract has been signed will not be allowed.
 2. Consideration: Requests for substitution of specified after the construction contract is signed will be considered only when they are reasonable, timely, fully documented, and for any one of the following reasons:
 - a. Owner's or Architect's request.
 - b. Reduction in contract time or contract sum.
 - c. Specified product is not available from any source.
 - d. Specified product would cause significant delay in the Contract time.

PART 3 - PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 6310

SECTION 01 7000 – EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. General installation of products.
 - 4. Coordination of Owner-installed products.
 - 5. Progress cleaning.
 - 6. Starting and adjusting.
 - 7. Protection of installed construction.
 - 8. Correction of the Work.
- B. Related Sections include the following:
 - 1. Division 1 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
 - 2. Division 1 Section "Submittal Procedures" for submitting surveys.
 - 3. Division 1 Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
 - 4. Division 1 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.3 SUBMITTALS

- A. Qualification Data: For land surveyor.
- B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.

1.4 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
- B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - a. a. Description of the Work.
 - b. b. List of detrimental conditions, including substrates.
 - c. c. List of unacceptable installation tolerances.
 - d. d. Recommended corrections.
 - 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 01 3100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to existing building dimensions and structural components. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 3. Inform installers of lines and levels to which they must comply.
 - 4. Check the location, level and plumb, of every major element as the Work progresses.
 - 5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 - 6. Close site surveys with an error of closure equal to or less than the standard established by
 - 7. authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

- A. Identification: Owner will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

- D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- E. Final Property Survey: Prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
 - 1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
 - 2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
 - 1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 - 2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: Comply with qualification requirements in Section 01 4000 "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.10 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 1 Section "Cutting and Patching."
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 7000

SECTION 01 7310 – CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.
- B. Related Sections include the following:
 - 1. Divisions 2 through 33 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
 - 1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
 - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
 - 3. Products: List products to be used and firms or entities that will perform the Work.
 - 4. Dates: Indicate when cutting and patching will be performed.
 - 5. Utility Services and Mechanical/Electrical Systems: List services/systems that cutting and patching procedures will disturb or affect. List services/systems that will be relocated and those that will be temporarily out of service. Indicate how long services/systems will be disrupted.
 - 6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
 - 7. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.5 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
 - 1. Primary operational systems and equipment.
 - 2. Air or smoke barriers.
 - 3. Fire-suppression systems.

4. Mechanical systems piping and ducts.
 5. Control systems.
 6. Communication systems.
 7. Conveying systems.
 8. Electrical wiring systems.
 9. Operating systems of special construction in Division 13 Sections.
- C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or those results in increased maintenance or decreased operational life or safety.
1. Water, moisture, or vapor barriers.
 2. Membranes and flashings.
 3. Exterior curtain-wall construction.
 4. Equipment supports.
 5. Piping, ductwork, vessels, and equipment.
 6. Noise- and vibration-control elements and systems.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- E. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
 - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 - 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 - 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

- END OF SECTION 01 7310**

SECTION 01 7700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
 - 5. Repair of the Work.
- B. Related Requirements:
 - 1. Section 01 7000 "Execution Requirements" for progress cleaning of Project site.
 - 2. Section 01 7823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 3. Section 01 7839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 ACTION SUBMITTALS

- A. Product Data: For cleaning agents.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Advise Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.

4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 5. Prepare and submit Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 8. Complete startup testing of systems.
 9. Submit test/adjust/balance records.
 10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 11. Advise Owner of changeover in heat and other utilities.
 12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 13. Complete final cleaning requirements, including touchup painting.
 14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected. 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.7 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment according to Section 01 2900 "Payment Procedures."
 2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order, starting with exterior areas first.
 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.

- c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.
4. Submit list of incomplete items in the following format:
- a. PDF electronic file. Architect will return annotated file.

1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
 - 1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
 - 4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
- C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Remove tools, construction equipment, machinery, and surplus material from Project site.

- d. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
- e. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
- f. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
- g. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
- h. Remove labels that are not permanent.
- i. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
- j. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
- k. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
- l. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - 1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.
- m. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
- n. Leave Project clean and ready for occupancy.

- C. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 7419 "Construction Waste Management and Disposal."

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
 - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
 - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
 - 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
 - 4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 01 7700

SECTION 01 7823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory.
 - 2. Operation manuals for systems, subsystems, and equipment.
 - 3. Product maintenance manuals.
 - 4. Systems and equipment maintenance manuals.
- B. Related Requirements:
 - 1. Section 01 3300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

- A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Architect will comment on whether content of operations and maintenance submittals are acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operations and maintenance manuals in the following format:
 - 1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.
 - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
 - b. Enable inserted reviewer comments on draft submittals.
 - 2. Three paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Architect will return two copies.
- C. Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.

1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:
 1. List of documents.
 2. List of systems.
 3. List of equipment.
 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 1. Title page.
 2. Table of contents.
 3. Manual contents.
- B. Title Page: Include the following information:
 1. Subject matter included in manual.
 2. Name and address of Project.
 3. Name and address of Owner.
 4. Date of submittal.
 5. Name and contact information for Contractor.
 6. Name and contact information for Construction Manager.
 7. Name and contact information for Architect.
 8. Name and contact information for Commissioning Authority.
 9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
 10. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.
1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.
 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
 4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
 5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 2. Performance and design criteria if Contractor has delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.
 8. Piped system diagrams.
 9. Precautions against improper use.
 10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
 2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.
 5. Operating characteristics.

6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.4 PRODUCT MAINTENANCE MANUALS

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
 - 1. Standard maintenance instructions and bulletins.
 - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - 3. Identification and nomenclature of parts and components.
 - 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 - 1. Test and inspection instructions.
 - 2. Troubleshooting guide.
 - 3. Precautions against improper maintenance.
 - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - 5. Aligning, adjusting, and checking instructions.
 - 6. Demonstration and training video recording, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

- A. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
 - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- C. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
 1. Do not use original project record documents as part of operation and maintenance manuals.
 2. Comply with requirements of newly prepared record Drawings in Section 017839 "Project Record Documents."
- D. Comply with Section 01 7700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01 7823

SECTION 01 7839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
- B. Related Requirements:
 - 1. Section 01 7700 "Closeout Procedures" for general closeout procedures.
 - 2. Section 01 7823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Submit one set of marked-up record drawings.
- B. Record Specifications: Submit one paper copy of Project's Specifications, including addenda and contract modifications.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
 - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding archive photographic documentation.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Locations and depths of underground utilities.
 - d. Revisions to routing of piping and conduits.
 - e. Revisions to electrical circuitry.
 - f. Actual equipment locations.
 - g. Locations of concealed internal utilities.

- h. Changes made by Change Order or Construction Change Directive.
 - i. Changes made following Architect's written orders.
 - j. Details not on the original Contract Drawings.
 - k. Field records for variable and concealed conditions.
 - l. Record information on the Work that is shown only schematically.
- 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
- 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
- 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
- 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

END OF SECTION 01 7839



OCS – SPECIAL EDUCATION AND ANNEX BUILDING REMODELS

DIVISION 2 – EXISTING CONDITIONS:

02 4119 Selective Demolition

SECTION 02 4119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of selected portions of building or structure.
 - 2. Demolition and removal of selected site elements.
 - 3. Salvage of existing items to be reused or recycled.
- B. Related Requirements:
 - 1. Section 01 1000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
 - 2. Section 01 7300 "Execution" for cutting and patching procedures.
 - 3. Section 01 3516 "Alteration Project Procedures" for general protection and work procedures for alteration projects.
 - 4. Section 31 1000 "Site Clearing" for site clearing and removal of above- and below-grade improvements not part of selective demolition.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and store.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.5 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review structural load limitations of existing structure.

3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.

1.6 INFORMATIONAL SUBMITTALS

- A. Schedule of Selective Demolition Activities: Indicate the following:
 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 3. Coordination for shutoff, capping, and continuation of utility services.
 4. Use of stairs.
 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

1.7 CLOSEOUT SUBMITTALS

1.8 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.9 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Storage or sale of removed items or materials on-site is not permitted.
- E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 1. Maintain fire-protection facilities in service during selective demolition operations.

1.10 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

3.2 PREPARATION

- A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - c. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.

3.4 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 5000 "Temporary Facilities and Controls."
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
1. Strengthen or add new supports when required during progress of selective demolition.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 5. Maintain fire watch during and for at least 2 hours after flame-cutting operations.
 6. Maintain adequate ventilation when using cutting torches.
 7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 10. Dispose of demolished items and materials promptly. Comply with requirements in Section 01 7419 "Construction Waste Management and Disposal."
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
1. Clean salvaged items.
 2. Store items in a secure area until delivery to Owner.
 3. Protect items from damage during transport and storage.

- D. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 3. Protect items from damage during transport and storage.
 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.
- D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings."

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and recycle or dispose of them according to Section 01 7419 "Construction Waste Management and Disposal."
1. Do not allow demolished materials to accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 4. Comply with requirements specified in Section 01 7419 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.

3.8 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 4119



OCS – SPECIAL EDUCATION AND ANNEX BUILDING REMODELS

DIVISION 3 - CONCRETE:

03 3000 Cast-In-Place Concrete

SECTION 03 3000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.
- B. Related Requirements:
 - 1. Section 31 2000 "Earth Moving" for drainage fill under slabs-on-ground.

1.2 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, and other pozzolans materials subject to compliance with requirements.
- B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Design Mixtures: For each concrete mixture, include the following:
 - 1. Mixture identification.
 - 2. Minimum 28-day compressive strength.
 - 3. Durability exposure class.
 - 4. Maximum w/cm.
 - 5. Calculated equilibrium unit weight, for lightweight concrete.
 - 6. Slump limit.
 - 7. Air content.
 - 8. Nominal maximum aggregate size.
 - 9. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
 - 10. Intended placement method.
 - 11. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.5 QUALITY ASSURANCE

- A. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
 - 1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with ASTM C94/C94M and ACI 301.

1.7 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 301 and ACI 306.1.

- B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with ACI 301 unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

- A. Cementitious Materials:

1. Portland Cement: ASTM C150/C150M, Type I.
2. Fly Ash: ASTM C618, Class C or F.
3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.

- B. Normal-Weight Aggregates: ASTM C33/C33M, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source.

1. Alkali-Silica Reaction: Comply with one of the following:
 - a. Expansion Result of Aggregate: Not more than 0.04 percent at one-year when tested in accordance with ASTM C1293.
 - b. Expansion Results of Aggregate and Cementitious Materials in Combination: Not more than 0.10 percent at an age of 16 days when tested in accordance with ASTM C1567.
 - c. Alkali Content in Concrete: Not more than 4 lb./cu. yd. for moderately reactive aggregate or 3 lb./cu. yd. for highly reactive aggregate, when tested in accordance with ASTM C1293 and categorized in accordance with ASTM C1778, based on alkali content being calculated in accordance with ACI 301.
2. Maximum Coarse-Aggregate Size: 1 inch nominal.
3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

- C. Air-Entraining Admixture: ASTM C260/C260M.

- D. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
2. Retarding Admixture: ASTM C494/C494M, Type B.
3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.

- E. Water and Water Used to Make Ice: ASTM C94/C94M, potable or complying with ASTM C1602/C1602M, including all limits listed in Table 2 and the requirements of paragraph 5.4

2.3 LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ChemMasters, Inc.

- b. ChemTec International.
- c. Concrete Sealers USA.
- d. Curecrete Distribution Inc.
- e. Dayton Superior.
- f. Euclid Chemical Company (The); an RPM company.
- g. Kaufman Products, Inc.
- h. Laticrete International, Inc.
- i. NewLook International, Inc.
- j. Nox-Crete Products Group.
- k. US SPEC, Division of US MIX Company.
- l. V-Seal Concrete Sealers & Specialty Coatings.
- m. Vexcon Chemicals Inc.

2.4 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- B. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
 - 1. Color:
 - a. Ambient Temperature Below 50 deg F: Black.
 - b. Ambient Temperature between 50 deg F and 85 deg F: Any color.
 - c. Ambient Temperature Above 85 deg F: White.
- C. Water: Potable or complying with ASTM C1602/C1602M.

2.5 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber.

2.6 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.
 - 1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - 1. Fly Ash or Other Pozzolans: 25 percent by mass.
 - 2. Total of Fly Ash or Other Pozzolans, Slag Cement: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass.
 - 3. Total of Fly Ash or Other Pozzolans: 35 percent by mass with fly ash or pozzolans not exceeding 25 percent by mass.
- C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.
 - 1. Use water-reducing high-range water-reducing in concrete, as required, for placement and workability.
 - 2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 - 3. Use water-reducing admixture in pumped concrete and concrete with a w/cm below 0.50.

2.7 CONCRETE MIXTURES

- A. Class C: Normal-weight concrete used for interior slabs-on-ground.
 - 1. Exposure Class: ACI 318 F0.
 - 2. Minimum Compressive Strength: 3000 psi at 28 days. See Structural Drawings for additional information.
 - 3. Maximum w/cm: 0.45.
 - 4. Slump Limit: 4 inches , plus or minus 1 inch.
 - 5. Slump Flow Limit: 22 inches , plus or minus 1.5 inches.
 - 6. Air Content:
 - a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.
 - 7. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.

2.8 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M and ASTM C1116/C1116M, and furnish batch ticket information.

PART 3 - EXECUTION

3.1 JOINTS

- A. Construct joints true to line, with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.
 - 1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
 - 2. Place joints perpendicular to main reinforcement.
 - a. Continue reinforcement across construction joints unless otherwise indicated.
 - b. Do not continue reinforcement through sides of strip placements of floors and slabs.
 - 3. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
 - 4. Locate joints for beams, slabs, joists, and girders at third points of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 - 5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 - 6. Space vertical joints in walls as indicated on Drawings. Unless otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.
- C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:
 - 1. Grooved Joints: Form control joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of control joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 - 2. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.

3.2 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.
 - 1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
 - 2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.
- B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.
- C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect in writing, but not to exceed the amount indicated on the concrete delivery ticket.
 - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301, but not to exceed the amount indicated on the concrete delivery ticket.
 - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.
 - 1. If a section cannot be placed continuously, provide construction joints as indicated.
 - 2. Deposit concrete to avoid segregation.
 - 3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
 - 4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301.
 - a. Do not use vibrators to transport concrete inside forms.
 - b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
 - c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
 - d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Do not place concrete floors and slabs in a checkerboard sequence.
 - 2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 3. Maintain reinforcement in position on chairs during concrete placement.
 - 4. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 5. Level concrete, cut high areas, and fill low areas.
 - 6. Slope surfaces uniformly to drains where required.
 - 7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
 - 8. Do not further disturb slab surfaces before starting finishing operations.

3.3 FINISHING FORMED SURFACES

- A. As-Cast Surface Finishes:

1. ACI 301 Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.
 - a. Patch voids larger than 1-1/2 inches wide or 1/2 inch deep.
 - b. Remove projections larger than 1 inch.
 - c. Tie holes do not require patching.
 - d. Surface Tolerance: ACI 117 Class D.
 - e. Apply to concrete surfaces not exposed to public view.
 2. ACI 301 Surface Finish SF-3.0:
 - a. Patch voids larger than 3/4 inch wide or 1/2 inch deep.
 - b. Remove projections larger than 1/8 inch.
 - c. Patch tie holes.
 - d. Surface Tolerance: ACI 117 Class A.
 - e. Locations: Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.
- B. Related Unformed Surfaces:
1. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.4 FINISHING FLOORS AND SLABS

- A. Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish:
1. While still plastic, texture concrete surface that has been screeded and bull-floated or darbied.
 2. Use stiff brushes, brooms, or rakes to produce a profile depth of 1/4 inch in one direction.
 3. Apply scratch finish to surfaces to receive concrete floor toppings or to receive mortar setting beds for bonded cementitious floor finishes.
- C. Float Finish:
1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.
 2. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 tolerances for conventional concrete.
 3. Apply float finish to surfaces to receive trowel finish.
- D. Trowel Finish:
1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
 2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
 3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 4. Do not add water to concrete surface.
 5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
 6. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
 7. Finish and measure surface, so gap at any point between concrete surface and an unlevelled, freestanding, 10-ft.-long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch.

- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thinset method. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.
 - 1. Coordinate required final finish with Architect before application.
 - 2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.
 - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
 - 2. Coordinate required final finish with Architect before application.

3.5 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

- A. Filling In:
 - 1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
 - 2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
 - 3. Provide other miscellaneous concrete filling indicated or required to complete the Work.

3.6 CONCRETE CURING

- A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
 - 1. Comply with ACI 301 and ACI 306.1 for cold weather protection during curing.
 - 2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.
 - 3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h before and during finishing operations.
- B. Curing Formed Surfaces: Comply with ACI 308.1 as follows:
 - 1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
 - 2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.
 - 3. If forms remain during curing period, moist cure after loosening forms.
 - 4. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:
 - a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
 - b. Continuous Sprinkling: Maintain concrete surface continuously wet.
 - c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
 - d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
 - e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 1) Recoat areas subject to heavy rainfall within three hours after initial application.
 - 2) Maintain continuity of coating and repair damage during curing period.
- C. Curing Unformed Surfaces: Comply with ACI 308.1 as follows:
 - 1. Begin curing immediately after finishing concrete.
 - 2. Interior Concrete Floors:
 - a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:

- 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than 12-inches.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
 - a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - b) Cure for not less than seven days.
 - 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - a) Water.
 - b) Continuous water-fog spray.
- b. Floors to Receive Curing Compound:
- 1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
 - 3) Maintain continuity of coating, and repair damage during curing period.
 - 4) Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.
- c. Floors to Receive Curing and Sealing Compound:
- 1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
 - 3) Repeat process 24 hours later, and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.7 TOLERANCES

- A. Conform to ACI 117.

3.8 APPLICATION OF LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment in accordance with manufacturer's written instructions.
1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
 2. Do not apply to concrete that is less than 14 days' old.
 3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing.
 4. Rinse with water; remove excess material until surface is dry.
 5. Apply a second coat in a similar manner if surface is rough or porous.

3.9 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.
- B. Testing Agency: a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
 - 1. Testing agency shall be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31/C31M.
 - 2. Testing agency shall immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
 - 3. Testing agency shall report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.
 - a. Test reports shall include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:
 - 1) Project name.
 - 2) Name of testing agency.
 - 3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
 - 4) Name of concrete manufacturer.
 - 5) Date and time of inspection, sampling, and field testing.
 - 6) Date and time of concrete placement.
 - 7) Location in Work of concrete represented by samples.
 - 8) Date and time sample was obtained.
 - 9) Truck and batch ticket numbers.
 - 10) Design compressive strength at 28 days.
 - 11) Concrete mixture designation, proportions, and materials.
 - 12) Field test results.
 - 13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
 - 14) Type of fracture and compressive break strengths at seven days and 28 days.
- C. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.
- D. Inspections:
 - 1. Headed bolts and studs.
 - 2. Verification of use of required design mixture.
 - 3. Concrete placement, including conveying and depositing.
 - 4. Curing procedures and maintenance of curing temperature.
 - 5. Verification of concrete strength before removal of shores and forms from beams and slabs.
 - 6. Batch Plant Inspections: On a random basis, as determined by Architect.
- E. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M shall be performed in accordance with the following requirements:
 - 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 - a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C143/C143M:
 - a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - b. Perform additional tests when concrete consistency appears to change.
3. Slump Flow: ASTM C1611/C1611M:
 - a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - b. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete.
 - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
5. Concrete Temperature: ASTM C1064/C1064M:
 - a. One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
6. Unit Weight: ASTM C567/C567M fresh unit weight of structural lightweight concrete.
 - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
7. Compression Test Specimens: ASTM C31/C31M:
 - a. Cast and laboratory cure two sets of two 6-inch by 12-inch or 4-inch by 8-inch cylinder specimens for each composite sample.
 - b. Cast, initial cure, and field cure two sets of two standard cylinder specimens for each composite sample.
8. Compressive-Strength Tests: ASTM C39/C39M.
 - a. Test one set of two laboratory-cured specimens at seven days and one set of two specimens at 28 days.
 - b. Test one set of two field-cured specimens at seven days and one set of two specimens at 28 days.
 - c. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi if specified compressive strength is 5000 psi, or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi.
11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
12. Additional Tests:
 - a. Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
 - b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.

1) Acceptance criteria for concrete strength shall be in accordance with ACI 301 section 1.6.6.3.

13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

F. Measure floor and slab flatness and levelness in accordance with ASTM E1155 within 24 hours of completion of floor finishing and promptly report test results to Architect.

3.10 PROTECTION

A. Protect concrete surfaces as follows:

1. Protect from petroleum stains.
2. Diaper hydraulic equipment used over concrete surfaces.
3. Prohibit vehicles from interior concrete slabs.
4. Prohibit use of pipe-cutting machinery over concrete surfaces.
5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.
7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.
8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using Floor Slab Protective Covering.

END OF SECTION 03 3000



OCS – SPECIAL EDUCATION AND ANNEX BUILDING REMODELS

DIVISION 4 - MASONRY:

04 2223	Architectural Concrete Unit Masonry
04 2613	Masonry Veneer

SECTION 04 2223 - ARCHITECTURAL CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install architectural concrete unit masonry as described in Contract Documents.
- B. Products Installed But Not Furnished Under This Section:
 - 1. Grout.
 - 2. Mortar.
 - 3. Reinforcement bars.

1.2 REFERENCES

- A. Definitions:
 - 1. Section 04 0501: 'Common Masonry Requirements' for:
 - a. Common Masonry Terms.
- B. Reference Standards:
 - 1. ASTM International:
 - a. ASTM C90-16a, 'Standard Specification for Loadbearing Concrete Masonry Units'.
 - b. ASTM C331/C331M-17, 'Standard Specification for Lightweight Aggregates for Concrete Masonry Units'.
 - 2. The Masonry Society (TMS):
 - a. TMS 402/602-16, 'Building Code Requirements and Specification for Masonry Structures'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
 - 1. Participate in MANDATORY pre-installation conference as specified in Section 01 3100 held jointly with other Division 04 'Masonry' specifications in this Project that require pre-installation conference as specified in Section 04 0501.

1.4 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Installer: Requirements of Section 01 4301 applies, but not limited to following:
 - a. Minimum of five (5) years' experience on successfully completed projects of similar nature.

1.5 DELIVERY, HANDLING, AND STORAGE

- A. Delivery And Acceptance Requirements:
 - 1. As specified in Section 04 0501: 'Common Masonry Requirements'.
- B. Storage And Handling Requirements:
 - 1. Aggregate, Cementitious Material, Masonry Accessories, Masonry Units, and Reinforcement:
 - a. As specified in Section 04 0501: 'Common Masonry Requirements'.

1.6 FIELD CONDITIONS

- A. Ambient Conditions:
 - 1. Cold Weather and Hot Weather Limitations:
 - a. As specified in Section 04 0501: 'Common Masonry Requirements'.

PART 2 - PRODUCTS

2.1 SYSTEM

- A. Design Criteria:
 - 1. Minimum Compressive Strength of (2000 psi).
- B. Materials:
 - 1. Mortar: Type 'S' mortar as specified in Section 04 0513: 'Cement and Lime Masonry Mortaring'.
 - 2. Concrete Masonry Units:
 - a. Design Criteria:
 - 1) Meet requirements of ASTM C90, lightweight classification:
 - a) 85 lbs per cu ft minimum weight classification.
 - b) Lightweight aggregates conforming to ASTM C331/C331M.
 - c) Do not use re-crushed masonry units as aggregate.
 - b. Face Types:
 - 1) Standard faced.

2.2 ACCESSORIES

- A. Construction Cleaning Compounds:
 - 1. Type Two Acceptable Products:
 - a. 202 or 202V by Diedrich Technologies, Oak Creek, WI www.diedrichtechnologies.com.
 - b. Surekleen No. 600 or Vana-Trol by ProSoCo Inc, Kansas City, KS www.prosoco.com.

- c. Equal as approved by Architect before use. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:

1. Verify substrates have been properly prepared.
2. Verify built-in items are in proper location, and ready for roughing into masonry.
3. Notify Architect of any unsatisfactory preparation before proceeding.
 - a. Do not install masonry over unsuitable conditions.
 - b. Commencement of Work by installer is considered acceptance of substrate.

3.2 PREPARATION

A. Coordinate placement of reinforcement, anchors and accessories specified in other sections.

B. Prior to placing masonry:

1. Clean reinforcement by removing mud, oil, or other materials that will adversely affect or reduce bond at time mortar or grout is placed.
2. Remove laitance, loose aggregate, and anything else that would prevent mortar from bonding to foundation.

C. Wetting Masonry Units:

1. Concrete masonry:
 - a. Do not wet concrete masonry units before laying. Wet cutting is permitted.

D. Reinforcement:

1. Place reinforcement and ties in grout spaces prior to grouting.

E. Provide temporary bracing during installation of masonry work:

1. Design, provide, and install bracing that will assure stability of masonry during construction.
2. Maintain bracing in place until building structure provides permanent support.

3.3 INSTALLATION

A. Interface With Other Work:

1. Masonry Cutting:
 - a. Make cuts proper size to accommodate work of other trades.
 - b. Cut openings for electrical devices using cover plates no larger than can be covered by standard size plate.
 - c. Replace unit masonry in which larger than necessary openings are cut.
 - d. Do not patch openings with mortar or other material.

B. General:

1. Cold Weather and Hot Weather Limitations:
 - a. Place grout and mortar as specified in Section 04 0501: 'Common Masonry Requirements'.
 2. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
 3. Step back unfinished work for joining with new work. Use toothing only with Architect's approval.
- C. Tolerances:
1. Masonry work shall be true to vertical and horizontal planes within 1/8 inch in 10 feet, non-cumulative.
 2. Maintain 3/8 inch mortar joints throughout.
- D. Mortar:
1. Use mortar within two (2) hours of initial mixing. Discard mortar that has begun to set. Set masonry units within one (1) minute of spreading mortar.
- E. Grouting:
1. General:
 - a. Provide grout that conforms to requirements as specified in Section 04 0516: 'Masonry Grouting'.
 - b. Use fine grout for cavities 2 inches and smaller in smallest dimension. Use coarse grout for cavities greater than 2 inches in smallest dimension.
 - c. Grout hollow metal door frames installed in masonry walls solid.
 - d. Provide grout-leveling bed for support of wall plates.
 2. Concrete Masonry Units:
 - a. Fully grout cells containing reinforcing bars.
 - b. Consolidate grout by means of mechanical vibrator. Do not use cell reinforcing to rod grout.
 - c. Before loss of plasticity, mechanically reconsolidate grout.
 3. Placing time:
 - a. Place grout within 1-1/2 inches introducing water in the mixture and prior to initial set:
 - 1) Discard site-mixed grout that does not meet specified slump without adding water after initial mixing.
 - 2) For ready-mixed grout:
 - a) Addition of water is permitted at time of discharge to adjust slump.
 - b) Discard ready-mixed grout that does not meet specified slump without adding water, other than water that was added at time of discharge.
 - c) Time limitation is waived as long as ready-mixed grout meets specified slump.
 4. Confinement:
 - a. Confine grout to areas indicated on Contract Drawings. Use material to confine grout that permits bond between masonry units and mortar.
 5. Grout Pour Height:
 - a. Place grout in 48 inch maximum lifts.
 6. Consolidation:
 - a. Consolidate grout at the time of placement:

- 1) Consolidate grout at time of placement in height by mechanical vibration or by puddling.
 - 2) Consolidate pours exceeding 12 inch in height by mechanical vibration, and reconsolidate by mechanical vibration after initial water loss and settlement has occurred.
 - b. Consolidation or reconsolidation is not required for self-consolidating grout.
7. Grout Key:
- a. When grouting, form grout keys between grout pours. Form grout keys between grout lifts when first lift is permitted to set prior to placement of subsequent lift:
 - 1) Form grout key by terminating grout minimum of 1-1/2 inch below mortar joint.
 - 2) Do not form grout keys within beams.
 - 3) At beams or lintels laid with closed bottom units, terminate grout pour at bottom of beam or lintel without forming grout key.

F. Laying:

1. Layout:
 - a. Running bond except where indicated otherwise.
2. Joints:
 - a. Tool concave. Fill completely except where indicated differently.
 - b. Do not tool until mortar has taken initial set.
 - c. Point holes in joints. Fill and tool properly.
3. Concrete Masonry Units:
 - a. Lay hollow masonry units dry. Do not lay masonry on frozen material.
 - b. Place hollow units so:
 - 1) Face shells of bed joints are fully mortared.
 - 2) Webs are fully mortared in all courses of piers, columns and pilasters and when necessary to confine grout or insulation.
 - 3) Head joints are mortared, minimum distance from each face equal to face shell thickness of unit.
 - 4) Vertical cells to be grouted are aligned and unobstructed openings for grout are provided in accordance with Contract Drawings.

G. Reinforcing:

1. Reinforcing shall be free of material that may destroy bond.
2. Continuous Joint Reinforcing:
 - a. Beginning approximately 8 inches from base of masonry, provide joint reinforcing 16 inches on center vertically, except 8 inches on center if drip crimped.
 - b. Lap splices and intersections minimum of 6 inches.
3. Reinforcing:
 - a. Place reinforcing and dowels before pouring grout.
 - b. Dowel vertical reinforcing bars out of structure below with bars of same size and spacing.

- c. Place horizontal bars in 8 inch deep bond beam units at 48 inches on center. Continue bond beam units and reinforcement within infilled openings.

3.4 CLEANING

A. General:

1. Clean exposed masonry surfaces of stains, efflorescence, mortar and grout droppings, and debris using methods that do not damage masonry.
2. After mortar has hardened, wet masonry and clean with specified cleaning compound. Use stiff fibered brush for application. Rinse masonry surfaces with water immediately after cleaning. Leave masonry clean, free of mortar daubs, and with tight mortar joints.
3. Wash adjacent non-masonry surfaces. Use detergent and soft brushes or cloth.
4. 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.

B. Waste Management:

1. Unit Masonry:
 - a. Clean up masonry debris and remove from site.

3.5 PROTECTION

A. General:

1. Brace masonry walls until walls attain adequate strength and are tied into building structure.
2. Do not allow structural loading of masonry walls until walls attain adequate strength.
3. During construction, all walls should be kept dry by covering top of wall with strong, water-resistant membrane at end of each day or shutdown period. Covering should overhang wall by at least 24 inches on each side, and should be secured against wind.
4. Covering should remain in place until top of cavity wall is completed or protected by adjacent materials.
5. Protect masonry with covering during rainy weather.

B. Cold Weather Requirements:

1. In cold weather, all materials and walls should be properly protected against freezing including storing of materials, preparation of mortar, heating of masonry units, laying precautions, and protection of Work.
2. Remove all masonry deemed frozen or damaged.

END OF SECTION

SECTION 04 2613 - MASONRY VENEER

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Brick.
 - 2. Mortar materials.
 - 3. Ties and anchors.
 - 4. Embedded flashing.

1.2 ACTION SUBMITTALS

- A. Samples: For each type and color of brick and colored mortar.

1.3 INFORMATIONAL SUBMITTALS

1.4 FIELD CONDITIONS

- A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602.
- B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602.

PART 2 - PRODUCTS

2.1 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602, except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects will be exposed in the completed Work.

2.2 BRICK

- A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units.
 - 1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
 - 2. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
- B. Clay Face Brick: Facing brick complying with ASTM C216.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Interstate Brick Company.
 - b. Acme Brick Company.
 - c. Belden Brick Company (The).
 - d. Boral Bricks, Inc; Boral Limited.
 - e. Endicott Clay Products Co.
 - f. General Shale Brick, Inc.
 - g. Glen-Gery Corporation.
2. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested in accordance with ASTM C67/C67M.
3. Efflorescence: Provide brick that has been tested in accordance with ASTM C67/C67M and is rated "not effloresced."
4. Surface Coating: Brick with colors or textures produced by application of coatings withstand 50 cycles of freezing and thawing in accordance with ASTM C67/C67M with no observable difference in the applied finish when viewed from 10 ft..
5. Size (Actual Dimensions): Match existing brick dimensions.
6. Color and Texture: Match existing brick color and texture.

2.3 MORTAR MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Masonry Cement: ASTM C91/C91M.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Argos USA LLC.
 - b. Cemex S.A.B. de C.V.
 - c. Fairborn Cement Company.
 - d. Federal White Cement, Ltd.
 - e. Holcim (US) Inc.
 - f. Lafarge North America Inc.
 - g. Lehigh Hanson; HeidelbergCement Group.
 - h. Lehigh White Cement Company.
 - i. Quikrete; The QUIKRETE Companies, LLC.
 - j. Sakrete; CRH Americas, Oldcastle APG.
- E. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979/C979M. Use only pigments with a record of satisfactory performance in masonry mortar.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Davis Colors.
 - b. Euclid Chemical Company (The); an RPM company.
 - c. Lanxess Corporation.
 - d. Solomon Colors Inc.
- F. Colored Cement Products: Packaged blend made from portland cement and hydrated lime and mortar pigments, all complying with specified requirements, and containing no other ingredients.

1. Colored Portland Cement-Lime Mix:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Argos USA LLC.
 - 2) Holcim (US) Inc.
 - 3) Lehigh Hanson; HeidelbergCement Group.
 2. Colored Masonry Cement:
 - b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Argos USA LLC.
 - 2) Cemex S.A.B. de C.V.
 - 3) Fairborn Cement Company.
 - 4) Holcim (US) Inc.
 - 5) Lafarge North America Inc.
 - 6) Lehigh Hanson; HeidelbergCement Group.
- G. Preblended Dry Mortar Mix: Packaged blend made from portland cement and hydrated lime, sand, mortar pigments, water repellents, and admixtures and complying with ASTM C1714/C1714M.
1. Preblended Dry Portland Cement Mortar Mix:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Amerimix is a trademark of Bonsal American, an Oldcastle company.
 - 2) Quikrete; The QUIKRETE Companies, LLC.
 - 3) SPEC MIX, LLC.
 - 4) Sakrete; CRH Americas, Oldcastle APG.
 2. Preblended Dry Masonry Cement Mortar Mix:
 - b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Amerimix is a trademark of Bonsal American, an Oldcastle company.
 - 2) SPEC MIX, LLC.
- H. Aggregate for Mortar: ASTM C144.
1. White-Mortar Aggregates: Natural white sand or crushed white stone.
 2. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- I. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Euclid Chemical Company (The); an RPM company.
 - b. GCP Applied Technologies Inc.
- J. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ACM Chemistries.

- b. Euclid Chemical Company (The); an RPM company.
- c. GCP Applied Technologies Inc.
- d. Master Builders Solutions.

K. Water: Potable.

2.4 TIES AND ANCHORS

- A. General: Ties and anchors extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face.
- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
 - 1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A1064/A1064M, with ASTM A153/A153M, Class B-2 coating.
 - 2. Stainless Steel Wire: ASTM A580/A580M, Type 304.
 - 3. Steel Sheet, Galvanized after Fabrication: ASTM A1008/A1008M, Commercial Steel, with ASTM A153/A153M, Class B coating.
- C. Adjustable Masonry-Veneer Anchors:
 - 1. General: Provide anchors that allow vertical adjustment but resist a 100 lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.
 - 2. Fabricate sheet metal anchor sections and other sheet metal parts from 0.1084-inch-thick steel sheet, galvanized after fabrication.
 - 3. Fabricate wire ties from 0.25-inch- diameter, hot-dip galvanized steel wire unless otherwise indicated.
 - 4. Masonry-Veneer Anchors; Seismic-Pintle Plate: Rib-stiffened, sheet metal anchor section with screw holes at top and bottom, projecting leg with slotted hole for vertical leg of seismic pintle tie. Tie is rib-stiffened, sheet metal bent plate with down-turned leg to fit in anchor slot and with integral tabs to hold continuous wire in veneer.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Hohmann & Barnard, Inc.
 - 2) Wire-Bond.

2.5 EMBEDDED FLASHING

- A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
 - 1. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.016 inch thick.
 - 2. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 ft. Provide splice plates at joints of formed, smooth metal flashing.
 - 3. Fabricate metal drip edges from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
 - 4. Fabricate metal sealant stops from stainless steel. Extend at least 3 inches into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch and down into joint 1/4 inch to form a stop for retaining sealant backer rod.
- B. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.6 MORTAR MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
 2. Use portland cement-lime mortar unless otherwise indicated.
 3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification. Use Type N unless another type is indicated.
- D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
1. Pigments do not exceed 10 percent of portland cement by weight.
 2. Pigments do not exceed 5 percent of masonry cement by weight.
 3. Application: Use pigmented mortar for exposed mortar joints.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- B. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.
- C. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested in accordance with ASTM C67/C67M. Allow units to absorb water so they are damp but not wet at time of laying.

3.2 TOLERANCES

- A. Dimensions and Locations of Elements:
1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
 3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.
- B. Lines and Levels:
1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 ft., or 1/2-inch maximum.
 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 ft., 1/4 inch in 20 ft., or 1/2-inch maximum.
 3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 ft., 3/8 inch in 20 ft., or 1/2-inch maximum.
 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 ft., 1/4 inch in 20 ft., or 1/2-inch maximum.
 5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 ft., 3/8 inch in 20 ft., or 1/2-inch maximum.
- C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch .

3.3 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

3.4 MORTAR BEDDING AND JOINTING

- A. Lay masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

3.5 ANCHORED MASONRY VENEERS

- A. Anchor masonry veneers to wall framing and masonry backup with seismic masonry-veneer anchors to comply with the following requirements:
 1. Fasten seismic anchors through sheathing to wall framing and to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
 2. Embed connector sections and continuous wire in masonry joints.
 3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
 4. Space anchors as indicated, but not more than 18 inches o.c. vertically and 24 inches o.c. horizontally, with not less than one anchor for each 2 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 8 inches, around perimeter.
 5. Space anchors as indicated, but not more than 16 inches o.c. vertically and 25 inches o.c. horizontally, with not less than one anchor for each 2.67 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 36 inches, around perimeter.
 6. Space anchors as indicated, but not more than 18 inches o.c. vertically and horizontally. Install additional anchors within 12 inches of openings and at intervals, not exceeding 24 inches, around perimeter.
- B. Provide not less than 1 inch of airspace between back of masonry veneer and face of CMI masonry.

3.6 FLASHING, WEEP HOLES, AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B. Install flashing as follows unless otherwise indicated:
 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before

- covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
2. Extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under water-resistive barrier, lapping at least 4 inches.
 3. At lintels and shelf angles, extend flashing 6 inches minimum, to edge of next full unit at each end. At heads and sills, extend flashing 6 inches minimum, to edge of next full unit and turn ends up not less than 2 inches to form end dams.
 4. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal drip edge.
 5. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal flashing termination.
- C. Install weep holes in veneers in head joints of first course of masonry immediately above embedded flashing.
1. Use specified weep/cavity vent products to form weep holes.
 2. Space weep holes 24 inches o.c. unless otherwise indicated.
- D. Place cavity drainage material in airspace behind veneers to comply with configuration requirements for cavity drainage material in "Accessories" Article.
- E. Install vents in head joints in exterior wythes at spacing indicated. Use specified weep/cavity vent products to form vents.
1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

3.7 CLEANING

- A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 2. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 4. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
 5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

3.8 MASONRY WASTE DISPOSAL

- A. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
1. Do not dispose of masonry waste as fill within 18 inches of finished grade.
- B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 04 2613



OCS – SPECIAL EDUCATION AND ANNEX BUILDING REMODELS

DIVISION 5 - METALS:

05 5000

Metal Fabrications

SECTION 05 5000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Steel framing and supports for mechanical and electrical equipment.
 - 2. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 - 3. Metal ladders.
 - 4. Elevator hoist beam.
 - 5. Steel shaped for supporting elevator door sills
- B. Related Requirements:
 - 1. Section 03 3000 "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

- C. Shop Drawings: Show fabrication and installation details. Provide Shop Drawings for the following:
 - 1. Steel framing and supports for mechanical and electrical equipment.
 - 2. Steel framing and supports for applications where framing and supports are not specified in other Sections.

1.5 INFORMATION SUBMITTALS

- A. Mill Certificates: Signed by stainless-steel manufacturers, certifying that products furnished comply with requirements.
- B. Welding certificates.

1.6 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding code – Steel."
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code – Steel."

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 4000 "Quality Requirements," to design.

2.2 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.
- D. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.
- E. Wide Flange: ASTM A992.

2.3 FASTENERS

- A. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3; with hex nuts, ASTM A 563, Grade C3; and, where indicated, flat washers.
- B. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.:
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- C. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
- D. Post-Installed Anchors:

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
- E. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches by length indicated with anchor straps or studs not less than 3 inches long at not more than 8 inches o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

2.4 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Section 09 9123 Interior Painting
- B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- C. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base materials.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
 - 1. Fabricate units from slotted channel framing where indicated.
 - 2. Furnish inserts for units installed after concrete is placed.
- C. Galvanize miscellaneous framing and supports where indicated.
- D. Prime miscellaneous framing and supports with where indicated.

2.7 FINISHES, GENERAL

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.8 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
 - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
- C. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

3.3 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION 05 5000



OCS – SPECIAL EDUCATION AND ANNEX BUILDING REMODELS

DIVISION 6 - WOOD AND PLASTICS:

06 1000	Rough Carpentry
06 1600	Sheathing
06 4116	Plastic-Laminate-Clad Architectural Cabinets

SECTION 06 1000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Framing with dimension lumber.
 - 2. Wood blocking, cants, and nailers.
 - 3. Wood furring and grounds.
 - 4. Plywood backing panels.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product.

1.3 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
- B. Evaluation Reports: For the following, from ICC-ES:
 - 1. Wood-preservative-treated wood.
 - 2. Power-driven fasteners.
 - 3. Post-installed anchors.
 - 4. Metal framing anchors.

1.4 QUALITY ASSURANCE

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
 - 3. Dress lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 19 percent.

2.2 DIMENSION LUMBER FRAMING

- A. Framing Other Than Non-Load-Bearing Partitions: Any species and grade with a modulus of elasticity of at least 1,600,000 psi and an extreme fiber stress in bending of at least 900 psi for 2-inch nominal thickness and 12-inch nominal width for single-member use. See structural drawings for more information.
 - 1. Application: Framing other than interior partitions not indicated as load-bearing.

2.3 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
 - 3. Furring.
- B. Dimension Lumber Items: Construction or No. 2 grade lumber of any species.

2.4 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: Plywood, DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.

2.5 FASTENERS

- A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.
 - 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.
- B. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

2.6 MISCELLANEOUS MATERIALS

- A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.
- B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.
- C. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D3498 that is approved for use indicated by adhesive manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- C. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- D. Do not splice structural members between supports unless otherwise indicated.
- E. Comply with AWP A M4 for applying field treatment to cut surfaces of preservative-treated lumber.

- F. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- G. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
 - 2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
 - 3. ICC-ES evaluation report for fastener.

3.2 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06 1000

SECTION 06 1600 - SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Wall sheathing.
 - 2. Roof sheathing.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product.

1.3 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:
 - 1. Wood-preserved-treated plywood.
 - 2. Fire-retardant-treated plywood.

1.4 QUALITY ASSURANCE

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

2.2 WOOD PANEL PRODUCTS

- A. Emissions: Products shall meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.3 PRESERVATIVE-TREATED PLYWOOD

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
- C. Application: Treat items indicated on Drawings and plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing.

2.4 FIRE-RETARDANT-TREATED PLYWOOD

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.
 2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201/D3201M at 92 percent relative humidity. Use where exterior type is not indicated.
 3. Design Value Adjustment Factors: Treated lumber plywood shall be tested according to ASTM D5516 and design value adjustment factors shall be calculated according to ASTM D6305. Span ratings after treatment shall be not less than span ratings specified. For roof sheathing and where high-temperature fire-retardant treatment is indicated, span ratings for temperatures up to 170 deg F shall be not less than span ratings specified.
- C. Kiln-dry material after treatment to a maximum moisture content of 15 percent.
- D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.
- E. Application: Treat plywood indicated on Drawings.

2.5 WALL SHEATHING

- A. Plywood Sheathing: As noted in the Structural Drawings.
- B. Oriented-Strand-Board Sheathing: DOC PS 2, Exposure 1, Structural I sheathing.

2.6 ROOF SHEATHING

- A. Plywood Sheathing: Exterior, Structural I sheathing. See structural drawings for more information.
- B. Oriented-Strand-Board Sheathing: DOC PS 2, Exposure 1, Structural I sheathing.

2.7 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
1. For roof, parapet, and wall sheathing, provide fasteners.

2.8 MISCELLANEOUS MATERIALS

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
 2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in the ICC's International Residential Code for One- and Two-Family Dwellings.
 3. ICC-ES evaluation report for fastener.
- D. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
 - 1. Wall and Roof Sheathing:
 - a. Nail to wood framing.
 - b. Screw to cold-formed metal framing.
 - c. Space panels 1/8 inch apart at edges and ends.

END OF SECTION 06 1600

SECTION 06 4116 - PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Plastic-laminate-clad architectural cabinets.
 - 2. Cabinet hardware and accessories.
 - 3. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-clad architectural cabinets that are not concealed within other construction.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. Shop Drawings:
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Apply AWI Quality Certification Program label to Shop Drawings.
- C. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and Installer.
- B. Research reports.
- C. Field quality control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.6 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
 - 1. Manufacturer's Certification: Licensed participant in AWI's Quality Certification Program.
- B. Installer Qualifications: Licensed participant in AWI's Quality Certification Program.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of cabinets indicated for construction, finishes, installation, and other requirements.
 - 1. Provide labels and certificates from AWI certification program indicating that woodwork complies with requirements of grades specified.
- B. Architectural Woodwork Standards Grade: Custom.
- C. Type of Construction: Frameless.
- D. Door and Drawer-Front Style: Flush overlay.
 - 1. Reveal Dimension: As indicated.
- E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.
- F. Laminate Cladding for Exposed Surfaces:
 - 1. Horizontal Surfaces: Grade HGS.
 - 2. Postformed Surfaces: Grade HGP.
 - 3. Vertical Surfaces: Grade HGS.
 - 4. Edges: PVC edge banding, 3.0 mm thick, matching laminate in color, pattern, and finish.
 - 5. Pattern Direction: Vertically for drawer fronts, doors, and fixed panels.
- G. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
 - 1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners or glued dovetail joints.
- H. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1. As indicated in Drawings.

2.2 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
 - 1. Wood Moisture Content: 5 to 10 percent.
- B. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
 - 1. Medium-Density Fiberboard: ANSI A208.2, Grade 130.
 - 2. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.

2.3 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in "Millwork Hardware Schedule" in Drawings.
- B. Frameless Concealed Hinges (European Type): See "Millwork Hardware Schedule" in Drawings.
- C. Pulls: ANSI/BHMA A156.9, B02011. See "Millwork Hardware Schedule" in Drawings.
- D. Adjustable Shelf Standards and Supports: ANSI/BHMA A156.9, B04071; with shelf rests, B04081.
- E. Shelf Rests: ANSI/BHMA A156.9, B04013; metal.
- F. Heavy Duty Shelf Pins with Shelf Sleeves: See "Millwork Hardware Schedule" in Drawings.
- G. Drawer Slides: ANSI/BHMA A156.9. See "Millwork Hardware Schedule" in Drawings.
- H. Door Locks: ANSI/BHMA A156.11, E07121. See "Millwork Hardware Schedule" in Drawings.
- I. Drawer Locks: ANSI/BHMA A156.11, E07041. See "Millwork Hardware Schedule" in Drawings.
- J. Door and Drawer Silencers: ANSI/BHMA A156.16, L03011.
- K. Grommets for Cable Passage: 2-1/4-inch, 1-inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.
 - 1. Color: Black.
- L. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with ANSI/BHMA A156.18 for ANSI/BHMA finish number indicated.
 - 1. Satin Stainless Steel: ANSI/BHMA 630.
- M. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in ANSI/BHMA A156.9.

2.4 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- C. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement, Contact cement.
 - 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.5 FABRICATION

- A. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

- B. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.
- B. Architectural Woodwork Standards Grade: Install cabinets to comply with quality standard grade of item to be installed.
- C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.
- D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches using concealed shims.
 - 1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
 - 2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 - 3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch penetration into wood framing, blocking, or hanging strips.

3.2 FIELD QUALITY CONTROL

- A. Inspections: Provide inspection of installed Work through AWI's Quality Certification Program certifying that woodwork, including installation, complies with requirements of the Architectural Woodwork Standards for the specified grade.
 - 1. Inspection entity shall prepare and submit report of inspection.

END OF SECTION 06 4116



OCS – SPECIAL EDUCATION AND ANNEX BUILDING REMODELS

DIVISION 7 - THERMAL AND MOISTURE PROTECTION:

07 2100	Thermal Insulation
07 2119	Foamed-In-Place Insulation
07 9200	Joint Sealants

SECTION 07 2100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Glass-fiber blanket insulation.

1.2 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Glass-fiber blanket insulation.

1.3 INFORMATIONAL SUBMITTALS

- A. Installer's Certification: Listing type, manufacturer, and R-value of insulation installed in each element of the building thermal envelope.
 - 1. Sign, date, and post the certification in a conspicuous location on Project site.
- B. Product test reports.

PART 2 - PRODUCTS

2.1 GLASS-FIBER BLANKET INSULATION

- A. Glass-Fiber Blanket Insulation, Unfaced: ASTM C665, Type I;; passing ASTM E136 for combustion characteristics.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. CertainTeed Corporation.
 - b. Johns Manville; a Berkshire Hathaway company.
 - c. Knauf Insulation.
 - d. Owens Corning.
 - 2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
 - 3. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.
 - 4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

2.2 ACCESSORIES

- A. Insulation for Miscellaneous Voids:
 - 1. Glass-Fiber Insulation: ASTM C764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E84.
 - 2. Spray Polyurethane Foam Insulation: ASTM C1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.
- B. Insulation Anchors, Spindles, and Standoffs: As recommended by manufacturer.

- C. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Install insulation with manufacturer's R-value label exposed after insulation is installed.
- D. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.2 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 - 4. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
 - 5. For wood-framed construction, install blankets according to ASTM C1320 and as follows:
 - a. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.

3.3 INSULATION SCHEDULE

- A. Interior Walls above ceilings where indicated at drawings:
 - 1. Glass Fiber Blanket, Unfaced.

END OF SECTION 07 2100

SECTION 07 2119 - FOAMED-IN-PLACE INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Closed-cell spray polyurethane foam.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Research reports.

PART 2 - PRODUCTS

2.1 CLOSED-CELL SPRAY POLYURETHANE FOAM

- A. Closed-Cell Spray Polyurethane Foam: ASTM C 1029, Type II, minimum density of 1.5 lb/cu. ft. and minimum aged R-value at 1-inch thickness of 6.2 deg F x h x sq. ft./Btu at 75 deg F.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BASF Corporation.
 - b. CertainTeed Corporation.
 - c. Dow Chemical Company (The).
 - d. Gaco Western LLC.
 - e. Henry Company.
 - f. Icynene-Lapolla; Icynene.
 - g. Johns Manville; a Berkshire Hathaway company.
 - h. NCFI Polyurethanes; a division of Barnhardt Manufacturing Company.
 - 2. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.

- B. Spray insulation to envelop entire area to be insulated and fill voids.
- C. Apply in multiple passes to not exceed maximum thicknesses recommended by manufacturer. Do not spray into rising foam.

END OF SECTION 07 2119

SECTION 07 9200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Silicone joint sealants.
 - 2. Urethane joint sealants.
 - 3. Latex joint sealants.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Samples: For each kind and color of joint sealant required.
- C. Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

- A. Silicone, S, NS, 100/50, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. GE Construction Sealants; Momentive Performance Materials Inc.
- B. Silicone, S, NS, 100/50, T, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Uses T and NT.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Pecora Corporation.
 - b. Sika Corporation; Joint Sealants.
 - c. The Dow Chemical Company.
- C. Silicone, S, NS, 25, T, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Uses T and NT.

2.3 URETHANE JOINT SEALANTS

- A. Urethane, S, NS, 100/50, T, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Uses T and NT.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Sika Corporation; Joint Sealants.
- B. Urethane, M, NS, 50, NT: Multicomponent, nonsag, plus 50 percent and minus 50 percent movement capability nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade NS, Class 50, Use NT.

2.4 JOINT-SEALANT BACKING

- A. Cylindrical Sealant Backings: ASTM C 1330, [Type C (closed-cell material with a surface skin)] [Type O (open-cell material)] [Type B (bicellular material with a surface skin)] [or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated], and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Adfast.
 - b. BASF Corporation.
- B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

2.5 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove laitance and form-release agents from concrete.
 - 2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion.

- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces.

3.2 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with ASTM C 1193 and joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
- C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 1. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

3.3 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.
 - 1. Joint Locations:
 - a. Isolation and contraction joints in cast-in-place concrete slabs.
 - b. Tile control and expansion joints.
 - c. Joints between different materials listed above.
 - d. Other joints as indicated on Drawings.
 - 2. Joint Sealant: Urethane, M, P, 50, T, NT.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
 - 1. Joint Locations:
 - a. Construction joints in cast-in-place concrete.
 - b. Control and expansion joints in unit masonry.
 - c. Other joints as indicated on Drawings.
 - 2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.

1. Joint Locations:
 - a. Isolation joints in cast-in-place concrete slabs.
 - b. Control and expansion joints in tile flooring.
 - c. Other joints as indicated on Drawings.
 2. Joint Sealant: Urethane, S, P, 25, T, NT.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
 - a. Tile control and expansion joints.
 - b. Vertical joints on exposed surfaces of unit masonry, concrete, walls, and partitions.
 - c. Other joints as indicated on Drawings.
 2. Joint Sealant: Urethane, S, NS, 25, NT.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.
1. Joint Locations:
 - a. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
 - b. Other joints as indicated on Drawings.
 2. Joint Sealant: Acrylic latex.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- F. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Tile control and expansion joints where indicated.
 - c. Other joints as indicated on Drawings.
 2. Joint Sealant.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 07 9200



OCS – SPECIAL EDUCATION AND ANNEX BUILDING REMODELS

DIVISION 8 - OPENINGS:

08 1113	Hollow Metal Doors and Frames
08 1433	Stiles and Rail Wood Doors
08 3113	Access Doors and Frames
08 4113	Aluminum Entrances and Storefronts
08 7100	Door Hardware
08 8100	Glass Glazing

SECTION 08 1113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:
 - 1. Interior standard steel doors and frames.
 - 2. Exterior standard steel doors and frames.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include the following:
 - 1. Elevations of each door type.
 - 2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
 - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
- C. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.4 INFORMATIONAL SUBMITTALS

1.5 CLOSEOUT SUBMITTALS

1.6 QUALITY ASSURANCE

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Apex Industries, Inc.
 - 2. Ceco Door; ASSA ABLOY.
 - 3. Curries Company; ASSA ABLOY.
 - 4. DCI Hollow Metal.
 - 5. Deansteel Manufacturing Company, Inc.
 - 6. Mesker Door Inc.
 - 7. Pioneer Industries.
 - 8. Republic Doors and Frames.
 - 9. Steelcraft; an Allegion brand.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated, Borrowed-Lite Assemblies: Assemblies complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.
- B. Thermally Rated Door Assemblies: Provide door assemblies with U-factor of not more than 0.40 deg Btu/F x h x sq. ft. when tested according to ASTM C518.

2.3 INTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B. At locations indicated in the Door and Frame Schedule.
 - 1. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches.
 - c. Face: Metallic-coated steel sheet, minimum thickness of 0.042 inch.
 - d. Edge Construction: Model 1, Full Flush.
 - e. Core: Manufacturer's standard.
 - 2. Frames:
 - a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch.
 - b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
 - c. Construction: Slip-on drywall, Full profile welded.

2.4 EXTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B. At locations indicated in the Door and Frame Schedule.
 - 1. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches.
 - c. Face: Metallic-coated steel sheet, minimum thickness of 0.042 inch, with minimum A40 A60 coating.
 - d. Edge Construction: Model 1, Full Flush.
 - e. Edge Bevel: Bevel lock and hinge edges 1/8 inch in 2 inches.
 - f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
 - g. Bottom Edges: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
 - h. Core: Manufacturer's standard.

2. Frames:
 - a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A40 coating.
 - b. Construction: Full profile welded.

2.5 FRAME ANCHORS

- A. Jamb Anchors:
 1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
 2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.
 3. Postinstalled Expansion Anchor: Minimum 3/8-inch-diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
- B. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
 1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized according to ASTM A153/A153M, Class B.

2.6 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A153/A153M.
- E. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- F. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.
- G. Glazing: Comply with requirements in Section 08 8000 "Glazing."

2.7 FABRICATION

- A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- B. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
 1. Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding, or by rigid mechanical anchors.
 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- C. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to ANSI/SDI A250.6, the Door Hardware Schedule, and templates.
 1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.
- D. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
 1. Provide stops and moldings flush with face of door, and with beveled square stops unless otherwise indicated.
 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
 4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
 5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

2.8 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

- A. Hollow-Metal Frames: Comply with ANSI/SDI A250.11.
 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
 - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
 - b. Install frames with removable stops located on secure side of opening.

2. Fire-Rated Openings: Install frames according to NFPA 80.
3. Floor Anchors: Secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
4. Solidly pack mineral-fiber insulation inside frames.
5. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
6. In-Place Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
7. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- B. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.
 1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8.
 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 3. Smoke-Control Doors: Install doors according to NFPA 105.
- C. Glazing: Comply with installation requirements in Section 08 8000 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 REPAIR

- A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- C. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 08 1113

SECTION 08 1433 - STILE AND RAIL WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Interior stile and rail wood doors.
 - 2. Factory fitting stile and rail wood doors to frames and factory machining for hardware.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product, including the following:
 - 1. Details of construction and glazing.
 - 2. Door frame construction.
 - 3. Factory-machining criteria.
 - 4. Factory- specifications.

1.3 INFORMATIONAL SUBMITTALS

- A. Field quality control reports.

1.4 QUALITY ASSURANCE

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Use only materials that comply with referenced standards and other requirements specified.
 - 1. Assemble exterior doors, including components, with wet-use adhesives complying with ASTM D5572 for finger joints and with ASTM D5751 for joints other than finger joints.
 - 2. Assemble interior doors, including components, with either dry-use or wet-use adhesives complying with ASTM D5572 for finger joints and with ASTM D5751 for joints other than finger joints.
- B. Panel Products: Any of the following unless otherwise indicated:
 - 1. Particleboard: ANSI A208.1, Grade M-2.
 - 2. Medium-density fiberboard (MDF), complying with ANSI A208.2, Grade 130.
 - 3. Hardboard complying with ANSI A135.4.
 - 4. Veneer-core plywood.
- C. Safety Glass: Provide products complying with testing requirements in 16 CFR 1201, for Category II materials, unless those of Category I are expressly indicated and permitted.

2.2 INTERIOR STILE AND RAIL WOOD DOORS

- A. Interior Stile and Rail Wood Doors: Interior custom doors complying with AWI, AWMAC, and WI's Architectural Woodwork Standards and with other requirements specified.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ETO Doors Corp.
 - b. Karona by JELD-WEN.
 - c. Masonite Architectural.
 - d. VT Industries, Inc.
 2. Performance Grade:
 - a. Architectural Woodwork Standards: Custom.
 3. Panel Designs: Indicated on Drawings. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
 4. Finish: Transparent.
 5. Wood Species and Cut for Transparent Finish: Species indicated on Drawings, plain sawed/sliced .
 6. Door Construction for Transparent Finish:
 - b. Stile and Rail Construction:
 - 1) Clear lumber; may be edge glued for width. Select lumber for similarity of grain and color and arrange for optimum match between adjacent pieces.
 - 2) Veneered, structural composite lumber or veneered, edge- and end-glued clear lumber. Select veneers for similarity of grain and color and arrange for optimum match between adjacent pieces. Use veneers not less than 1/16 inch thick.
 - c. Raised-Panel Construction:
 - 1) Clear lumber: edge glued for width. Select lumber for similarity of grain and color and arrange for optimum match between adjacent pieces.
 - 2) Edge-glued, clear lumber; glued to both sides of a wood-based panel product. Select lumber for similarity of grain and color and arrange for optimum match between adjacent pieces.
 - 3) Veneered, wood-based panel product with mitered, raised rims made from matching clear lumber.
 - 4) Veneered, shaped, wood-based panel product with veneer conforming to raised-panel shape.
 - d. Flat-Panel Construction: Veneered, wood-based panel product.
 7. Stile and Rail Widths: As indicated.
 - e. Stiles, Top and Intermediate Rails: See door elevations.
 - f. Bottom Rails: See door elevations.
 8. Raised-Panel Thickness: 1-3/4 inches.
 9. Flat-Panel Thickness: 1/2 inch.
 10. Molding Profile (Sticking): As selected by Architect from manufacturer's full range.
 11. Glass: Uncoated, clear, fully tempered float glass, 5.0 mm thick, complying with Section 08 8000 "Glazing."
 12. Mark, label, or otherwise identify stile and rail wood doors as complying with WDMA I.S. 6A and grade specified.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Hardware: For installation, see Section 08 7100 "Door Hardware."
- B. Install doors and frames to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
 - 1. Install fire-rated door frames in accordance with NFPA 80.
 - a. Install frames level, plumb, true, and straight.
 - 1) Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.
 - b. Anchor frames to anchors or blocking built in or directly attached to substrates.
 - 1) Secure with countersunk, concealed fasteners and blind nailing.
 - 2) Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.
 - c. For shop-finished items, use filler matching finish of items being installed.
 - 2. Install fire-rated doors in accordance with NFPA 80.
 - 3. Install smoke- and draft-control doors in accordance with NFPA 105.
- C. Job-Fitted Doors:
 - 1. Align and fit doors in frames with uniform clearances and bevels as indicated below.
 - a. Do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors.
 - 2. Machine doors for hardware.
 - 3. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 - 4. Clearances:
 - a. Provide 1/8 inch at heads, jambs, and between pairs of doors.
 - b. Provide 1/4 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated on Drawings.
 - c. Where threshold is shown on Drawings or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.
 - d. Comply with NFPA 80 for fire-rated doors.
 - 5. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
 - 6. Bevel fire-rated doors 1/8 inch in 2 inches on lock edge; trim stiles and rails only to extent permitted by labeling agency.
- D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- E. Factory- Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.2 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or 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 08 1433

SECTION 08 3113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Access doors and frames.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

2.2 ACCESS DOORS AND FRAMES

- A. Flush Access Doors with Exposed Flanges:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ACUDOR Products, Inc.
 - b. Babcock-Davis.
 - c. Cendrex Inc.
 - d. Elmdor; Morris Group International, Inc.
 - e. J. L. Industries, Inc.; Activar Construction Products Group, Inc.
 - f. Karp Associates, Inc.
 - g. Lane-Aire Manufacturing Corp.
 - h. Larsen's Manufacturing Company.
 - i. MIFAB, Inc.
 - j. Maxam Metal Products Limited.
 - k. Metropolitan Door Industries Corp.
 - l. Milcor; Hart & Cooley, Inc.
 - 2. Description: Face of door flush with frame, with exposed flange and concealed hinge.
 - 3. Optional Features: .
 - 4. Locations: Wall and ceiling.
 - 5. Uncoated Steel Sheet for Door: Nominal 0.060 inch, 16 gage, factory primed.
 - 6. Frame Material: Same material, thickness, and finish as door.
 - 7. Latch and Lock: Cam latch, screwdriver operated with interior release.

2.3 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A879/A879M, with cold-rolled steel sheet substrate complying with ASTM A1008/A1008M, Commercial Steel (CS), exposed.
- C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B; with minimum G60 or A60 metallic coating.
- D. Stainless Steel Plate, Sheet, and Strip: ASTM A240/A240M or ASTM A666, Type 304. Remove tool and die marks and stretch lines, or blend into finish.
- E. Stainless Flat Bars: ASTM A666, Type 304. Remove tool and die marks and stretch lines, or blend into finish.
- F. Frame Anchors: Same material as door face.
- G. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A153/A153M or ASTM F2329.

2.4 FABRICATION

- A. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- B. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.
- C. Latch and Lock Hardware:
 - 1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.
 - 2. Keys: Furnish two keys per lock and key all locks alike.
 - 3. Mortise Cylinder Preparation: Where indicated, prepare door panel to accept cylinder specified in Section 08 7100 "Door Hardware."

2.5 FINISHES

- A. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
 - 1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
 - 2. Factory Finished: Apply manufacturer's standard baked-enamel or powder-coat finish immediately after cleaning and pretreating, with minimum dry-film thickness of 1 mil for topcoat.
 - a. Color: As selected by Architect from full range of industry color.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION 08 3113

SECTION 08 4113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Aluminum-framed entrance and storefront systems.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product data.
- B. Shop Drawings:
 - 1. Plans, elevations, sections, full-size details, and attachments to other work.
 - 2. Connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
 - 3. Point-to-point wiring diagrams.
- C. Samples: Manufacturer's standard color sheets, showing full range of available colors for each type of exposed finish.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.5 QUALITY ASSURANCE

1.6 WARRANTY

- A. Special Finish Warranty, Factory-Applied Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of baked-enamel, powder-coat, or organic finishes within specified warranty period.
 - 1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrance and storefront systems representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Aluminum-framed entrance and storefront systems to withstand movements of supporting structure, including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
 - e. Failure of operating units.

B. Structural: Test in accordance with ASTM E330/E330M as follows:

1. When tested at positive and negative wind-load design pressures, storefront assemblies, including entrance doors, do not evidence deflection exceeding specified limits.
2. When tested at 150 percent of positive and negative wind-load design pressures, storefront assemblies, including entrance doors and anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
3. Test Durations: As required by design wind velocity, but not less than 10 seconds.

2.2 ALUMINUM-FRAMED ENTRANCE AND STOREFRONT SYSTEMS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Arcadia, Inc.
2. Boyd Aluminum Mfg. Co.
3. CMI Architectural Products, Inc.
4. Coral Architectural Products; Coral Industries, Inc.
5. EFCO Corporation.
6. Kawneer Company, Inc.; Arconic Corporation.
7. Leed Himmel Industries, Inc.
8. Manko Window Systems, Inc.
9. Oldcastle buildingenvelope (OBE).
10. Pittco Architectural Metals, Inc.
11. Trulite Glass & Aluminum Solutions, LLC.
12. Tubelite Inc.

B. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing or automatic operation.

1. Door Construction: 1-3/4-inch overall thickness, with minimum 0.125-inch-thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated, and fillet welded or that incorporate concealed tie rods.
 - a. Thermal Construction: High-performance plastic connectors separate aluminum members exposed to the exterior from members exposed to the interior.
2. Door Design: Medium stile; 3-1/2-inch nominal width.
3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
 - b. Provide nonremovable glazing stops on outside of door.

2.3 MATERIALS

A. Sheet and Plate: ASTM B209.

- B. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221.
- C. Structural Profiles: ASTM B308/B308M.
- D. Steel Reinforcement:
 - 1. Structural Shapes, Plates, and Bars: ASTM A36/A36M.
 - 2. Cold-Rolled Sheet and Strip: ASTM A1008/A1008M.
 - 3. Hot-Rolled Sheet and Strip: ASTM A1011/A1011M.
- E. Steel Reinforcement Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods in accordance with recommendations in SSPC-SP COM, and prepare surfaces in accordance with applicable SSPC standard.

2.4 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Physical and thermal isolation of glazing from framing members.
 - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 - 5. Provisions for field replacement of glazing from exterior.
 - 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
- F. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
- G. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- H. After fabrication, clearly mark components to identify their locations in Project in accordance with Shop Drawings.

2.5 ALUMINUM FINISHES

- A. Superior-Performance Organic Finish, Three-Coat PVDF: Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat.
 - 1. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 2. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 INSTALLATION OF ALUMINUM-FRAMED ENTRANCE AND STOREFRONT SYSTEMS

- A. Comply with manufacturer's written instructions.
- B. Do not install damaged components.
- C. Fit joints to produce hairline joints free of burrs and distortion.
- D. Rigidly secure nonmovement joints.
- E. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
- F. Seal perimeter and other joints watertight unless otherwise indicated.
- G. Metal Protection:
 - 1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
 - 2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- H. Set continuous sill members and flashing in full sealant bed, as specified in Section 07 9200 "Joint Sealants," to produce weathertight installation.
- I. Install joint filler behind sealant as recommended by sealant manufacturer.
- J. Install components plumb and true in alignment with established lines and grades.
- K. Install entrance doors to produce smooth operation and tight fit at contact points.
 - 1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
 - 2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware in accordance with entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.
- L. Install glazing as specified in Section 08 8000 "Glazing."

END OF SECTION 08 4113

SECTION 08 7100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:
 - 1. Mechanical door hardware for the following:
 - a. Swinging doors.
- B. Related Sections:
 - 1. Division 08 Section "Flush Wood Doors."
- C. Products furnished, but not installed under this section include the following; coordination, purchasing, delivering, and scheduling remain requirements of this section.
 - 1. Simplex mechanical push button lock
 - 2. Cylinders for locks on aluminum and glass entrance doors.
 - 3. Permanent cores to be installed by Owner.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Samples for Verification: For exposed door hardware of each type required, in each finish specified, prepared on Samples of size indicated below. Tag Samples with full description for coordination with the door hardware schedule. Submit Samples before, or concurrent with, submission of door hardware schedule.
 - 1. Sample Size: Full-size units or minimum 2-by-4-inch Samples for sheet and 4-inch long Samples for other products.
 - a. Full-size Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.
- C. Other Action Submittals:
 - 1. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - a. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling

requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.

- b. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
- c. Content: Include the following information:

- 1) Identification number, location, hand, fire rating, size, and material of each door and frame.
- 2) Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
- 3) Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
- 4) Description of electrified door hardware sequences of operation and interfaces with other building control systems.
- 5) Fastenings and other pertinent information.
- 6) Explanation of abbreviations, symbols, and codes contained in schedule.
- 7) Mounting locations for door hardware.
- 8) List of related door devices specified in other Sections for each door and frame.

- 2. Keying Schedule: Prepared by or under the supervision of Installer, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

- D. Qualification Data: For Installer and Architectural Hardware Consultant.
- E. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final hardware and keying schedule.
- F. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and an Architectural Hardware Consultant who is available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
 - 1. Warehousing Facilities: In Project's vicinity.
 - 2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
- B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as follows:
 - 1. For door hardware, an Architectural Hardware Consultant (AHC).
- C. Source Limitations: Obtain each type of door hardware from a single manufacturer.
- D. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C, unless otherwise indicated.
- E. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meet requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.

1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at the tested pressure differential of 0.3-inch wg (75 Pa) of water.
- F. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- G. Accessibility Requirements: For door hardware on doors in an accessible route, comply with ICC/ANSI A117.1.
1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22.2 N).
 2. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
 - b. Sliding or Folding Doors: 5 lbf (22.2 N) applied parallel to door at latch.
 - c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
 3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch (13 mm) high.
 4. Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.
- H. Keying Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." In addition to Owner, Contractor, and Architect, conference participants shall also include Installer's Architectural Hardware Consultant and Owner's security consultant. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:
1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 2. Preliminary key system schematic diagram.
 3. Requirements for key control system.
 4. Requirements for access control.
 5. Address for delivery of keys.
- I. Preinstallation Conference: Conduct conference at Project site.
1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 2. Inspect and discuss preparatory work performed by other trades.
 3. Review required testing, inspecting, and certifying procedures.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
- B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
- C. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.
- D. Deliver keys and permanent cores to Owner by registered mail or overnight package service.

1.6 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including excessive deflection, cracking, or breakage.
 - b. Faulty operation of doors and door hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
 - 2. Warranty Period: Three years from date of Substantial Completion, unless otherwise indicated.
 - a. Exit Devices: Two years from date of Substantial Completion.
 - b. Manual Closers: 10 years from date of Substantial Completion.

1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.
- B. Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door and door hardware operation. Provide parts and supplies that are the same as those used in the manufacture and installation of original products.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. Provide door hardware for each door as scheduled on the Drawings to comply with requirements in this Section.
 - 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated on the Drawings. Products are identified by using door hardware designations, as follows:
 - 1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements.
 - 2. References to BHMA Designations: Provide products complying with these designations and requirements for description, quality, and function.

2.2 HINGES

- A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - a. Hager Companies.
 - b. Bommer Industries, Inc.
 - c. McKinney Products Company; an ASSA ABLOY Group company.
 - d. Stanley Commercial Hardware; Div. of the Stanley Works
 - e. Roton
 - 2. Characteristics:
 - a. Provide only template-produced units.
 - b. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 - 1) Interior Doors: Non-rising pins.
 - 2) Tips: Flat button and matching plug. Finished to match leafs.
 - 3) Size: Subject to compliance with requirements, provide size indicated on Drawings. If hinge size is not indicated on drawings, provide hinges sized in accordance with specified manufacturer's published recommendations.
 - 4) Continuous hinge where indicated.

2.3 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: As indicated in door hardware schedule.
- B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
 - 1. Bored Locks: Minimum 1/2-inch latch bolt throw.
- C. Lock Backset: 2-3/4 inches, unless otherwise indicated.
- D. Lock Trim:
 - 1. Description: As indicated on Drawings.
 - 2. Levers: Cast.
 - a. Model: As indicated on Drawings
 - 3. Escutcheons (Roses): Cast.
 - 4. Dummy Trim: Match lever lock trim and escutcheons.
 - 5. Operating Device: Lever with escutcheons (roses).
- E. Strikes: Provide manufacturer's standard strike for each lock bolt or latch bolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.
 - 1. Flat-Lip Strikes: For locks with three-piece antifriction latch bolts, as recommended by manufacturer.
 - 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 - 3. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
 - 4. Rabbet Front and Strike: Provide on locksets for rabbeted meeting stiles.

F. Bored Locks: BHMA A156.2; Grade 1; Series 4000.

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings.

2.4 LOCK CYLINDERS

A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.

1. Manufacturer: Same manufacturer as for locking devices.

B. Standard Lock Cylinders: BHMA A156.5; Grade 1; permanent cores that are interchangeable; face finished to match lockset.

C. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

2.5 KEYING

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference.

B. Keys: Nickel silver.

1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
a. Notation: "DO NOT DUPLICATE."

2.6 OPERATING TRIM

A. Operating Trim: BHMA A156.6; provide finish indicated on Drawings.

1. Basis-of-Design Product: Subject to compliance with requirement. Provide product indicated on drawings.

2.7 SURFACE CLOSERS

A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product, as indicated on drawings.

2.8 MECHANICAL STOPS AND HOLDERS

A. Wall- and Floor-Mounted Stops: BHMA A156.16; polished cast brass, bronze, or aluminum base metal.

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings.

2.9 DOOR GASKETING

- A. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - a. Pemko Manufacturing Co.; an ASSA ABLOY Group company
 - b. Hager Companies
 - c. National Guard
 - d. Reese Enterprises, Inc.

2.10 THRESHOLDS

- A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - a. Pemko Manufacturing Co.; an ASSA ABLOY Group company.

2.11 METAL PROTECTIVE TRIM UNITS

- A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch-thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - a. Baldwin Hardware Corporation.
 - b. IVES Hardware; an Ingersoll-Rand company.
 - c. Rockwood Manufacturing Company.

2.12 AUXILIARY DOOR HARDWARE

- A. Auxiliary Hardware: BHMA A156.16.
- B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings.

2.13 FABRICATION

- A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels and as otherwise approved by Architect.
 - 1. Manufacturer's identification is permitted on rim of lock cylinders only.
- B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.

- C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
 - 1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
 - 2. Fire-Rated Applications:
 - a. Wood or Machine Screws: For the following:
 - 1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors and frames.
 - 2) Strike plates to frames.
 - 3) Closers to doors and frames.
 - b. Steel Through Bolts: For the following unless door blocking is provided:
 - 1) Surface hinges to doors.
 - 2) Closers to doors and frames.
 - 3) Surface-mounted exit devices.
 - 3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
 - 4. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."
 - 5. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.14 FINISHES

- A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
- B. Wood Doors: Comply with DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."

3.3 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights indicated on Drawings.
- B. Install each door hardware item to comply with manufacturer's 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 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- D. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches (750 mm) of door height greater than 90 inches (2286 mm).
- E. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 - 1. Furnish permanent cores to Owner for installation.
- F. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- G. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, [above accessible ceilings or in equipment room. Verify location with Architect.
 - 1. Configuration: Provide one power supply for each door opening with electrified door hardware.
- H. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
- I. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
- J. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- K. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- L. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 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.
 - 1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
 - 2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
 - 3. 3. Door Closers: Adjust sweep period to comply with accessibility requirements and
 - 4. requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately six months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.5 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 08 7100

SECTION 08 8100 - GLASS GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

1. Quality of glazing used in entries, doors, and windows.

B. Related Requirements:

1. Sections Under 08 1000 Heading: 'Doors And Frames' for furnishing and installing of flush wood door lites in new doors.
2. Section 08 4113: 'Aluminum-Framed Entrances And Storefronts' for furnishing and installing of glazing in aluminum-framed storefront.
3. Section 08 5113: 'Vinyl Windows' or 08 5313: 'Aluminum Windows' for furnishing and installing of glazing in windows.
4. Section 08 5683: 'Wood Door Lites' for retro-fitting door lites in existing doors.
5. Section 11 9119: 'Font Railing' for glass provided in Font Railing.

1.2 REFERENCES

A. Definitions:

1. Float Glass: Glass which has its bottom surfaces formed by floating on molten metal, top surface being gravity formed, producing high optical quality of glass with parallel surfaces and, without polishing and grinding, fire-finished brilliance of finest sheet glass.
2. Glass Surface:
 - a. Insulated glass unit:
 - 1) Surface 1: Exterior surface of outer lite.
 - 2) Surface 2: Interspace-facing surface of outer lite.
 - 3) Surface 3: Interspace-facing surface of inner lite.
 - 4) Surface 4: Interior surface of inner lite.
 - b. Monolithic glass:
 - 1) Surface 1: Exterior surface.
 - 2) Surface 2: Interior surface.
3. Heat-Strengthened Glass: Glass which is reheated, after forming, just below melting point and then cooled. Compressed surface is formed which increases its strength. Used for spandrel glass.
4. Insulated Glass: Two pieces of glass spaced apart and hermetically sealed to form single-glazed unit with air space between. Heat transmission through this type of glass may be as low as half that without air space. Also called double glazing, double pane, insulated unit, and thermal pane.
5. Laminated Glass: Two or more sheets with inner layer of transparent plastic to which glass adheres if broken. Used for overhead, safety glazing, and sound reduction.
6. Low-Emissivity Glass (Low-E): Reduces wintertime heat loss from interior with thin, almost colorless metallic coating that reflects heat back inside structure. Allows moderate solar heat gain while reducing harmful ultraviolet light in any season. Minimizes summertime air conditioning loss by reflecting radiated heat to outside. May be tempered for where safety glass is required. Available in single strength clear, gray and bronze (brown) color.
7. Obscure Glass: Adds privacy where window coverings are impractical or undesirable. Various colors and texture patterns provide translucent or semi-opaque effect. May be tempered for use where safety glass is required.

8. Polycarbonate: Translucent amorphous plastic noted for high impact resistance and dimensional stability over wide temperature range.
9. Shading Coefficient: Ratio of solar heat gain passing through a glazing system to solar heat gain that occurs under the same conditions if the window was made of clear, unshaded double strength glass. Lower SC number, the better solar control efficiency of glazing system.
10. Solar Heat Gain Coefficient (SHGC): Ratio of total solar heat passing through a given window relative to the solar heat incident on the projected window surface at normal solar incidence. (Percentage of solar energy directly transmitted or absorbed and re-radiated into a building). Lower SHGC, the better it is able to reduce heat.
11. Solar Reflectance (R): Percent of incident solar radiation that is reflected by window film/glass system. Lower the number, the less solar radiation reflected.
12. Spandrel Glass: Heat-strengthened float glass with colored-ceramic coating adhered to back by heat-fusing process. It has double the strength of annealed glass of same size and thickness, enabling it to withstand greater uniform loads and thermal stresses. Spandrel glass cannot be re-cut after heat-strengthening. Used as fixed opaque colored glass on buildings in front of floor slabs and columns and non-vision areas. Available in wide array of colors.
 - a. Ceramic Frit Opacification: Ceramic frit opacification consists of coating of durable, colored ceramic material that is compatible with base glass and is fire-fused into one surface of the glass during heat-treating process.
13. Tempered Glass: Glass strengthened through process of heating, creating tensile strength that causes glass to resist breakage, yet disintegrate into small pieces if break occurs. Tempered glass is type of safety glass.
14. U-Value: Measurement of heat transfer through film due to outdoor/indoor temperature differences. Lower U-value, less heat transfers. When using performance data, the lower U-value, better insulating qualities of window film/glass system.
15. Visible Light Transmitted (VLT): Percent of total visible light (380-780 nanometers) that passes through glass. Lower the number, the less visible light transmitted.

B. Reference Standards:

1. American National Standards Institute:
 - a. ANSI Z97.1-2009, 'Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test'.
2. ASTM International:
 - a. ASTM C1036-16, 'Standard Specification for Flat Glass'.
 - b. ASTM C1048-18, 'Standard Specification for Heat-Treated Flat Glass - Kind H, Kind FT Coated and Uncoated Glass'.
 - c. ASTM C1172-14, 'Standard Specification for Laminated Architectural Flat Glass'.
 - d. ASTM C1281-16, 'Standard Specification for Preformed Tape Sealants for Glazing Applications'.
 - e. ASTM E2190-10, 'Standard Specification for Insulating Glass Unit Performance and Evaluation'.
3. Consumer Products Safety Commission (CPSC):
 - a. 16 CFR, Part 1201 CAT 1 and 11, 'Safety Standard for Architectural Glazing Materials'.
4. National Fire Protection Association (NFPA):
 - a. NFPA 80 - 'Standard for Fire Doors and Other Opening Protectives' (2019 or most recent edition adopted by AHJ).
 - b. NFPA 252 - 'Fire Tests of Door Assemblies' (2017 or most recent edition adopted by AHJ).
 - c. NFPA 257 - 'Fire Test for Window and Glass Block Assemblies' (2017 or most recent edition adopted by AHJ).

1.3 SUBMITTALS

A. Action Submittals:

1. Product Data:

- a. Manufacturer's data sheets for each glass product and glazing material.
- 2. Samples:
 - a. Provide 12 inch by 12 inch sample with color required for spandrel glass.
- B. Informational Submittals:
 - 1. Qualification Statement:
 - a. Installer:
 - 1) Provide Qualification documentation if requested by Architect or Owner.
- C. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Warranty Documentation:
 - 1) Final, executed copy of Warranty.

1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Glazing shall meet applicable requirements of Federal Consumer Product Safety Standard 16 CFR 1201.
 - 2. Comply with published recommendations of glass product Manufacturers and organizations, except where more stringent requirements are indicated.
 - 3. Glazing for Fire-Rated Door and Window Assemblies:
 - a. Glazing tested per NFPA 252 and NFPA 257, as applicable, for assemblies complying with NFPA 80 and listed and labeled per requirements of authorities having jurisdiction.
- B. Qualifications:
 - 1. Installer: Requirements of Section 01 4301 applies, but not limited to following:
 - a. Satisfactorily completed at least three (3) installations of similar size, scope, and complexity in each of past two (2) years and be approved by glass product Manufacturer before bidding.
 - b. Upon request, submit documentation.
- C. Certifications:
 - 1. Labels showing strength, grade, thickness, type, and quality are required on each piece of glass.
 - 2. Manufacturers/Fabricators certifying products furnished comply with project requirements.
 - 3. Insulating-Glass Certification Program: Indicate compliance with requirements of Insulating Glass Certification Council on applicable glazing products.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 - 1. Follow Manufacturer's instruction for receiving, handling, and protecting glass & glazing materials to prevent breakage scratching, damage to seals, or other visible damage.

2. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Storage And Handling Requirements:

1. Follow Manufacturer's instruction for storing and protecting glass & glazing materials.
2. Store materials protected from exposure to harmful environmental conditions and at temperatures and humidity conditions recommended by Manufacturer.
3. Protect edge damage to glass, and damage/deterioration to coating on glass.

1.6 FIELD CONDITIONS

A. Ambient Conditions:

1. Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation or other causes.

1.7 WARRANTY

A. Manufacturer Warranty:

1. Insulating Glass Warranty:

- a. Manufacturer's standard form, signed by insulating-glass product Manufacturer/Fabricator, agreeing to replace insulating-glass units that exhibit failure of hermetic seal under normal use evidenced by obstruction of vision by dust, moisture, or film on interior surfaces of glass, for ten 10 years of date of installation.

2. Installer's Warranty:

- a. Form acceptable to Owner, signed by glass product Installer, agreeing to replace glass products that deteriorate, or that exhibit damage or deterioration of glass or glazing products due to faulty installation, for two (2) years from date of installation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Manufacturers:

1. Manufacturer Contact List for Low E Glazing:

- a. AGC Flat glass North America, Kingsport, TN www.us.agc.com.
- b. Carlex (subsidiary of Central Glass Co., Ltd., Nashville, TN www.carlex.com.
- c. Guardian Industries Corp., Auburn Hills, MI www.guardian.com.
- d. Oldcastle BuildingEnvelope, Santa Monica, CA www.oldcastlebe.com.
- e. Pilkington North America Inc., Toledo, OH www.pilkington.com.
- f. Vitro Architectural Glass (formerly PPG glass), Cheswick, PA www.ppgglass.com or PPG Canada Ltd, Glass Division, Toronto, ON (416) 789-3331.

B. Design Criteria:

1. Glazing for Fire-Rated Door and Window Assemblies: Glazing tested per NFPA 252 and NFPA 257, as applicable, for assemblies complying with NFPA 80 and listed and labeled per requirements of authorities having jurisdiction.

C. Exterior Window Glazing:

1. Thickness: 1/8 inch minimum, Double Strength (Insulated Glass).
2. Glazing shall have following characteristics:
 - a. Low-Emissivity (or Low E):
 - 1) Design Criteria:
 - a) Clear:
 - b) Meet requirements of ASTM C1036, Type I, Class I, Quality Q3.
 - c) Location: Surface 2.
 - 2) Type Two Low-Emissivity (or Low E) Acceptable Product:
 - a) Performance Standard:
 - (1) 70 percent Visible Light Transmission (VLT).
 - (2) 0.29 U-value winter.
 - (3) 0.27 U-value summer.
 - (4) 0.38 Solar Heat Gain Coefficient (SHGC).
 - (5) 0.44 Shading Coefficient.
 - (6) 11 percent Visible Light Reflectance.
 - b) Quality Standard:
 - (1) Cardinal LoE³-366.
 - (2) Solarban 70 XL.
 - (3) Other low E glazing system standard with window manufacturer that meets or exceeds performance characteristics of specified glazing is acceptable as approved by Architect before bidding. See Section 01 6200.
 - 3) Acceptable Manufacturers:
 - a) AGC.
 - b) Guardian.
 - c) Vitro Architectural Glass.
 - d) Equal as approved by Architect before bidding.
 - b. Obscure:
 - 1) Design Criteria:
 - a) Meet requirements of ASTM C1036, Type II, Class I, Form 3, Quality Q8, Pattern - #62.
 - c. Glazing in Windows within 24 inches of Exterior Doors:
 - 1) Design Criteria:
 - a) Tempered.
 - b) Meet requirements of ASTM C1048, Kind FT, Condition A, Type I, Class I, Quality Q3.

D. Storefront Glazing:

1. Thickness: 1/4 inch.
2. Glazing shall have following characteristics:
 - a. Low-Emissivity (or Low E):
 - 1) Design Criteria:

- a) Clear.
 - b) Insulated Glass: 1 inch units with 1/2 inch airspace and two (2) 1/4 inch lites.
 - c) Meet requirements of ASTM C1036, Type I, Class I, Quality Q3.
 - d) Location: Surface 2.
- 2) Type Two Low-Emissivity (or Low E) Acceptable Product:
 - a) Performance Standard:
 - (1) 64 percent Visible Light Transmission (VLT).
 - (2) 0.28 U-value winter.
 - (3) 0.26 U-value summer.
 - (4) 0.27 Solar Heat Gain Coefficient (SHGC).
 - (5) 0.32 Shading Coefficient.
 - (6) 12 percent Visible Light Reflectance.
 - b) Quality Standard:
 - (1) Cardinal LoE³-366.
 - (2) Solarban 70 XL.
 - (3) Equal product by Acceptable Manufacturer as approved by Architect before bidding. See Section 01 6200.
- 3) Acceptable Manufacturers:
 - a) AGC.
 - b) Guardian.
 - c) Vitro Architectural Glass.
 - d) Equal as approved by Architect before bidding. See Section 01 6200.
- b. Obscure:
 - 1) Design Criteria:
 - a) Meet requirements of ASTM C1036, Type II, Class I, Form 3, Quality Q8, Pattern - #62.
- c. Glazing Below Door Height:
 - 1) Design Criteria:
 - a) Tempered.
 - b) Meet requirements of ASTM C1048, Kind FT, Condition A, Type I, Class I, Quality Q3.

E. Insulated Spandrel Glass Units:

- 1. Description:
 - a. Heat-strengthened float glass with colored-ceramic coating adhered to back by heat-fusing process.
- 2. Thickness: 5/8 inch minimum, one inch maximum.
- 3. Glazing shall have following characteristics:
 - a. Design Criteria:
 - 1) Glazing shall be heat strengthened float glass meeting requirements of ASTM C1048, Kind HS.
 - 2) Ceramic-coated spandrel glass:

- a) Ceramic Frit on Surface 4.
- 3) Insulated-Glass Units:
 - a) Factory-assembled units consisting of dual-sealed lites of glass separated by dehydrated interspace, with Manufacturer's standard spacer material and construction, per ASTM E2190.
 - b) Color: As selected by Architect from Manufacturer's available colors.
- b. Low-Emissivity (or Low E):
 - 1) Design Criteria:
 - a) Location: Surface 2:
 - 2) Type Two Acceptable Product:
 - a) Performance Standard:
 - (1) 64 percent Visible Light Transmission (VLT).
 - (2) 0.28 U-value winter.
 - (3) 0.26 U-value summer.
 - (4) 0.27 Solar Heat Gain Coefficient (SHGC).
 - (5) 0.32 Shading Coefficient.
 - (6) 12 percent Visible Light Reflectance.
 - b) Quality Standard:
 - (1) Solarban 70 XL (2) by Vitro Architectural Glass.
 - (2) Equal product by Acceptable Manufacturer as approved by Architect before bidding. See Section 01 6200.
 - 3) Acceptable Manufacturers:
 - a) AGC.
 - b) Guardian.
 - c) Vitro Architectural Glass.
 - d) Equal as approved by Architect before bidding. See Section 01 6200.

F. Fabrication:

- 1. Except where glass exceeds 66 inches in width, cut clear glass so any wave will run horizontally when glazed.
- 2. Install muntins for exterior aluminum entries and aluminum windows between panes of insulating glazing units. No muntins on interior Vestibule storefront entries.
- 3. Sealed, Insulating Glazing Units:
 - a. Double pane, sealed insulating glass units. Install at exterior windows and exterior aluminum-framed storefront.
 - b. Unit Thickness: 5/8 inch minimum, one inch maximum.
 - c. Insulated obscure units shall consist of one pane of specified obscure glass and one pane of standard glass.
 - d. Type Seal:
 - 1) Metal-to-glass bond and separated by 1/2 inch dehydrated air space.
 - 2) Use non-hardening sealants.
 - e. Approved Fabricators.
 - 1) Members of Sealed Insulating Glass Manufacturer's Association.

2.2 ACCESSORIES

- A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- B. Glazing Tape: Butyl-based elastomeric tape with integral resilient tube spacer, 10 to 15 Shore A durometer hardness, black color, coiled on release paper; widths required for specified installation, complying with ASTM C1281 and AAMA 800 for application.

PART 3 - EXECUTION: Not Used

END OF SECTION

DIVISION 9 - FINISHES:

09 0000	Finish Schedule – Annex Building
09 0000	Finish Schedule – Special Education Building
09 2216	Non-Structural Metal Framing
09 2900	Gypsum Board
09 3013	Ceramic Tiling
09 5113	Acoustical Panel Ceilings
09 5116	Acoustical Tile Ceilings
09 6513	Resilient Base and Accessories
09 6519	Resilient Tile Flooring
09 6813	Tile Carpeting
09 7710	Laminate Wall Surfacing
09 9113	Exterior Painting
09 9300	Staining and Transparent Finishing
09 9600	High Performance Coatings

SECTION 09 0000 – FINISH SCHEDULE – ANNEX BUILDING

MARK	PRODUCT	MANUFACTURER	DESCRIPTION
FLOOR MATERIALS			
F01	Carpet tile.	Tarkett	Painted Desert, Warm Adobe, 18"x36"
F02	Carpet tile.	Tarkett	Tundra Flower, Warm Adobe, 18"x36"
F03	Carpet tile.	Tarkett	Sky Atlas, Warm Adobe, 18"x36"
F04	Walk off carpet tile.	Tarkett	Abrasive Action II; Charcoal, 24"x24"
F05	Resilient tile flooring (LVT)	Tarkett	Contour, PCAR Antrifice, 10771 Honed Metal, Quarry, 18"x18"

BASE MATERIALS			
B01	Primed & painted existing hardwood base	Sherwin Williams	SW 7674 Peppercorn
B02	4" coved rubber base.	Roppe	123 Charcoal

WALL MATERIALS			
W01	Primed & painted wall surface.	Sherwin Williams	SW 7064 Passive, paint chair rail to match where occurs
W02	Primed & painted wall surface (Epoxy).	Sherwin Williams	SW 7064 Passive, paint chair rail to match where occurs

CEILING MATERIALS			
C01	1' x 1' acoustical ceiling tile over existing plaster ceiling system	-	-
C02	Patch & repair existing plaster ceiling as req.	Sherwin Williams	Paint color: Extra White SW7006

MILLWORK FINISHES			
M01	Plastic laminate.	Wilsonart	Grey Elm
M02	Solid surface	Wilsonart	Peace Grey
M03	Millwork base	Roppe	123 Charcoal
M04	Melamine	-	-

SPECIALTIES			
S02	Primed & painted existing hardwood door casing & transom panel	Sherwin Williams	Paint frame; Paint color: SW 7674 Peppercorn
S03	Solid surface window sill	Wilsonart	Cloud Mist

END OF SECTION 09 0000

SECTION 09 0000 – FINISH SCHEDULE – SPECIAL EDUCATION BUILDING

MARK	PRODUCT	MANUFACTURER	DESCRIPTION
FLOOR MATERIALS			
F01	Carpet tile.	Tarkett	Optic, Wireframe, 24"x24"
F02	Walk off carpet tile.	Tarkett	Abrasive Action II; Charcoal, 24"x24"
F03	Resilient tile flooring (LVT)	Tarkett	Contour, PCAR Antrifrice, 10771 Honed Metal, Quarry, 18"x18"
F04	Floor tile.	Mosa	Core Collection Terra, 226V, Mid Cool Grey, 36"x36"; Epoxy Grout: Mapei, Kerapoxy, 47 Charcoal
F05	Rubber stair treads	Tarkett	Johnsite Angle Fit Rubber Stair Treads, Hammered, 20 Charcoal, no inserts

BASE MATERIALS			
B01	4" coved rubber base.	Roppe	123 Charcoal/ #00 Simplicity-PV4000, 4" height, 1/4" thickness
B02	No base.	-	-

WALL MATERIALS			
W01	Primed & painted wall surface.	Sherwin Williams	Gray Matters SW 7066
W02	Primed & painted wall surface (Epoxy).	Sherwin Williams	Gray Matters SW 7066
W03	Wainscot System	Formica	HardStop, Sarum Twill
W04	Ceramic wall tile	Mosa	Core Collection Terra, 226V, Mid Cool Grey, 18"x36"; Epoxy Grout: Mapei, Kerapoxy, 47 Charcoal
W05	Ceramic wall tile	Mosa	Core Collection Terra, 226V, Mid Cool Grey, 4"x36"; Epoxy Grout: Mapei, Kerapoxy, 47 Charcoal
W06	Ceramic wall tile	Mosa	Core Collection Terra, 226V, Mid Cool Grey, 8"x36"; Epoxy Grout: Mapei, Kerapoxy, 47 Charcoal
W07	Primed & painted wall surface (High performance paint system).	Sherwin Williams	Gray Matters SW 7066

CEILING MATERIALS			
C01	Suspended 2' x 4' acoustical lay-in tile ceiling. See details 02 & 05 on sheet A1.15.	-	Match existing
C02	Suspended 5/8" gypsum board ceiling system (1 layer).	Sherwin Williams	Smooth texture. Paint color: Extra White SW7006. See detail 01 on sheet A1.15.
C03	5/8" gypsum board ceiling system (1 layer) installed over framing.	Sherwin Williams	Smooth texture; Paint color: Extra White SW7006

MILLWORK FINISHES			
M01	Plastic laminate.	Wilsonart	Grey Elm
M02	Solid surface	Wilsonart	Peace Grey
M03	Millwork base	Roppe	123 Charcoal
M04	Melamine	-	-

SPECIALTIES			
S03	Hollow metal frame	Sherwin Williams	Paint frame; Paint color: Web Gray SW 7075

END OF SECTION 09 0000

SECTION 09 2216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Non-load-bearing steel framing systems for interior partitions.
 - 2. Suspension systems for interior ceilings and soffits.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of code-compliance certification for studs and tracks.
- B. Evaluation reports for embossed, high-strength steel studs and tracks.

1.4 QUALITY ASSURANCE

- A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association the Steel Framing Industry Association or the Steel Stud Manufacturers Association.

PART 2 - PRODUCTS

2.1 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for steel unless otherwise indicated.
 - 2. Protective Coating: ASTM A 653/A 653M, G60, hot-dip galvanized unless otherwise indicated.
- B. Studs and Tracks: ASTM C 645. [Use either conventional steel studs and tracks or embossed, high-strength steel studs and tracks.]
 - 1. Minimum Base-Steel Thickness: 20 ga. Or as indicated on drawings.
 - 2. Depth: As indicated on Drawings.
- C. Slip-Type Head Joints: Where indicated, provide one of the following:
 - 1. Double-Track System: ASTM C 645 top outer tracks, inside track with 2-inch-deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction-fit over inner track.
 - 2. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) ClarkDietrich.
 - 2) MarinoWARE.
 - 3) SCAFCO Steel Stud Company.

4) The Steel Network, Inc.

- D. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ClarkDietrich.
 - b. Fire Trak Corp.
 - c. Metal-Lite.
 - d. SCAFCO Steel Stud Company.
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
1. Minimum Base-Steel Thickness: 0.0451 inch, or as otherwise indicated on drawings.
- F. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-steel thickness, with minimum 1/2-inch-wide flanges.
1. Depth: As indicated on Drawings.
 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch-thick, galvanized steel.
- G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
1. Minimum Base-Steel Thickness: 0.0312 or as otherwise indicated on drawings.
 2. Depth: As indicated on Drawings.
- H. Resilient Furring Channels: 1/2-inch-deep, steel sheet members designed to reduce sound transmission.
1. Configuration: Asymmetrical or hat shaped.
- I. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges.
1. Depth: As indicated on Drawings.
 2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch.
 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.

2.2 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.
- B. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
- C. Flat Hangers: Steel sheet, in size indicated on Drawings.
- D. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-steel thickness of 0.0538 inch and minimum 1/2-inch-wide flanges.
1. Depth: 2 inches.
- E. Furring Channels (Furring Members):

1. Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.
2. Steel Studs and Tracks: ASTM C 645. Use either conventional steel studs and tracks or embossed, high-strength steel studs and tracks.
 - a. Minimum Base-Steel Thickness: 0.0312 inch or as indicated on Drawings.
 - b. Depth: As indicated on Drawings.
3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
 - a. Minimum Base-Steel Thickness: 0.0312 inch.
4. Resilient Furring Channels: 1/2-inch-deep members designed to reduce sound transmission.
 - a. Configuration: Asymmetrical or hat shaped.

2.3 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
 1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide one of the following:
 1. Asphalt-Saturated Organic Felt: ASTM D 226/D 226M, Type I (No. 15 asphalt felt), nonperforated.
 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
 1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C 841 that apply to framing installation.
 2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
 3. Gypsum Veneer Plaster Assemblies: Also comply with requirements in ASTM C 844 that apply to framing installation.
 4. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.2 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
 - 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 - 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.
 - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
 - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 - 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
 - 4. Curved Partitions:
 - a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
 - b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches o.c.
- E. Direct Furring:
 - 1. Screw to wood framing.
 - 2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
- F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.3 INSTALLING CEILING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

- a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
- 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
- 4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
- 5. Do not attach hangers to steel roof deck.
- 6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
- 7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
- 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Seismic Bracing: Sway-brace suspension systems with hangers used for support.
- E. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 09 2216

SECTION 09 2900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Interior gypsum board.
 - 2. Tile backing panels.

1.2 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Gypsum wallboard.
 - 2. Gypsum board, Type X.
 - 3. Flexible gypsum board.
 - 4. Gypsum ceiling board.
 - 5. Impact-resistant gypsum board.
 - 6. Mold-resistant gypsum board.
 - 7. Gypsum board, Type C.
 - 8. Glass-mat, water-resistant backing board.
 - 9. Cementitious backer units.
 - 10. Interior trim.
 - 11. Joint treatment materials.
 - 12. Laminating adhesive.
 - 13. Sound-attenuation blankets.
 - 14. Acoustical sealant.
- B. Samples: For each texture finish indicated on same backing indicated for Work.

PART 2 - PRODUCTS

2.1 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.2 INTERIOR GYPSUM BOARD

- A. Gypsum Wallboard: ASTM C1396/C1396M.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. American Gypsum.
 - b. CertainTeed Gypsum.
 - c. Georgia-Pacific Gypsum LLC.
 - d. National Gypsum Company.
 - e. USG Corporation.
 - 2. Thickness: 5/8 inch.
 - 3. Long Edges: Tapered.

- B. Gypsum Board, Type X: ASTM C1396/C1396M.
 - 1. Thickness: 5/8 inch.
 - 2. Long Edges: Tapered.
- C. Flexible Gypsum Board: ASTM C1396/C1396M. Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. CertainTeed Gypsum.
 - b. Georgia-Pacific Gypsum LLC.
 - c. National Gypsum Company.
 - d. USG Corporation.
 - 2. Thickness: 1/4 inch.
 - 3. Long Edges: Tapered.
- D. Gypsum Ceiling Board: ASTM C1396/C1396M.
 - 1. Thickness: 5/8 inch.
 - 2. Long Edges: Tapered.
- E. Mold-Resistant Gypsum Board: ASTM C1396/C1396M. With moisture- and mold-resistant core and paper surfaces.
 - 1. Core: 5/8 inch , Type X.
 - 2. Long Edges: Tapered.
 - 3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.3 SPECIALTY GYPSUM BOARD

- A. Gypsum Board, Type C: ASTM C1396/C1396M. Manufactured to have increased fire-resistive capability.
 - 1. Thickness: As required by fire-resistance-rated assembly indicated on Drawings.
 - 2. Long Edges: Tapered.

2.4 TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Board: ASTM C1178/C1178M, with manufacturer's standard edges.
 - 1. Core: 5/8 inch , Type X.
 - 2. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.
- B. Cementitious Backer Units: ANSI A118.9 and ASTM C1288 or ASTM C1325, with manufacturer's standard edges.
 - 1. Thickness: 5/8 inch.
 - 2. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.5 TRIM ACCESSORIES

- A. Interior Trim: ASTM C1047.
 - 1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
 - 2. Shapes:

- a. Cornerbead.
- b. LC-Bead: J-shaped; exposed long flange receives joint compound.
- c. L-Bead: L-shaped; exposed long flange receives joint compound.
- d. Expansion (control) joint.
- e. Curved-Edge Cornerbead: With notched or flexible flanges.

2.6 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C475/C475M.
- B. Joint Tape:
 - 1. Interior Gypsum Board: Paper.
 - 2. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 - 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
 - 4. Finish Coat: For third coat, use drying-type, all-purpose compound.
 - 5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.
- D. Joint Compound for Tile Backing Panels:
 - 1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
 - 2. Cementitious Backer Units: As recommended by backer unit manufacturer.
 - 3. Water resistant gypsum backing board: Use setting type taping compound and setting type, sandable topping compound.

2.7 AUXILIARY MATERIALS

- A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
- C. Steel Drill Screws: ASTM C1002 unless otherwise indicated.
 - 1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
 - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- E. Acoustical Sealant: As specified in Section 07 9219 "Acoustical Joint Sealants."
- F. Thermal Insulation: As specified in Section 07 2100 "Thermal Insulation."

- G. Vapor Retarder: As specified in Section 07 2600 "Vapor Retarders."

PART 3 - EXECUTION

3.1 INSTALLATION AND FINISHING OF PANELS

- A. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- B. Comply with ASTM C840.
- C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- D. For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- E. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- G. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile and panels that are substrate for acoustical tile.
 - 3. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in Section 09 9123 "Interior Painting."
 - 4. Level 5: At panel surfaces in spaces accessible to the public..
 - a. Primer and its application to surfaces are specified in Section 09 9123 "Interior Painting."
- H. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.
- I. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.2 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION 09 2900

SECTION 09 3013 - CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Porcelain tile.
 - 2. Stone thresholds.
 - 3. Tile backing panels.
 - 4. Waterproof membrane.
 - 5. Crack isolation membrane.
 - 6. Metal edge strips.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples:
 - 1. Each type and composition of tile and for each color and finish required.
 - 2. Stone thresholds.
 - 3. Metal edge strips in 6-inch lengths.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Installer is a Five-Star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
 - 2. Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.
 - 3. Installer employs only Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers for Project.
 - 4. Installer employs at least one installer for Project that has completed the Advanced Certification for Tile Installers (ACT) certification for installation of mud floors, membranes, gauged porcelain tile/gauged porcelain tile panels and slabs, and large format tile.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide Standard-grade tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

2.2 TILE PRODUCTS

A. Ceramic Tile (SPED Building) Type 'F03' Unglazed porcelain tile.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Mosa as indicated on drawing.
2. Certification: Tile certified by the Porcelain Tile Certification Agency.
3. Face Size: 36x36 inches.
4. Face Size Variation: Rectified.
5. Thickness: .51 inch.
6. Face: As indicated.
7. Dynamic Coefficient of Friction: Not less than 0.42.
8. Tile Color, Glaze, and Pattern: As indicated on drawings.
9. Grout Color: As selected by Architect from manufacturer's full range.
10. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base for Portland Cement Mortar and Thin-Set Mortar Installations:
 - 1) None at wall tile installations. Extend wall tile to floor tile.
 - b. Wainscot Cap for Portland Cement Mortar and Thin-Set Mortar Installations:
 - 1) Square finished edge or surface bullnose as selected by Architect.
 - c. External Corners for Portland Cement Mortar and Thin-Set Mortar Installations:
 - 1) Surface bullnose.

B. Ceramic Tile (SPED Building) Type 'W04' Unglazed porcelain tile.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Mosa as indicated on drawing.
2. Certification: Tile certified by the Porcelain Tile Certification Agency.
3. Face Size: 18x36 inches.
4. Face Size Variation: Rectified.
5. Thickness: .51 inch.
6. Face: As indicated.
7. Dynamic Coefficient of Friction: Not less than 0.42.
8. Tile Color, Glaze, and Pattern: As indicated on drawings.
9. Grout Color: As selected by Architect from manufacturer's full range.
10. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base for Portland Cement Mortar and Thin-Set Mortar Installations:
 - 1) None at wall tile installations. Extend wall tile to floor tile.
 - b. Wainscot Cap for Portland Cement Mortar and Thin-Set Mortar Installations:
 - 1) Square finished edge or surface bullnose as selected by Architect.
 - c. External Corners for Portland Cement Mortar and Thin-Set Mortar Installations:
 - 1) Surface bullnose.

C. Ceramic Tile (SPED Building) Type 'W05' Unglazed porcelain tile.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Mosa as indicated on drawing.

2. Certification: Tile certified by the Porcelain Tile Certification Agency.
3. Face Size: 4x36 inches.
4. Face Size Variation: Rectified.
5. Thickness: .51 inch.
6. Face: As indicated.
7. Dynamic Coefficient of Friction: Not less than 0.42.
8. Tile Color, Glaze, and Pattern: As indicated on drawings.
9. Grout Color: As selected by Architect from manufacturer's full range.
10. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base for Portland Cement Mortar and Thin-Set Mortar Installations:
 - 1) None at wall tile installations. Extend wall tile to floor tile.
 - b. Wainscot Cap for Portland Cement Mortar and Thin-Set Mortar Installations:
 - 1) Square finished edge or surface bullnose as selected by Architect.
 - c. External Corners for Portland Cement Mortar and Thin-Set Mortar Installations:
 - 1) Surface bullnose.

D. Ceramic Tile (SPED Building) Type 'W06' Unglazed porcelain tile.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Mosa as indicated on drawing.
2. Certification: Tile certified by the Porcelain Tile Certification Agency.
3. Face Size: 8x36 inches.
4. Face Size Variation: Rectified.
5. Thickness: .51 inch.
6. Face: As indicated.
7. Dynamic Coefficient of Friction: Not less than 0.42.
8. Tile Color, Glaze, and Pattern: As indicated on drawings.
9. Grout Color: As selected by Architect from manufacturer's full range.
10. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base for Portland Cement Mortar and Thin-Set Mortar Installations:
 - 1) None at wall tile installations. Extend wall tile to floor tile.
 - b. Wainscot Cap for Portland Cement Mortar and Thin-Set Mortar Installations:
 - 1) Square finished edge or surface bullnose as selected by Architect.
 - c. External Corners for Portland Cement Mortar and Thin-Set Mortar Installations:
 - 1) Surface bullnose.

2.3 THRESHOLDS

A. Marble Thresholds:

1. Description: Provide the following:
 - a. Daltile. As indicated on drawings.

2.4 TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A118.9 or ASTM C1325, Type A.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. C-Cure.
- b. Custom Building Products.
- c. FinPan, Inc.
- d. Georgia-Pacific Gypsum LLC.
- e. USG Corporation.

- 2. Thickness: To match adjacent gypsum wall board.

2.5 CRACK ISOLATION MEMBRANE

- A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.12 for standard performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Fabric-Reinforced, Modified-Bituminous Sheet: Self-adhering, modified-bituminous sheet with fabric reinforcement facing; 0.040-inch nominal thickness.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide [MAPEI Corporation](#) Mapeguard™ 2 or comparable product by one of the following:
 - a. Mapei Corporation.
 - b. National Applied Construction Products, Inc., Strataflex.

2.6 SETTING MATERIALS

- A. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.02.
- B. Standard Dry-Set Mortar (Thinset): ANSI A118.1.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Boiardi Products Corporation; a QEP company.
 - b. Bonsal American, an Oldcastle company.
 - c. Bostik, Inc.
 - d. C-Cure.
 - e. Custom Building Products.
 - f. H.B. Fuller Construction Products Inc. / TEC.
 - g. Jamo Inc.
 - h. LATICRETE SUPERCAP, LLC.
 - i. MAPEI Corporation.
 - j. Southern Grouts & Mortars, Inc.
 - k. Summitville Tiles, Inc.
 - 2. For wall applications, provide nonsagging mortar.

2.7 GROUT MATERIALS

- A. Epoxy Grout: ANSI A118.3, A108.6 and ISO material specification ISO13007 RG.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ARDEX: Ardex WA.
 - b. Custom Building Products: CEG-Lite 100% Solids Commercial Epoxy Grout.
 - c. LATICRETE SUPERCAP, LLC: SpectraLOCK PRO.
 - d. MAPEI Corporation: Kerapoxy (sanded).

- e. Merkrete: Pro Epoxy.

2.8 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; white zinc alloy exposed-edge material.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Schluter Systems L.P.
- C. Floor Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bonsal American, an Oldcastle company.
 - b. Custom Building Products.
 - c. Jamo Inc.
 - d. Southern Grouts & Mortars, Inc.
 - e. Summitville Tiles, Inc.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
 - 2. Verify that concrete substrates for tile floors installed with adhesives bonded mortar bed or thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproof membrane by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
 - 1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
 - a. Tile floors in wet areas.
 - b. Tile floors in laundries.
 - c. Tile floors consisting of tiles 8 by 8 inches or larger.
 - d. Tile floors consisting of rib-backed tiles.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- E. Where accent tile differs in thickness from field tile, vary setting bed thickness so that tiles are flush.
- F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
- G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
 - 1. Porcelain Tile: 1/16 inch.
- H. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- I. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
 - 1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
- J. Stone Thresholds: Install stone thresholds in same type of setting bed as adjacent floor unless otherwise indicated.
 - 1. At locations where mortar bed (thickset) would otherwise be exposed above adjacent floor finishes, set thresholds in modified dry-set mortar (thinset).
 - 2. Do not extend cleavage membrane, waterproof membrane, or crack isolation membrane under thresholds set in standard dry-set, modified dry-set, or improved modified dry-set mortar. Fill joints between such thresholds and adjoining tile set on cleavage membrane, waterproof membrane, or crack isolation membrane with elastomeric sealant.
- K. Metal Edge Strips: Install at locations indicated.

- L. Floor Sealer: Apply floor sealer to cementitious grout joints in tile floors according to floor-sealer manufacturer's written instructions. As soon as floor sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.
- M. Install tile backing panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use modified dry-set mortar for bonding material unless otherwise directed in manufacturer's written instructions.
- N. Install waterproof membrane to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.
- O. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.

3.4 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

- A. Interior Floor Installations, Concrete Subfloor:
 - 1. Ceramic Tile Installation (SPED Building) 'F03': TCNA F111 and ANSI A108.1C; cement mortar bed (thickset) with cleavage membrane.
 - a. Ceramic Tile (SPED Building) Type: 'F03'.
 - b. Bond Coat for Cured-Bed Method: Dry-set Latex Portland Cement mortar.
 - c. Grout: Epoxy grout.
- B. Interior Wall Installations, Masonry or Metal Studs or Furring:
 - 1. Ceramic Tile (SPED Building) Installation 'W04', 'W05', 'W06': TCNA W244C or TCNA W244F; thinset mortar on cementitious backer units or fiber-cement backer board over vapor-retarder membrane.
 - a. Ceramic Tile (SPED Building) Type: 'W04', 'W05', or 'W06'.
 - b. Thinset Mortar: Dry-set Latex Portland Cement mortar.
 - c. Grout: Epoxy grout.

END OF SECTION 09 3013

SECTION 09 5113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for interior ceilings.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Research reports.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Suspended ceilings shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- 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: Class A according to ASTM E 1264.

2.2 ACOUSTICAL PANELS 'C01'

- A. Manufacturers: Subject to compliance with requirements, undefined:
 - 1. Armstrong, Optima.
- B. Acoustical Panel Standard: Manufacturer's standard panels according to ASTM E 1264.
- C. Color: White.
- D. Light Reflectance (LR): Not less than 0.83.
- E. Ceiling Attenuation Class (CAC): Not less than 38.
- F. Noise Reduction Coefficient (NRC): Not less than 0.70.
- G. Edge/Joint Detail: Reveal sized to fit flange of exposed suspension-system members.
- H. Thickness: As indicated on Drawings.

- I. Modular Size: As indicated on Drawings.

2.3 METAL SUSPENSION SYSTEM

- A. Manufacturers: Subject to compliance with requirements, undefined:
 - 1. USG Corporation, Centricitee 9/16".
 - 2. Provide narrow edge trim with seismic clips.
- B. Metal Suspension-System Standard: Manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C 635/C 635M.
- C. Narrow-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 9/16-inch-wide metal caps on flanges.
 - 1. Structural Classification: Heavy-duty system.
 - 2. End Condition of Cross Runners: Override Stepped or butt-edge type.
 - 3. Face Design: Flat, flush.
 - 4. Cap Material: Cold-rolled steel.
 - 5. Cap Finish: Painted to match color of acoustical unit.

2.4 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- B. Hold-Down Clips: Manufacturer's standard hold-down.

2.5 METAL EDGE MOLDINGS AND TRIM

- A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated.
- B. Layout openings for penetrations centered on the penetrating items.

3.2 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C 636/C 636M, seismic design requirements, and manufacturer's written instructions.
- B. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Do not use exposed fasteners, including pop rivets, on moldings and trim.
3. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on reflected ceiling plans.
4. Install hold-down impact and seismic clips in areas indicated; space according to panel manufacturer's written instructions unless otherwise indicated.

END OF SECTION 09 5113

SECTION 09 5116 - ACOUSTICAL TILE CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install acoustical tile on backerboard as described in Contract Documents.

B. Related Requirements:

1. Section 09 2226: 'Metal Suspension System' for Gypsum Board.
2. Section 09 2900: 'Gypsum Board'.
3. Section 09 5116: 'Interior Lighting'.

1.2 REFERENCES

A. Association Publications:

1. The Ceilings & Interior Systems Construction Association (CISCA), 405 Illinois Avenue, 2B, St Charles IL. www.cisca.org.
 - a. *'Ceiling Systems Handbook'*: Recommendations for direct hung acoustical tile installation.
 - b. *'Production Guide'*: Practical reference for ceiling systems and estimating costs.

B. Definitions:

1. Absorption: Materials that have capacity to absorb sound. Absorption is the opposite of reflection.
2. Ceiling Attenuation Class (CAC): Rates ceiling's efficiency as barrier to airborne sound transmission between adjacent closed offices. Shown as minimum value, previously expressed as CSTC (Ceiling Sound Transmission Class). Single-figure rating derived from normalized ceiling attenuation values in accordance with classification ASTM E413, except that resultant rating shall be designated ceiling attenuation class. (Defined in ASTM E1414.) Acoustical unit with high CAC may have low NRC.
3. Class A: Fire classification for product with flame spread rating of no more than 25 and smoke developed rating not exceeding 50, when tested in accordance with ASTM E84 or UL 723.
4. Flame Spread: The propagation of flame over a surface.
5. Flame Spread Index: Comparative measure, expressed as a dimensionless number, derived from visual measurements of the spread of flame versus time for a material tested in accordance with ASTM E84 or UL 723.
6. Light Reflectance (LR): Percentage of light a surface reflected by ceiling surface expressed in decimal form.
7. Noise Reduction Coefficient (NRC): Average sound absorption coefficient measured at four frequencies: 250, 500, 1,000 and 2,000 Hertz expressed to the nearest integral multiple of 0.05. Rates ability of ceiling or wall panel or other construction to absorb sound. NRC is fraction of sound energy, averaged over all angles of direction and from low to high sound frequencies that is absorbed and not reflected.
8. Smoke-Developed Index: Comparative measure, expressed as a dimensionless number, derived from visual measurements of smoke obscuration versus time for a material tested in accordance with ASTM E84 or UL 723.
9. Sound Absorption: Property possessed by materials and objects, including air, of converting sound energy into heat energy. Sound wave reflected by surface always loses part of its energy. Fraction of energy that is not reflected is called sound absorption coefficient of reflecting surface. For instance, if material reflects 80 percent of sound energy, then sound absorption coefficient would be 20 percent (0.20).
10. Surface Burning Characteristic: Rating of interior and surface finish material providing indexes for flame spread and smoke developed, based on testing conducted according to ASTM Standard E84 or UL 723.
11. Textured Pattern: Granular or raised (fine, coarse, or a blend), felted or matted surface as an integral part of the basic product or superimposed on the product surface.

C. Reference Standards:

1. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRA):
 - a. ASHRAE Standard 62.1-2013, 'Ventilation for Acceptable Indoor Air Quality'.
2. ASTM International;
 - a. ASTM D1779-98(2017), 'Standard Specification for Adhesive for Acoustical Materials'.
 - b. ASTM E84-18b, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
 - c. ASTM E795-16, 'Standard Practices for Mounting Test Specimens During Sound Absorption Tests'.
 - d. ASTM E1264-14, 'Standard Classification for Acoustical Ceiling Products'.
 - e. ASTM E1414/E1414-16, 'Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum'.
 - f. ASTM E1477 - 98a(2017), 'Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers'.
3. International Building Code (IBC) (2018 or latest approved Edition):
 - a. Chapter 8, 'Interior Finishes':
 - 1) Section 803, 'Wall And Ceiling Finishes':
 - a) 803.1.1, 'Interior Wall and Ceiling Finish Materials'.
 - b) 803.1.2, 'Room Corner Test for Interior Wall or Ceiling Finish Materials'.
4. National Fire Protection Association:
 - a. NFPA 101: 'Life Safety Code' (2018 Edition).
 - b. NFPA 265: 'Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Coverings on Full Height Panels and Walls' (2015 Edition).
5. Underwriters Laboratories Inc.:
 - a. UL 723, 'Standard for Safety Test for Surface Burning Characteristics of Building Materials' (Tenth Edition).

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:

1. Participate in pre-installation conference specified in Section 09 2900 to review finish requirements for gypsum wallboard ceilings.
2. Schedule acoustical tile ceiling pre-installation conference after installation of gypsum wallboard but before beginning installation of tile.
3. In addition to items specified in Section 01 3100, review following:
 - a. Verify that tile comes from same dye lot and has same dye lot code.
 - b. Review requirements of acceptable and non-acceptable tile.

1.4 SUBMITTALS

A. Action Submittals:

1. Samples:

- a. One (1) sample of each variant of specified tile series.
- B. Informational Submittals:
 - 1. Certificates:
 - a. Installer(s):
 - 1) Provide each Installer's 'Certificate of Completion - Duratile' from Manufacture showing Name and completion date with bid to be included in closing documents for project.
 - a) Certificate is valid for two (2) years from date printed on Certificate before recertification is required.
 - 2. Test And Evaluation Reports:
 - a. If requested by Owner, provide copies of Quality Assurance requirements for 'Class A' flame spread rating and 'Room-Corner Test'.
 - 3. Manufacturer Installations:
 - a. Published installation recommendations.
 - 4. Qualification Statement:
 - a. Installer(s):
 - 1) Provide Qualification documentation unless waived by Owner.
- C. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Warranty Documentation:
 - 1) Include final, executed copy of warranty.
 - b. Record Documentation:
 - 1) Manufacturers Documentation:
 - a) Manufacturer's literature on tile and adhesive.
 - b) Color and pattern selection.
 - 2) Installer(s) 'Certificate of Completion - Duratile' submitted at time of bid.
- D. Maintenance Material Submittals:
 - 1. Extra Stock Materials:
 - a. Provide Owner with six (6) cartons of each type of tile with same dye lot code.

1.5 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:

1. Fire-Test-Response Characteristics: As determined by testing identical ceiling tile applied with identical adhesives to substrates according to test method indicated below by qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Surface-Burning Characteristics:
 - 1) Ceiling tile shall have Class A flame spread rating in accordance with ASTM E84 or UL 723 Type 1.
 - a) Class A (Flame spread index 0-25; Smoke-developed index 0-450).
 - b) Flash point: None.
2. Passage of 'Room-Corner Test' as recognized by AHJ, is required for system. Adhesive cited in test literature is required for installation of ceiling tile on Project.
 - a. Room Corner Tests:
 - 1) ASTM E84, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
 - 2) IBC 803.2.1, 'Room Corner Test for Interior Wall or Ceiling Finish Materials'.
 - 3) NFPA 265: 'Room Corner Test for Interior Wall or Ceiling Finish Materials'.
 - 4) UL 723, 'Standard for Safety Test for Surface Burning Characteristics of Building Materials'.

B. Qualifications:

1. Installer: Requirements of Section 01 4301 applies, but not limited to following:
 - a. Minimum five (5) years satisfactorily completed projects of comparable quality, similar size, and complexity including a minimum of three (3) years of experience in glue-up ceiling tile installations and shall have satisfactorily completed glue-up installation(s) within in past three (3) years before bidding.
 - b. Review, understand, and comply Installer Qualifications and submitted 'Duratile' published installation recommendations provided by Manufacturer:
 - 1) Contact Armstrong CSA customer service center at (800) 442-4212 to obtain and review compliance package on Duratile prior to bidding.
 - 2) This requirement may be waived by Owner, if Installer has previously complied with Installer Qualification requirements and can document at least two (2) satisfactorily completed projects of comparable size using Armstrong 12 inch x 12 inch (300 mm x 300 mm) ceiling tile for glue-up within past three (3) years prior to bidding.
 - 3) Installer shall note complete compliance with Qualification requirements on submitted bid form.
 - 4) Submit qualification documentation unless waived by Owner.
 - c. Agree to complete and pass 'Duratile Personal Learning Module' (Certificate required for all Installer(s) for Church projects). Certification valid for two (2) years:
 - 1) Go to <http://www.armstrong.com/commceilingsna/#>.
 - 2) Click on My Armstrong Upper Right hand Corner.
 - 3) First time users: Click on 'Register' button and provide all appropriate information for username and password (you must register as a contractor to have access to 'ELearning System').
 - 4) Under My Armstrong Functions (left hand side), click on 'ELearning System'.
 - 5) Click on 'Duratile Video'.
 - 6) Watch video and take Quiz (10 questions). Passing grade required for certificate.
 - 7) Print Certificate.
 - 8) Certificate must be submitted with Bid.
 - 9) Submit 'Certificate of Completion - Duratile'. Required for all projects and may not be waived by Owner.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements:

1. Materials shall be delivered in original, unopened packages with labels intact.

B. Storage And Handling Requirements:

1. Store materials where protected from moisture, direct sunlight, surface contamination, and damage.
2. Store acoustic tile in cool, dry location, out of direct sunlight and weather, and at temperatures between 32 deg F and 86 deg F (30 deg C).
3. Store adhesive on site at installation temperature, between 65 and 90 deg F, for one week before installation.
4. Handle acoustical ceiling tiles carefully to avoid chipping edges or damage. Use no soiled, scratched, or broken material in the Work.

1.7 FIELD CONDITIONS

A. Ambient Conditions:

1. Building shall be enclosed, mechanical system operating with proper filters in place, and temperature and humidity conditions stabilized within limits under which Project will operate before, during, and after installation until Substantial Completion.
2. Temperature at time of setting tile shall be 50 deg F minimum and 100 deg F maximum.

1.8 WARRANTY

A. Manufacturer Warranty:

1. Provide Manufacturer's ten (10) year limited system warranty for the following:
 - a. Manufacturer's warranty to be free from defects in materials and factory workmanship.
 - b. Manufacturer's warranty against sagging and warping.
 - c. Manufacturer's warranty against mold/mildew, and bacterial growth.
2. Provide Manufacturer's system warranty for the following:
 - a. Manufacturer's warranty to be free from defects in materials and factory workmanship.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:

1. Manufacturer Contact List:

- a. Armstrong World Industries, Strategic Accounts, Lancaster, PA www.ceilings.com.
 - 1) For pricing and ordering of tile, contact Sherry Brunt, Phyllis Miller, or Beth Rinehart at (800) 442-4212, or Armstrongcsa@armstrong.com.
 - 2) For Strategic Account information, contact Deborah Pickens at (480) 695-9053 dlpickens@armstrong.com.
- b. Franklin International, Inc., Columbus, OH www.titebond.com.

2. Manufacturer Contact List:

- a. Armstrong World Industries, Strategic Accounts, Lancaster, PA www.armstrong.com.
 - 1) For pricing and ordering of tile, contact Sherry Brunt, Phyllis Miller, or Beth Rinehart at (800) 442-4212, or Armstrongcsa@armstrong.com.
 - 2) For Strategic Account information, contact Deborah Pickens at (480) 695-9053 dlpickens@armstrong.com.
- b. Franklin International, Inc, Columbus, OH www.titebond.com.
- c. USG Inc, Chicago, IL www.usg.com.

B. Materials:

- a. Description:
- b. Size: 3/4 inch thick minimum by 12 inches square.
- c. Color: White.
- d. Grid Face: Tile glue-up.
- e. Surface Finish: Factory-applied.
- f. Wet-formed high density mineral fiber.

2. Design Criteria:

- a. Meet requirements of ASTM E1264, Type III (mineral base with painted finish), Form 2 (water felted), Pattern CE (perforated, small holes – lightly textured), Fire Class A.
- b. Acoustics:
 - 1) Noise Reduction Coefficient (Rating expressed according to ASTM E1284 requirements:
 - a) NRC rating: 60 minimum.
 - 2) CAC rating: 35 minimum.
- c. Anti Mold / Mildew:
 - 1) Resistance against growth of mold/mildew.
- d. Durable:
 - 1) Impact-resistant.
 - 2) Scratch-resistant.
- e. Tongue and Groove.
- f. Finish:
 - 1) Abuse-resistant/durable, factory applied vinyl latex paint.
- g. Fire Performance:
 - 1) Panels meet ASTM E84 or UL 723 Type 1 surface burning characteristics.
- h. High Recycled Content (HRC): Classified as containing greater than 50 percent total recycled content.
- i. Light Reflectance (LR): 0.86 Average (Range of 0.84 to 0.88).
- j. Sag Resistance:
 - 1) Resistance to sagging in high humidity conditions up to, but not including, standing water and outdoor applications.

- k. Texture: Embossed texture with fine fissuring and small perforations with natural variation in texture and color appearance between tile.
 - l. VOC Emissions:
 - 1) Low formaldehyde: Contributing less than 13.5 ppb in typical conditions per ASHRAE Standard 62, 'Ventilation for Acceptable Indoor Air Quality'.
- 3. Acoustic Tile:
 - a. Category Three Approved Products. See Section 01 6200 for definitions of Categories:
 - 1) Armstrong, Fine Fissured.
- C. Materials:
 - a. Description:
 - b. Size: 3/4 inch thick minimum by 12 inches square.
 - c. Color: White.
 - d. Grid Face: Tile glue-up.
 - e. Surface Finish: Factory-applied.
 - f. Wet-formed high density mineral fiber.
 - 2. Design Criteria:
 - a. Armstrong:
 - 1) Meet requirements of ASTM E1264, Type III (mineral base with painted finish), Form 2 (water felted), Pattern CE (perforated, small holes – lightly textured), Fire Class A.
 - 2) Meet requirements of ASTM E1264, Type III (mineral base with painted finish), Form 1 (nodular), Pattern E (lightly textured) or Pattern F (heavily textured), Fire Class A.
 - b. USG:
 - 1) Meet requirements of ASTM E1264, Type III (mineral base with painted finish), Form 4 (cast or molded), Pattern D (Fissured), Fire Class A.
 - c. Acoustics:
 - 1) Noise Reduction Coefficient (Rating expressed according to ASTM E1284 requirements:
 - a) NRC rating: 60 minimum.
 - 2) CAC rating:
 - a) Armstrong: 35 minimum.
 - b) USG: 25 minimum.
 - d. Anti Mold / Mildew:
 - 1) Resistance against growth of mold/mildew.
 - e. Durable:
 - 1) Impact-resistant.
 - 2) Scratch-resistant.

- f. Finish:
 - 1) Abuse-resistant/durable, factory applied vinyl latex paint.
- g. Fire Performance:
 - 1) Panels meet ASTM E84 or UL 723 Type 1 surface burning characteristics.
- h. High Recycled Content (HRC): Classified as containing greater than 50 percent total recycled content.
- i. Light Reflectance (LR): 0.79 minimum.
- j. VOC Requirements:
 - 1) Armstrong:
 - a) Low formaldehyde: Contributing less than 13.5 ppb in typical conditions per ASHRAE Standard 62, 'Ventilation for Acceptable Indoor Air Quality'.
 - 2) USG:
 - a) Zero.
- 3. Acoustic Tile:
 - a. Approved Products.
 - 1) Duratile Item No. MN80377 by Armstrong.
 - b. Approved Products.
 - 1) 'F' Fissured by USG.
- D. Accessories:
 - 1. Adhesive:
 - a. Description:
 - 1) For use on acoustical ceiling tiles.
 - b. Design Criteria:
 - 1) Meet requirements of ASTM D1779.
 - 2) Meet NFPA Class A fire rating when tested in accordance with ASTM E84.
 - 3) Fast grab and 'no sag' installation.
 - 4) Water cleanup.
 - 5) Not recommended for use on tiles larger than 12 inch x 12 inch.
 - c. Type Two Acceptable Products:
 - 1) Titebond No. 2704 Solvent Free Acoustical Ceiling Tile Adhesive by Franklin International.
 - 2) Highest quality of adhesive from manufacturer recommended by Tile Manufacturer as approved by Architect before use.
 - 2. Edge Molding:
 - a. Steel 'U' molding with baked enamel finish.
 - b. Type Two Acceptable Products:

- 1) 7843 Series by Armstrong.
 - 2) Equal as approved by Architect before installation.
- c. Type Two Acceptable Products:
- 1) US 12 RWS 14 by USG Interiors.
 - 2) Equal as approved by Architect before installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:

1. Inspect for defects in backing and support that are not acceptable.
 - a. Examine areas around HVAC diffusers and light fixtures for tile installation problems.
 - b. Examine ceiling for levelness. CISCA 'Code of Practice' requires ceiling to be free of irregularities and be level to within 1/4 inch (6 mm) in 12 foot.
 - c. Examine substrate for any problems that will compromise adhesion of ceiling tile.
2. Notify Architect in writing of unacceptable conditions.
3. Do not apply ceiling tile until defects in backing and support are corrected.

3.2 PREPARATION

A. Surface Preparation:

1. Follow Manufacturer recommendations for surface preparation:
 - a. Substrate must be clean, free of grease and dirt, sound, smooth, even and level before applying tile to surface.
 - 1) Do not install new ceiling tile over old glue globs or bad substrate with any surface finish that is incompatible with tile adhesive.
 - b. Painted Surfaces: Avoid applying tile to newly painted ceiling.
 - c. Materials shall be dry and clean at time of application.

3.3 INSTALLATION

A. Special Techniques:

1. Installation shall be in accordance with Manufacturer's recommendations:
 - a. Do not install tile when room temperature exceeds or below recommended ambient conditions.
 - b. Tile is directional tile and must be installed in same direction of pattern running parallel to long dimension of each room.
 - c. Remove loose dust from back of tile and ceiling where adhesive is to be applied.
 - d. Prime 3 inch minimum circle near each corner by buttering very thin coat of adhesive.
 - e. Apply daub of adhesive to each corner. Daubs will be of sufficient size to form a circle 2-1/2 to 3 inches in diameter and 1/8 to 1/4 inch thick when tile is pressed firmly in place. Do not apply daubs so far in advance of installation that adhesive skins over.
 - f. Do not bend tile during installation.

2. Tile Layout:
 - a. Lay out tile symmetrically about center lines of room.
 - b. Lay out so tiles at room perimeters are at least 1/2 full tile size.
 - c. Leave tile in true plane with straight, even joints.
 - d. Tile joints shall be straight and in alignment, and exposed surface flush and level.
 - e. Furnish and install specified molding wherever tile has exposed edges or abuts walls, columns, and other vertical surfaces, except at curves of 3 inch radius or smaller.
 - f. Cut around penetrations that are not to receive moldings cleanly with sharp knife and at a slight angle away from cutout.
3. Ceiling mounted items:
 - a. Locate light fixtures, speakers, and mechanical diffusers and grilles symmetrically in room and centered on tile centers or tile joints insofar as possible, unless shown otherwise.
 - b. Keep method of locating ceiling mounted items as consistent as possible throughout building.
 - c. Ceiling mounted item location method within each room shall always be consistent.

3.4 FIELD QUALITY CONTROL

A. Non-Conforming Work:

1. Acoustical Tile. The following have been identified by the Manufacturer as tile defects, should not be installed, and will be replaced at no charge to Owner. Manufacturer will replace any material that does not meet product specifications. Installer to call 1 (800) 442-4212 immediately to report any tile discrepancies:
 - a. Obvious Tile Defects:
 - 1) Gross surface defects or damage.
 - 2) Gross damage to edges and corners.
 - 3) Bevels without paint.
 - b. Size Measurement:
 - 1) Tiles measure 12 inches, plus or minus 1/32 inch, measured across center of two (2) parallel sides.
 - c. Squareness Measurement:
 - 1) Measure two (2) diagonals of an individual ceiling tile.
 - 2) Diagonal measurements need to be within 1/16 inch of each other. No more than 1/16 inch difference.
 - d. Warp:
 - 1) Tiles specification is plus or minus 0.050 inch as measured in the center of tile.
2. Installer:
 - a. Substrate preparation and installation of ceiling tile not following CISCA Code of Practice will be unacceptable and considered defective and subject to replacement at no cost to Owner.

3.5 ADJUSTING

- #### A. 'Touch-up' minor abraded surfaces.

3.6 CLEANING

- A. Remove from site debris connected with work of this Section.

END OF SECTION

SECTION 09 6513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Thermoset-rubber base.
 - 2. Thermoplastic-rubber base.
 - 3. Vinyl base.
 - 4. Rubber molding accessories.
 - 5. Vinyl molding accessories.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.

PART 2 - PRODUCTS

2.1 THERMOSET-RUBBER BASE SPED BUILDING 'B01' AND ANNEX BUILDING 'B02'

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Roppe Corporation, USA.
- B. Product Standard: ASTM F 1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).
 - 1. Style and Location:
 - a. Style A, Straight: As indicated on drawings.
- C. Thickness: 0.125 inch.
- D. Height: 4 inches.
- E. Lengths: Coils in manufacturer's standard length.
- F. Outside Corners: Preformed.
- G. Inside Corners: Preformed.
- H. Colors: As indicated on drawings.

2.2 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until materials are the same temperature as space where they are to be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.2 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.

3.3 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 09 6513

SECTION 09 6519 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Solid vinyl floor tile, LVT.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and pattern specified.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 SOLID VINYL FLOOR TILE: SPED BUILDING 'F04' AND ANNEX BUILDING 'F04'

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products indicated on Drawings:
 - 1. Tarkett
- B. Tile Standard: ASTM F 1700.
 - 1. Class: Class III, Printed Film Vinyl Tile.
 - 2. Type: B, Embossed Surface.
- C. Thickness: 0.81mm.
- D. Size: As indicated on drawings.
- E. Colors and Patterns: As indicated on drawings.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.

- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 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 floor tile manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
 - 4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
 - b. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.
 - 1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.2 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 - 1. Lay tiles in pattern indicated.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
 - 1. Lay tiles with grain running in one direction.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

END OF SECTION 09 6519

SECTION 09 6813 - TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Modular carpet tile.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For carpet tile installation, plans showing the following:
 - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
 - 2. Carpet tile type, color, and dye lot.
 - 3. Type of subfloor.
 - 4. Type of installation.
 - 5. Pattern of installation.
 - 6. Pattern type, location, and direction.
 - 7. Pile direction.
 - 8. Type, color, and location of insets and borders.
 - 9. Type, color, and location of edge, transition, and other accessory strips.
 - 10. Transition details to other flooring materials.
- C. Samples: For each exposed product and for each color and texture required.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Certified by the International Certified Floorcovering Installers Association at the Master II certification level.

1.5 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Lifetime years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE (SPED BUILDING) 'F01', 'F02' AND (ANNEX BUILDING) 'F01', 'F02', 'F03', 'F04'

- A. Products: Subject to compliance with requirements, provide the following:
 - 1. As indicated on drawings.
- B. Color: As indicated on drawings.

- C. Pattern: As indicated on drawings.
- D. Size: As indicated on drawings.

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.
- C. Rubber transition strips: Profile and width shown, of height required to protect exposed edge of carpet, and maximize lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Concrete Slabs:
 - 1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
 - b. Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
 - c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.

3.2 PREPARATION

- A. General: Comply with the Carpet and Rug Institute's CRI 104 and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- D. Metal Substrates: Clean grease, oil, soil and rust, and prime if recommended in writing by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.
- E. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

- A. General: Comply with the Carpet and Rug Institute's CRI 104, Section 10, "Carpet Tile," and with carpet tile manufacturer's written installation instructions.

- B. Installation Method: As recommended in writing by carpet tile manufacturer.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Maintain pile-direction patterns recommended in writing by carpet tile manufacturer.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Install pattern parallel to walls and borders.
- I. Access Flooring: Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.
- J. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 09 6813

SECTION 09 7710 - LAMINATE WALL SURFACING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. FRL® (Fiber Reinforced Laminate) Wall Protection Panels for wall and door applications.
 - 2. Accessories, including adhesives and sealants.
- B. Related Sections: Coordinate with work of other sections including the following:
 - 1. Section 09 2900 – Gypsum Board.
 - 2. Section 09 6513 – Resilient Base.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's literature including product characteristics, accessories and limitations.
- B. Selection Samples: Submit samples of colors and finishes if requested by architect.
- C. Verification Samples: Submit samples of materials selected specified to verify color and finish.
- D. Industry Certifications and Standards: Submit copy of documentation indicating compliance.

1.3 QUALITY ASSURANCE

- A. Manufacturer: Minimum of 5-years experience manufacturing similar products.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials and products in unopened factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations.

1.5 WARRANTY

- A. Manufacturer's Warranty: Provide manufacturer's standard warranty against defects in manufacturing.

PART 2 - PRODUCTS

2.1 FIBER REINFORCED LAMINATES SPED BUILDING 'W03'

- A. Manufacturer: Panolam Industries International, Inc., One Corporate Drive, Suite 725, Shelton, CT 06484. Tel: 203-925-1556. Web: www.panolam.com. Panels shall comply with the following:
 - 1. Thickness: 0.075 inches Also available in a sanded back for door applications only (0.062 inches).

2. Color and Finish: Formica, as indicated on drawing.
3. Surface Burning Characteristics: US Standard UL-723/ASTM E 84 Class A; Canadian Standard ULC-S102 Class A for Surface Burning Characteristics of Building Materials.
4. Sustainability, Indoor Air Quality: GREENGUARD Gold Certification.
5. IMO Certified for marine use.
6. Chemical resistant compliant with SEFA 8 requirements.
7. Wear Resistance (Cycles) NEMA 3.13: 3500 typical.
8. Flexural Strength ASTM D790: 20,148 psi typical.
9. Molding Profiles: Outside corners flat, outside corners round, division bars, inside corners, standard end caps.
10. Adhesive: Construction Adhesive #4319 by Franklin Adhesives and Polymers or equal approved by panel manufacturer.
11. Joint Caulking: Color Sil by Color Rite or equal approved by panel manufacturer; 100 percent silicone based colored caulking.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install products in strict accordance with manufacturer's instructions and approved submittals. 1. Clean substrate of dirt, dust, waxes, and other bond breaking substances prior to beginning installation. The wall must be finished to level 3 and fully primed. 2. Install panels with bottom edge located to clear top of any rigid wall base. Rubber wall bases may be bonded over the FRL® panels using a polymer or urethane-based adhesive. 3. Apply adhesive uniformly using adhesive manufacturers recommended notched trowel to the entire back of panels completely to the edge. 4. Lay FRL® panels in place leaving approximately 1/8 inch vertical installations 3/16 inch for horizontal installations between panel joints. 5. Follow adhesive manufacturer's recommendations for set and application times. 6. If you are attaching FRL® panels to a door or wood substrate, we recommend the use of contact glue. Please follow contact glue manufacturer's directions. 7. Apply pressure to entire panel face with laminate type roller, removing trapped air and ensure proper adhesion between surfaces. 8. If no trim is used, seal panel joints and top, side, and bottom edges with colored 100% silicone caulking to match panel color. Wipe smooth and remove excess caulk from FRL® panel face.

3.3 ADJUSTING AND CLEANING

- A. Replace installations out of plumb and not aligned with adjacent panels and construction.
- B. Clean panel face to remove soiling, stains, dust, and dirt using clean rags, and cleaning agents as instructed by manufacturer.
- C. Leave installation clean, free of residue and debris resulting from work of this section.

END OF SECTION 09 7710

SECTION 09 9113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following exterior substrates:

1. Galvanized metal.

1.2 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- D. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- E. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- F. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
- B. Samples: For each type of paint system and each color and gloss of topcoat.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Behr Process Corporation.
 2. Benjamin Moore & Co.
 3. Columbia Paint & Coatings.
 4. Dulux (formerly ICI Paints); a brand of AkzoNobel.
 5. Duron, Inc.
 6. Glidden Professional.
- B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include but are not limited to products listed in the Exterior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

- B. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- C. Colors: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Fiber-Cement Board: 12 percent.
 - 3. Masonry (Clay and CMUs): 12 percent.
 - 4. Wood: 15 percent.
 - 5. Portland Cement Plaster: 12 percent.
 - 6. Gypsum Board: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
- B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION

- A. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

- B. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 EXTERIOR PAINTING SCHEDULE

- A. Galvanized-Metal Substrates:

- 1. Latex System MPI EXT 5.3H:
 - a. Prime Coat: Primer, galvanized, water based, MPI #134.
 - 1) Sherwin Williams, Pro Industrial Pro-Cry Universal Primer B66-310 Series.
 - b. Intermediate Coat: Latex, exterior, matching topcoat.
 - c. Topcoat: Latex, exterior, gloss (MPI Gloss Level 6), MPI #119.
 - 1) Sherwin Williams Pro Industrial Zero VOC Acrylic Gloss, B66-600 Series.

END OF SECTION 09 9113

SECTION 09 9123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:
 - 1. Gypsum board and plaster.
 - 2. Hollow metal door frames.

1.2 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
- B. Samples: For each type of paint system and in each color and gloss of topcoat.

1.4 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft..
 - b. Other Items: Architect will designate items or areas required.
 - 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Sherwin-Williams Company (The).
- B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include but are not limited to products listed in the Interior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- C. Colors: Match Architect's samples As indicated in a color schedule.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Fiber-Cement Board: 12 percent.
 - 3. Masonry (Clay and CMUs): 12 percent.
 - 4. Wood: 15 percent.
 - 5. Gypsum Board: 12 percent.
 - 6. Plaster: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
- B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 INTERIOR PAINTING SCHEDULE

- A. Gypsum Board and Plaster Substrates:
 1. Latex over Latex Sealer System MPI INT 9.2A:
 - a. Prime Coat: Primer sealer, latex, interior, MPI #50.
 - 1) Sherwin Williams, Premium Wall & Wood Primer.
 - b. Intermediate Coat: Latex, interior, matching topcoat.
 - c. Topcoat: Latex, interior (MPI Gloss Level 3), MPI #52.
 - 1) Sherwin Williams, Cashmere Interior Acrylic Latex.
 - d. Topcoat: Latex, interior, semi-gloss (MPI Gloss Level 5), MPI #54.
 - 1) Sherwin Williams, Cashmere Interior Acrylic Latex.
- B. Hollow Metal Door Frames; Misc. and Ornamental Iron
 1. Sherwin-Williams – SW Pro Industrial Latex (100% Acrylic) Systems
 - a. 1st Coat: S-W Pro Industrial Pro-Cry Universal Primer B66-310 Series.
 - 1) Finish: Low sheen.
 - 2) Thickness (mils per coat): 5-10 wet; 2-4 dry.
 - b. 2nd Coat: S-W Pro Industrial Zero VOC Acrylic Gloss, B66-600 Series.
 - c. 3rd Coat: S-W Pro Industrial Zero VOC Acrylic Gloss, B66-600 Series.
 - 1) Finish: Gloss.
 - 2) Thickness (mils per coat): 6-12 wet; 2.5-4 dry.
- C. Gypsum Board and Plaster Substrates – Interior Epoxy System
 1. Sherwin-Williams – Epoxy System (water base) with Vinyl Acrylic Primer
 - a. 1st Coat: S-W ProMar 200 Zero VOC Interior Latex Primer B28W02600 Series.
 - 1) Finish: Flat.
 - 2) Sheen (at 85 deg): 0 – 5 units.
 - 3) Thickness (mils per coat): 4 wet; 1.5 dry.
 - b. 2nd Coat: S-W Pro Industrial Zero VOC Water-Based Epoxy Gloss, Series B73-300 Series.

c. 3rd Coat: S-W Pro Industrial Zero VOC Water-Based Epoxy Gloss, Series B73-300 Series.

- 1) Finish: Gloss (verify with Architect and Owner.
- 2) Sheen (at 60 deg): 90+ units.
- 3) Thickness (mils per coat): 5 - 10 wet; 2 - 4 dry.

END OF SECTION 09 9123

SECTION 09 9300 - STAINING AND TRANSPARENT FINISHING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and application of wood stains and transparent finishes
 - 1. Interior Substrates:
 - a. Interior stile and rail wood doors.
 - b. Interior Running Wood Trim.

1.2 DEFINITIONS

- A. MPI Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- C. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- D. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- E. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
- B. Samples: For each type of finish system and in each color and gloss of finish required.

1.4 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each finish system indicated and each color selected to verify preliminary selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each type of finish system and substrate.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 20 sq. ft.
 - b. Other Items: Interior flush wood door sample finished on both sides.
 - 2. Final approval of stain color selections will be based on mockups.
 - a. If preliminary stain color selections are not approved, apply additional mockups of additional stain colors selected by Architect at no added cost to Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Behr Paint Company; Behr Process Corporation.
 - 2. Benjamin Moore & Co.
 - 3. Kelly-Moore Paint Company Inc.
 - 4. PPG Paints.
 - 5. Pratt & Lambert.
 - 6. Sherwin-Williams Company (The).
- B. Products: Subject to compliance with requirements, provide product listed in wood finish systems schedules for the product category indicated.

2.2 MATERIALS, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products List."
- B. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- C. Stain Colors: Stain doors and running trim to match existing wood doors and running trim.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Exterior Wood Substrates: 15 percent, when measured with an electronic moisture meter.
- C. Maximum Moisture Content of Interior Wood Substrates: 9 percent, when measured with an electronic moisture meter.
- D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- E. Proceed with finish application only after unsatisfactory conditions have been corrected.
 - 1. Beginning finish application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing.
 - 1. After completing finishing operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean and prepare surfaces to be finished according to manufacturer's written instructions for each substrate condition and as specified.
 - 1. Remove dust, dirt, oil, and grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.
 - 2. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.

3.3 APPLICATION

- A. Apply finishes according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
- B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

3.4 CLEANING AND PROTECTION

- A. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- B. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

3.5 INTERIOR WOOD -FINISH-SYSTEM SCHEDULE

- A. Wood Substrates: Interior Stile & Rail Wood Doors and Running Wood Trim.
 - 1. Moisture-Cured Clear Polyurethane over Semi-Transparent Stain:
 - a. Prime Coat: Semi-Transparent Stain to match existing.
 - b. Intermediate Coat: Moisture-cured polyurethane matching topcoat.
 - c. Topcoat: Varnish, polyurethane, moisture cured, gloss (MPI Gloss Level 6), MPI #31.
 - 1) ICI 1908 Woodpride

END OF SECTION 09 9300

SECTION 09 9600 - HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of high-performance coating systems
 - 1. Exterior Substrates:
 - a. Steel.

1.2 DEFINITIONS

- A. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- B. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- C. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
- B. Samples: For each type of coating system and in each color and gloss of topcoat indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Tnemec Inc.
- B. Products: Subject to compliance with requirements, provide product listed in the Exterior High-Performance Coating Schedule for the coating category indicated.

2.2 HIGH-PERFORMANCE COATINGS, (SPED BUILDING) 'W07'

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
 - 3. Products shall be of same manufacturer for each coat in a coating system.

- C. Colors: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- C. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and coating systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce coating systems indicated.

3.3 APPLICATION

- A. Apply high-performance coatings according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
- B. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

3.4 EXTERIOR HIGH-PERFORMANCE COATING SCHEDULE

- A. Steel Substrates: (Steel Sash Window Frames & Sashes)
 - 1. Pigmented Polyurethane over Epoxy Zinc-Rich Primer and High-Build Epoxy System MPI EXT 5.1G:
 - a. Prime Coat: Primer, zinc rich, epoxy, MPI #20.
 - 1) Tnemec Series 90-97 Tnemec-Zinc.
 - b. Intermediate Coat: Epoxy, high build, low gloss, MPI #108.
 - 1) Tnemec Series 66HS Hi-Build Epoxoline II.

- c. First and Second Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6), MPI #72.
 - 1) Tnemec Series 1070V Flvornar.

END OF SECTION 09 9600



OCS – SPECIAL EDUCATION AND ANNEX BUILDING REMODELS

DIVISION 10 - SPECIALTIES:

10 2113	Metal Toilet Compartments
10 2800	Toilet and Bath Accessories
10 4310	Signage
10 4413	Fire Protection Cabinets
10 4416	Fire Extinguishers

SECTION 10 2113 - METAL TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install metal toilet compartments as described in Contract Documents.

B. Related Requirements:

1. Section 06 1100: 'Wood Framing' for blocking in wood framing for compartment installation and door bumper.
2. Section 06 1100: 'Wood Framing' for blocking in wood framing for compartment installation, ceiling support for urinal partitions, and door bumper.
3. Section 09 2216: 'Non-Structural Metal Framing' for blocking in non-load-bearing metal framing for compartment installation and door bumper.
4. Section 10 2813: 'Commercial Toilet Accessories'.

1.2 REFERENCES

A. Reference Standards:

1. ASTM International:
 - a. ASTM A484/A484M-18a, 'Standard Specification for General Requirements for Stainless Steel Bars, Billets, and Forgings'.

1.3 SUBMITTALS

A. Action Submittals:

1. Product Data:
 - a. Color selection.

B. Closeout Submittals:

1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Warranty Documentation:
 - 1) Final, executed copy of Warranty.
 - b. Record Documentation:
 - 1) Manufacturers documentation:
 - a) Manufacturer's literature or cut sheet.
 - b) Color selection.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:

1. Materials shall be delivered in original, unopened packages with labels intact.

B. Storage And Handling Requirements:

1. Store and handle in compliance with Manufacturer's instructions and recommendations.

1.5 WARRANTY

A. Manufacturer Warranty:

1. Manufacturer's standard warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Type One Acceptable Manufacturers:

1. Accurate Partitions Inc, Lyons, IL www.accuratepartitions.com.
2. AMPCO Products Inc, Miami, FL www.ampco.com.
3. Columbia Partitions, Columbia, SC www.psisc.com.
4. Flush-Metal Partition Corp, Maspeth, NY www.flushmetal.com.
5. Global Steel Products Corp, Eastanollee, GA www.globalpartitions.com.
6. Hadrian Inc, Mentor, OH www.hadrian-inc.com.
7. Knickerbocker Partitions Corp, Freeport, NY www.knickerbockerpartition.com.
8. Metpar, Westbury, NY www.metpar.com.
9. Equal as Approved by Architect before bidding.

2.2 MANUFACTURED UNITS

A. Toilet And Miscellaneous Partitions:

1. Floor-mounted, overhead-braced.
2. Panels:
 - a. Galvanized bonderized steel sheets (minimum 0.00015 inch zinc coating).
 - b. Edges bound interlocked with drawn molding welded on corners.
 - c. Corners welded and ground smooth.
 - d. Sound deadening honeycomb core.
 - e. Provide wood blocking on all panels that have grab bars.
 - f. Gauge:
 - 1) Doors: 22 ga minimum.
 - 2) Panels: 22 ga minimum.
 - 3) Pilasters: 22 ga minimum.
 - 4) Screens: 22 ga minimum.

3. Posts:
 - a. 20 ga minimum of same construction and finish as panels.
4. Headrails:
 - a. Aluminum.
 - b. 20 ga minimum of same construction and finish as panels.
 - c. Anti-grip design.
5. Plinths:
 - a. 20 ga Type 304 stainless steel, Number 4 finish.
 - b. 3 inch minimum high, secured with concealed clips.
 - c. All fasteners used to attach Plinths, Posts and Pilasters to the floor shall be Type 304 stainless steel.
6. Anchorages and fasteners:
 - a. Concealed: Non-corrosive, protective finish.
 - b. Tamper resistant Torx Head with pin screws.
7. Hardware:
 - a. Each door:
 - 1) Gravity type hinges with double handed, nylon bottom cam, adjustable for partial door closing position, bottom hinge finished flush with door bottom.
 - 2) Sliding or concealed door bolt with emergency access.
 - 3) Door strike and keeper with rubber bumper.
 - 4) Coat hook / door bumper.
 - b. Finish: Chrome plated.
 - c. Meet requirements of ASTM B86, Alloy AG 40A.

B. Urinal Partition:

1. Basic construction same as panels above, floor mounted.
2. Basic construction same as panels above, floor and ceiling mounted.
3. Width to be 16 inches minimum.
 - a. Partition maximum width shall not encroach into required accessibility clear floor space.

2.3 FINISHES

A. Finish And Color:

1. Powder-coated paint finish.
2. Color as selected from Manufacturer's full color range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:

1. Field verify dimensions.
2. Verify that necessary blocking has been installed in framed walls for partition installation and for place where coat hook / door bumper will strike wall.

3.2 INSTALLATION

- A. Install pilasters rigid, plumb, and level. Maintain proper door openings. Anchor pilaster to floor with Type 304 stainless steel fasteners embedded 2 inches into concrete slab below setting bed.
- B. Secure panels to walls with two stirrup brackets minimum attached near top and bottom of each panel. Use fasteners of length to provide one-inch embedment into blocking or masonry.
- C. Secure overhead brace to face sheets with two fasteners minimum per face. Set door tops parallel with brace. Set door bottom 12 inches above floor.
- D. Plinth to be level with and snug to floor.

3.3 FIELD QUALITY CONTROL

- A. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
 1. Correct any work found defective or not complying with contract document requirements at no additional cost to the Owner.
 2. Replace damaged or severely scratched materials with new materials at no additional cost to the Owner.

3.4 ADJUSTING

- A. Lubricate hardware as recommended by Manufacturer.
- B. Set hinges on out-swinging doors to return to nearly closed position.
- C. Perform final adjustments to pilaster leveling devices, door hardware, and other operating parts of partition assembly just before Substantial Completion.

3.5 CLEANING

- A. Remove protective masking. Clean exposed surfaces of partitions, hardware, fittings, and accessories.
- B. Touch-up minor scratches and other finish imperfections using materials and methods recommended by Manufacturer.

END OF SECTION

SECTION 10 2800 - TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Toilet and bath accessories.

1.3 SUBMITTALS

- A. Product Data: Include construction details, material descriptions and thicknesses, dimensions, profiles, fastening and mounting methods, specified options, and finishes for each type of accessory specified.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise approved by Architect.
- B. Product Options: Accessory requirements, including those for materials, finishes, dimensions, capacities, and performance, are established by specific products indicated in the Toilet and Bath Accessory Schedule.
 - 1. Other manufacturers' products with equal characteristics may be considered. See Division 1 Section "Substitutions."
 - 2. Do not modify aesthetic effects, as judged solely by Architect, except with Architect's approval. Where modifications are proposed, submit comprehensive explanatory data to Architect for review.

1.5 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by disabled persons, proper installation, adjustment, operation, cleaning, and servicing of accessories.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide accessories by one of the following:
 - 1. Toilet and Bath Accessories:
 - a. A & J Washroom Accessories, Inc.
 - b. American Specialties, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.

- e. Sugastune, Inc.
- B. Products: Subject to compliance with requirements, provide one of the products indicated for each designation in the Toilet and Bath Accessory Schedule at the end of Part 3.

2.2 TOILET ACCESSORIES

- A. SPED Building RA-01, RA-02, RA-03 Grab Bar: Where this designation is indicated, provide stainless-steel grab bar complying with the following:
 - 1. Provide the following: 832 Series by Bradley Corp.
 - 2. Mounting: Concealed with manufacturer's standard flanges and anchors.
 - 3. Gripping Surfaces: Manufacturer's standard slip-resistant texture.
 - 4. Outside Diameter: 1-1/4 inches for medium-duty applications, 1-1/2 inches for heavy-duty applications.
- B. RA-05: Mirror Unit: Where this designation is indicated, provide mirror unit complying with the following:
 - 1. Basis of Design: B-1556 Series by Bobrick.

2.3 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, with No. 4 finish (satin), in 0.0312-inch minimum nominal thickness, unless otherwise indicated.
- B. Sheet Steel: ASTM A 366/A 366M, cold rolled, commercial quality, 0.0359-inch minimum nominal thickness; surface preparation and metal pretreatment as required for applied finish.
- C. Chromium Plating: ASTM B 456, Service Condition Number SC 2 (moderate service), nickel plus chromium electrodeposited on base metal.
- D. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- E. Fasteners: Screws, bolts, and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.

2.4 FABRICATION

- A. General: Names or labels are not permitted on exposed faces of accessories. On interior surface not exposed to view or on back surface of each accessory, provide printed, waterproof label or stamped nameplate indicating manufacturer's name and product model number.
- B. Surface-Mounted Toilet Accessories: Unless otherwise indicated, fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with continuous stainless-steel hinge. Provide concealed anchorage where possible.
- C. Framed Glass-Mirror Units: Fabricate frames for glass-mirror units to accommodate glass edge protection material. Provide mirror backing and support system that permits rigid, tamper-resistant glass installation and prevents moisture accumulation.
 - 1. Provide galvanized steel backing sheet, not less than 0.034 inch and full mirror size, with nonabsorptive filler material. Corrugated cardboard is not an acceptable filler material.
- D. Mirror-Unit Hangers: Provide mirror-unit mounting system that permits rigid, tamper- and theft-resistant installation, as follows:
 - 1. One-piece, galvanized steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.

- E. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of four keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Secure mirrors to walls in concealed, tamper-resistant manner with special hangers, toggle bolts, or screws. Set units level, plumb, and square at locations indicated, according to manufacturer's written instructions for substrate indicated.
- C. Install grab bars to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

END OF SECTION 10 2800

SECTION 10 4310 – SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. ADA accessibility signs for interior toilet rooms and tactile exit signs.
 - 2. All other signage will be provided and installed by Owners.

1.3 DEFINITIONS

- A. ADA-ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines."

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication and installation details for signs.
 - 1. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
 - 2. Provide message list, typestyles, graphic elements, including tactile characters and Braille, and layout for each sign.
- C. Samples for Verification: For each of the following products and for the full range of color, texture, and sign material indicated, of sizes indicated:
 - 1. Panel Signs: Full-size samples of each type of sign required.
- D. Sign Schedule: Use same designations indicated on Drawings.
- E. Qualification Data: For Installer and fabricator.
- F. Maintenance Data: For signs to include in maintenance manuals.
- G. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

- B. Source Limitations for Signs: Obtain each sign type indicated from one source from a single manufacturer.
- C. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify recess openings by field measurements before fabrication and indicate measurements on Shop Drawings.
- B. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit installation of signs in exterior locations to be performed according to manufacturers' written instructions and warranty requirements.

1.7 COORDINATION

- A. For signs supported by or anchored to permanent construction, advise installers of anchorage devices about specific requirements for placement of anchorage devices and similar items to be used for attaching signs.
 - 1. Coordinate placement of anchorage devices with templates for installing signs.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Deterioration of metal and polymer finishes beyond normal weathering.
 - b. Deterioration of embedded graphic image colors and sign lamination.

PART 2 - PRODUCTS

2.1 UNFRAMED PANEL SIGNS

- A. General: Provide panel signs that comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.
 - 1. Produce smooth panel sign surfaces constructed to remain flat under installed conditions within tolerance of plus or minus 1/16 inch (1.5 mm) measured diagonally.
- B. Cast-Acrylic Sheet: Manufacturer's standard and as follows:
 - 1. Color: As selected by Architect from manufacturer's full range.
- C. Phenolic-Backed Photopolymer Sheet: Provide light-sensitive, water-wash photopolymer face layer bonded to a phenolic base layer to produce a composite sheet with overall, face-layer, and base-layer thicknesses, respectively, of 0.120 inch and a Type D Shone durometer hardness of 80.
 - 1. Available Product: Subject to compliance with requirements, a product that may be incorporated into Work includes, but is not limited to, "Jet-388 Phenolic Interior Signage" by JetUSA.

- D. Unframed Panel Signs: fabricate signs with edges mechanically and smoothly finished to comply with the following requirements:
 - 1. Edge Condition: Square Cut.
 - 2. Corner Condition: Square.
- E. Graphic Content and Style: Provide sign copy that complies with requirements indicated in the Sign Schedule on Drawings for size, style, spacing, content, mounting height, and location, material, finishes, and colors of signage.
- F. Tactile and Braille Copy: Manufacturer's standard process for producing copy complying with ADA Accessibility Guidelines and ICC/ANSI A117.1. Text shall be accompanied by Grade 2 Braille. Produce precisely formed characters with square cut edges free from burrs and cut marks.
 - 1. Panel Material: Opaque acrylic sheet.
 - 2. Raised-Copy Thickness: Not less than 1/32 inch.
- G. Engraved Copy: Machine engrave letters, numbers, symbols, and other graphic devices into panel sign on face indicated to produce precisely formed copy, incised to uniform depth.
 - 1. Engraved Opaque Acrylic Sheet: Fill engraved copy with enamel.
- H. Colored Coatings for Acrylic Sheet: For copy and background colors, provide Pantone Matching Systems (PMS) colored coatings, including inks and paints, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and are non-fading for application intended.

2.2 ACCESSORIES

- A. Vinyl Film: Provide opaque nonreflective vinyl film, 0.0035-inch minimum thickness, with pressure-sensitive adhesive backing suitable for both exterior and interior applications.
- B. Mounting Methods: Use double-sided vinyl tape fabricated from materials that are not corrosive to sign material and mounting surface.
- C. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.
- D. Note Holders: Manufacturer's standard aluminum paper sheet holders.

2.3 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Verify that items provided under other sections of Work are sized and located to accommodate signs.
- C. Examine supporting members to ensure that surfaces are at elevations indicated or required to comply with authorities having jurisdiction and are free from dirt and other deleterious matter.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Locate signs and accessories where indicated, using mounting methods of types described and complying with manufacturer's written instructions.
 - 1. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Interior Wall Signs: Install signs on walls adjacent to latch side of door where applicable. Where not indicated or possible, such as double doors, install signs on nearest adjacent walls. Locate to allow approach within 3 inches (75 mm) of sign without encountering protruding objects or standing within swing of door.
- B. Wall-Mounted Panel Signs: Comply with sign manufacturer's written instructions except where more stringent requirements apply.
 - 1. Vinyl-Tape Mounting: Use double-sided foam tape to mount signs to smooth, nonporous surfaces. Do not use this method for vinyl-covered or rough surfaces.
 - 2. Where panel signs are scheduled or indicated to be mounted on glass, provide matching plate on opposite side of glass to conceal mounting materials.

3.3 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

END OF SECTION 10 4310

SECTION 10 4413 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fire-protection cabinets for portable fire extinguishers.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.4 COORDINATION

- A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E814 for fire-resistance rating of walls where they are installed.

2.2 FIRE-PROTECTION CABINET

- A. Cabinet Type: Suitable for fire extinguisher.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - b. Larsens Manufacturing Company.
 - c. Potter Roemer LLC; a Division of Morris Group International.
- B. Cabinet Construction: Nonrated.
 - 1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.043-inch-thick cold-rolled steel sheet lined with minimum 5/8-inch-thick fire-barrier material. Provide factory-drilled mounting holes.
- C. Cabinet Material: Cold-rolled steel sheet.
- D. Recessed Cabinet:
 - 1. Exposed Flat Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).

- E. Cabinet Trim Material: Same material and finish as door.
- F. Door Material: Steel sheet.
- G. Door Style: Fully glazed panel with frame.
- H. Door Glazing: Tempered float glass (clear).
 - 1. Acrylic Sheet Color: Clear transparent acrylic sheet.
 - 2. Acrylic Sheet Color: Clear transparent acrylic sheet painted white on unexposed side.
 - 3. Acrylic Bubble Color: Clear, transparent.
- I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
- J. Materials:
 - 1. Cold-Rolled Steel: ASTM A1008/A1008M, Commercial Steel (CS), Type B.
 - a. Finish: Baked enamel, TGIC polyester powder coat, HAA polyester powder coat, epoxy powder coat, or polyester/epoxy hybrid powder coat, complying with AAMA 2603.
 - b. Color: As selected by Architect from manufacturer's full range.
 - 2. Tempered Float Glass: ASTM C1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear).
 - 3. Transparent Acrylic Sheet: ASTM D4802, Category A-1 (cell-cast sheet), 3 mm thick, with Finish 1 (smooth or polished).

2.3 FABRICATION

- A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Prepare recesses for recessed and fire-protection cabinets as required by type and size of cabinet and trim style.
- B. Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
- C. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.
- D. Identification: Apply decals at locations indicated.
- E. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

END OF SECTION 10 4413

SECTION 10 4416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers.

1.2 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.3 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - b. Larsens Manufacturing Company.
 - c. Potter Roemer LLC; a Division of Morris Group International.
 - 2. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.
- B. Multipurpose Dry-Chemical Type 10 lb. nominal capacity, with monoammonium phosphate-based dry chemical in manufacturer's standard enameled container.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Examine fire extinguishers for proper charging and tagging.
 - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Install fire extinguishers in locations indicated and in compliance with requirements of authorities having jurisdiction.

END OF SECTION 10 4416



OCS – SPECIAL EDUCATION AND ANNEX BUILDING REMODELS

DIVISION 12 - FURNISHINGS:

12 2413 Roller Shades

SECTION 12 2413 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Sunscreen roller shades, manual operation.

1.2 RELATED SECTIONS

- A. Division 6 Section "Rough Carpentry" for wood blocking and grounds for mounting roller shades and accessories.
- B. Division 9 Section "Gypsum Board" for coordination with gypsum board assemblies for installation of shade pockets, closures and related accessories.
- C. Division 9 Section "Acoustical Ceilings" for coordination with acoustical ceiling systems for installation of shade pockets, closures and related accessories.

1.3 REFERENCES

- A. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- B. NFPA 70 - National Electrical Code.
- C. NFPA 701 - Fire Tests for Flame-Resistant Textiles and Films.

1.4 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
 - 3. Storage and handling requirements and recommendations.
 - 4. Mounting details and installation methods.
- B. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, and relationship to adjacent work.
 - 1. Prepare shop drawings on Autocad format using base sheets provided electronically by the Architect.
- C. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.
- D. Selection Samples: For each finish product specified, one set of shade cloth options and aluminum finish color samples representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, one complete set of shade components, unassembled, demonstrating compliance with specified requirements. Shade cloth sample and aluminum finish sample as selected. Mark face of material to indicate interior faces.

- F. Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of twenty years experience in manufacturing products comparable to those specified in this section.
- B. Installer Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.
- C. Fire-Test-Response Characteristics: Passes NFPA 701 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.
- D. Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver shades in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in the Window Treatment Schedule.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Install roller shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.8 WARRANTY

- A. Roller Shade Hardware and Chain Warranty: Manufacturer's standard non-depreciating twenty-five year limited warranty.
- B. Standard Shadecloth: Manufacturer's standard twenty-five year warranty.
- C. Roller Shade Installation: One year from date of Substantial Completion, not including scaffolding, lifts or other means to reach inaccessible areas.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design: The design for the motorized shades is based on Mariak.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Castec, Inc.
 - 2. MechoShade Systems, Inc.
 - 3. Mariak

2.2 ROLLER SHADE TYPES

A. Manual Operated Shades:

1. Product: Mariak, M-series, wall hung with square fascia.
2. Solar Shadecloths:
 - a. Shade Fabric: Mariak EconoScreen 3%.
 - b. Color: As selected by Architect from Manufacturer's full range.

2.3 SHADE FABRICATION

- A. Fabricate units to completely fill existing openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise.
- B. Provide battens in standard shades as required to assure proper tracking and uniform rolling of the shadebands. Contractor shall be responsible for assuring the width-to-height (W:H) ratios shall not exceed manufacturer's standards or, in absence of such standards, shall be responsible for establishing appropriate standards to assure proper tracking and rolling of the shadecloth within specified standards. Battens shall be roll-formed stainless steel or tempered steel, as required.

2.4 COMPONENTS

A. Access and Material Requirements:

1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.
2. Provide shade hardware that allows for removal and re-mounting of the shade bands without having to remove the shade tube, drive or operating support brackets.
3. Use only Delrin engineered plastics by DuPont for all plastic components of shade hardware. Styrene based plastics, and /or polyester, or reinforced polyester will not be acceptable.

B. Shade Hardware and Shade Brackets:

1. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel, or heavier, thicker, as required to support 150 percent of the full weight of each shade.
2. Provide shade hardware system that allows for field adjustment of motor or replacement of any operable hardware component without requiring removal of brackets, regardless of mounting position (inside, or outside mount).

2.5 ACCESSORIES

A. Pocket Accessories: As selected by the architect from the manufacturer's full range of options.

B. Fascia:

1. Continuous removable extruded aluminum fascia that attaches to shade mounting brackets without the use of adhesives, magnetic strips, or exposed fasteners. Align seams with seams of shade fabric.
2. Fascia shall be able to be installed across two or more shade bands in one piece.
3. Fascia shall fully conceal brackets, shade roller and fabric on the tube.
4. Provide bracket / fascia end caps where mounting conditions expose outside of roller shade brackets.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install roller shades level, plumb, square, and true according to manufacturer's written instructions, and located so shade band is not closer than 2 inches (50 mm) to interior face of glass. Allow proper clearances for window operation hardware.
- B. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
- C. Clean roller shade surfaces after installation, according to manufacturer's written instructions.
- D. Engage Installer to train Owner's maintenance personnel to adjust, operate and maintain roller shade systems.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 12 2413



OCS – SPECIAL EDUCATION AND ANNEX BUILDING REMODELS

DIVISION 22 - PLUMBING:

22 0501	Common Plumbing Requirements
22 0529	Hangers and Supports for Plumbing Piping
22 0553	Plumbing Identification
22 0719	Plumbing Piping Insulation
22 1116	Domestic Water Piping
22 1119	Domestic Water Piping Specialties
22 1313	Facility Sanitary Sewers
22 1319	Facility Sanitary Sewer Specialties
22 3423	Domestic Electric Water Heaters
22 4200	Commercial Plumbing Fixtures

SECTION 22 0501- COMMON PLUMBING REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Common requirements and procedures for plumbing systems.
 - 2. Furnish and install sealants relating to installation of systems installed under this Division.

1.2 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's catalog data for each manufactured item.
 - 1) Provide section in submittal for each type of item of equipment. Include Manufacturer's catalog data of each manufactured item and enough information to show compliance with Contract Document requirements. Literature shall show capacities and size of equipment used and be marked indicating each specific item with applicable data underlined.
- B. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual:
 - a. Operations and Maintenance Data.
 - 1) At beginning of PLUMBING section of Operations and Maintenance Manual, provide master index showing items included:
 - a) Provide name, address, and phone number of Architect, Architect's Mechanical Engineer, General Contractor, and Plumbing subcontractor.
 - b) Identify maintenance instructions by using same equipment identification used in Contract Drawings. Maintenance instructions shall include:
 - (1) List of plumbing equipment used to indicate name, model, serial number, and nameplate data of each item together with number and name associated with each system item.
 - (2) Manufacturer's maintenance instructions for each piece of plumbing equipment installed in Project. Instructions shall include name of vendor, installation instructions, parts numbers and lists, operation instructions of equipment, and maintenance instructions.
 - b. Warranty Documentation:
 - 1) Include copies of warranties required in individual Sections of Division 22.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:

1. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- B. Storage And Handling Requirements:
 1. Store items subject to moisture damage in dry, heated spaces.

1.4 WARRANTY

- A. Manufacturer Warranty:
 1. Provide certificates of warranty for each piece of equipment made out in favor of Owner.
- B. Special Warranty:
 1. Guarantee plumbing systems to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.

PART 2 - PRODUCTS

2.1 COMPONENTS

- A. Components shall bear Manufacturer's name and trade name. Equipment and materials of same general type shall be of same make throughout work to provide uniform appearance, operation, and maintenance.
- B. Sleeves:
 1. General:
 - a. Two sizes larger than bare pipe or insulation on insulated pipe.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Drawings:
 1. Building is existing. Contractor shall visit the project site prior to bidding to familiarize themselves with the existing conditions that may affect the installation of the work.
 2. Plumbing Drawings show general arrangement of piping, equipment, etc. Follow as closely as actual existing building construction and work of other trades will permit.
 3. Consider Architectural and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over Plumbing Drawings.
 4. Because of small scale of Drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.
 5. Coordinate with mechanical and electrical trades regarding location of piping systems installed as part of the work.
- B. Verification Of Conditions:
 1. Ensure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final

installation shall suit true intent and meaning of Contract Documents. If approval is received by Addendum or Change Order to use other than originally specified items, be responsible for specified capacities and for ensuring that items to be furnished will fit space available.

2. Check that slots and openings provided under other Divisions through floors, walls, ceilings, and roofs are properly located. Perform cutting and patching caused by neglecting to coordinate with Divisions providing slots and openings at no additional cost to Owner.
3. No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.

3.2 PREPARATION

A. Changes Due to Equipment Selection:

1. Where equipment specified or otherwise approved requires different arrangement or connections from that shown in Contract Documents, submit drawings showing proposed installations.
2. If proposed changes are approved, install equipment to operate properly and in harmony with intent of Contract Documents. Make incidental changes in piping, ductwork, supports, installation, wiring, heaters, panelboards, and as otherwise necessary.
3. Provide additional motors, valves, controllers, fittings, and other equipment required for proper operation of systems resulting from selection of equipment.
4. Be responsible for proper location of rough-in and connections provided under other Divisions.

3.3 INSTALLATION

A. Cut carefully to minimize necessity for repairs to previously installed or existing work. Do not cut beams, columns, or trusses.

B. Locating Equipment:

1. Arrange pipes and equipment to permit ready access to valves, unions and to clear openings of doors and access panels.
2. Adjust locations of pipes, equipment, and fixtures to accommodate work to interferences anticipated and encountered.
3. Install plumbing work to permit removal of equipment and parts of equipment requiring periodic replacement or maintenance without damage to or interference with other parts of equipment or structure.
4. Determine exact route and location of each pipe before fabrication.

a. Right-Of-Way:

- 1) Lines that pitch shall have right-of-way over those that do not pitch. For example, plumbing drains shall normally have right-of-way.
- 2) Lines whose elevations cannot be changed shall have right-of-way over lines whose elevations can be changed.

b. Offsets, Transitions, and Changes in Direction:

- 1) Make offsets, transitions, and changes in direction in pipes as required to maintain proper head room and pitch of sloping lines whether or not indicated on Drawings.

C. Penetration Firestops:

1. Install Penetration Firestop System appropriate for penetration at plumbing systems penetrations through walls, ceilings, roofs, and top plates of walls.

D. Sealants:

1. Seal openings through building exterior caused by penetrations of elements of plumbing systems.
- E. Furnish and install complete system of piping, valved as indicated or as necessary to completely control entire apparatus:
1. Pipe drawings are diagrammatic and indicate general location and connections. Piping may have to be offset, lowered, or raised as required or directed at site. This does not relieve this Division from responsibility for proper installation of plumbing systems.
 2. Arrange piping to not interfere with removal of other equipment, ducts, or devices, or block access to doors, windows, or access openings:
 - a. Provide accessible flanges or ground joint unions, as applicable for type of piping specified, at connections to equipment and on bypasses.
 - 1) Make connections of dissimilar metals with di-electric unions.
 - b. Do not use reducing bushings, bull head tees, close nipples, or running couplings. Street elbows are allowed only on potable water pipe 3/4 inch in diameter and smaller.
 - c. Place valves and specialties to permit easy operation and access.
 3. Do not install piping in shear walls.
 4. Cut piping accurately to measurements established at site. Remove burr and cutting slag from pipes.
 5. Work piping into place without springing or forcing.
 6. Make changes in direction with proper fittings.
- F. Sleeves:
1. Do not place sleeves around soil, waste, vent, or roof drain lines passing through concrete slabs on grade.
 2. Sleeves through floors and foundation walls shall be watertight.
- G. Escutcheons:
1. Provide spring clamp plates where pipes run through walls, floors, or ceilings and are exposed in finished locations of building. Plates shall be chrome plated heavy brass of plain pattern and shall be set tight on pipe and to building surface.

3.4 REPAIR / RESTORATION

- A. Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it:
1. Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown.
 2. Surface finishes shall exactly match existing finishes of same materials.

3.5 FIELD QUALITY CONTROL

- A. Field Tests:
1. Perform required tests noted herein or required by AHJ on plumbing piping systems. Furnish devices required for testing purposes.
 2. Furnish test reports on test conducted to Architect for review.
- B. Non-Conforming Work:

1. Replace material or workmanship proven defective with sound material at no additional cost to Owner.
2. Repeat tests on new material, if requested.

3.6 CLEANING

- A. Remove dirt, grease, and other foreign matter from each length of piping before installation:
 1. After each section of piping used for movement of water or steam is installed, flush with clean water, except where specified otherwise.
 2. Arrange temporary flushing connections for each section of piping and arrange for flushing total piping system.
 3. Provide temporary cross connections and water supply for flushing and drainage and remove after completion of work.
- B. Clean exposed piping, equipment, and fixtures. Remove stickers from fixtures and adjust flush valves.

3.7 CLOSEOUT ACTIVITIES

- A. Instruction of Owner:
 1. Instruct building maintenance personnel in operation and maintenance of plumbing systems utilizing Operation And Maintenance Manual when so doing.
 2. Conduct instruction period after Substantial Completion inspection when systems are properly working and before final payment is made.

3.8 PROTECTION

- A. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system. Cap or plug open ends of pipes and equipment to keep dirt and other foreign materials out of system. Do not use plugs of rags, wool, cotton waste, or similar materials.

END OF SECTION 22 0501

SECTION 22 0529 - HANGERS AND SUPPORTS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

1. Hanger and support requirements and procedures for plumbing systems.

B. Related Requirements:

1. Section 23 0529: 'Hangers And Supports For HVAC Piping' for gas piping used with HVAC equipment.
2. Section 23 0553: 'Identification For HVAC Piping And Equipment' for paint identification of gas piping used with HVAC equipment.

1.2 SUBMITTALS

A. Action Submittals:

1. Product Data:
 - a. Manufacturer's catalog data for each manufactured item.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Materials:

1. Hangers, Rods
 - a. Galvanized and UL approved for service intended.
 - b. Support horizontal piping from hangers. Hangers shall have double nuts.
 - 1) Support insulated pipes 2 inches in diameter and smaller with adjustable swivel ring hanger with insulation protection shield. Gauge and length of shield shall be in accordance with Anvil design data.
 - a) Acceptable Products:
 - (1) Swivel Ring Hanger: Anvil Fig. 69.
 - (2) Insulation Protection Shield: Anvil Fig. 167.
 - (3) Equals by Cooper B-Line.
 - 2) Support uninsulated copper pipe 2 inches in diameter and smaller from swivel ring hanger, copper plated and otherwise fully suitable for use with copper tubing. Support non-copper uninsulated pipes from swivel ring hanger.
 - a) Acceptable Products:

- (1) Swivel Ring Hanger For Copper Pipe: Anvil Fig. CT-69.
 - (2) Swivel Ring Hanger For Other Pipe: Anvil Fig. 69.
 - (3) Equals by Cooper B-Line.
- 3) Support non-copper uninsulated pipes from clevis hanger.
- a) Acceptable Products:
 - (1) Clevis Hanger For Copper Pipe: Anvil Fig. CT-65.
 - (2) Clevis Hanger For Other Pipe: Anvil Fig. 260.
 - (3) Equals by Cooper B-Line.

- c. Support rods for single pipe shall be in accordance with following table:

Rod Diameter	Pipe Size
3/8 inch	2 inches and smaller
1/2 inch	2-1/2 to 3-1/2 inches
5/8 inch	4 to 5 inches

- d. Riser Clamps For Vertical Piping:

- 1) Acceptable Products:
 - a) Anvil Fig. 261.
 - b) Equals by Cooper B-Line.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Piping:

1. Properly support piping and make adequate provisions for expansion, contraction, slope, and anchorage.
 - a. Suspend piping from roof or floor structure or clamp to vertical walls using Unistrut and clamps. Do not hang pipe from other pipe, equipment, or ductwork. Laying of piping on any building element or bare ground is not allowed.
 - b. Supports For Horizontal Piping:
 - 1) Support metal piping at 96 inches on center maximum for pipe 1-1/4 inches or larger and 72 inches on center maximum for pipe 1-1/8 inch or less.
 - 2) Support thermoplastic pipe at 48 inches on center maximum.
 - 3) Provide support at each elbow. Install additional support as required.
 - c. Supports for Vertical Piping:
 - 1) Place riser clamps at each floor or ceiling level.
 - 2) Securely support clamps by structural members, which in turn are supported directly from building structure.
 - 3) Provide clamps as necessary to brace pipe to wall.
 - d. Insulate hangers for copper pipe from piping by means of at least two layers of Scotch 33 plastic tape.

2. Gas piping Identification:

- a. Apply paint identification for gas piping used with HVAC equipment as specified in Section 23 0553.

END OF SECTION 22 0529

SECTION 22 0553 - PLUMBING IDENTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To
 - 1. Furnish and install identification of plumbing equipment and piping as described in Contract Documents.
- B. Pipe labels shall comply with ANSI A13.1 standards.

PART 2 - PRODUCTS

2.1 LABELS

- A. Pipe Identification
 - 1. Coiled plastic markers identifying pipe contents and flow direction.
 - 2. Self adhesive or tape markers identifying pipe contents and flow.

2.2 PAINTING

- A. Pipe Painting: Paint all exposed roof top gas piping with two coats of Yellow enamel paint. Stencil "GAS" on piping at 10'-0" on center.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Piping Identification
 - 1. Only coiled plastic or self-adhesive pipe markers with legends, directional arrows, and color bands are acceptable.
 - 2. Locate identifying legends, directional arrows, and color bands at following points on exposed piping of each piping system -
 - a. Adjacent to each item of equipment.
 - b. At point of entry and exit where piping goes through wall.
 - c. On each riser and junction.
 - d. Every 25 feet on long continuous lines.
 - 3. Character height and marker size:

PIPE DIAMETER	MARKER WIDTH	CHARACTER HEIGHT
3/4" thru 1"	8"	1/2"
1-1/8" thru 2-3/8"	8"	3/4"
2-1/2" thru 3-1/4"	12"	1-1/4"

3.2 SCHEDULES

A. Schedule Pipe Identification and Background Colors for Pipe Identification

1. Apply pipe symbols as follows:

<u>Pipe Type and Identification</u>	<u>Color</u>	<u>Background Color</u>
Domestic Hot Water	Red	White
Domestic Cold Water	Blue	White
Waste and Vent	Green	White
Refrigerant	Black	Yellow
Gas	Black	Yellow

END OF SECTION 22 0553

SECTION 22 0719 - PLUMBING PIPING INSULATION

PART 1 - GENERAL

- A. Includes But Not Limited To:
1. Furnish and install insulation on hot and hot water recirculation lines, fittings, valves, and accessories as described in Contract Documents.
 2. Domestic cold water piping in crawl space and basement does not need to be insulated.
- B. Related Requirements:
1. Section 22 1116: 'Domestic Water Piping'.

PART 2 - PRODUCTS

2.1 COMPONENTS

- A. Materials:
1. Above Grade Metal Piping:
 - a. Insulation For Piping:
 - 1) Snap-on glass fiber with ASJ Max Fiberglas pipe insulation with factory vapor jacket.
 - 2) Insulation Thickness:

Service Water Temperature	Pipe Sizes		
	Up to 1-1/4 In	1-1/2 to 2 In	Over 2 In
170 - 180 Deg F	1 In	1-1/2 In	2 In
140 - 160 Deg F	1/2 In	One In	1-1/2 In
45 - 130 Deg F	1/2 In	1/2 In	1 In
 - 3) Performance Standards: Fiberglas ASJ Max Fiberglas by Owens-Corning.
 - 4) Acceptable Manufacturers:
 - a) Childers Products.
 - b) Knauf.
 - c) Manson.
 - d) Owens-Corning.
 - e) Johns-Manville.
 - f) Equal as approved by Architect before bidding.
 - b. Fitting, Valve, And Accessory Covers:
 - 1) PVC.
 - 2) Performance Standard: Zeston by Johns-Manville.
 - 3) Acceptable Manufacturers:

- a) Knauf.
 - b) Speedline.
 - c) Johns-Manville.
 - d) Equal as approved by Architect before bidding.
- 2. Below Grade Metal Piping:
 - a. Insulation:
 - 1) 1/2 inch thick.
 - 2) Acceptable Products:
 - a) SS Tubolit by Armacell.
 - b) ImcoLock by Imcoa.
 - c) Nomalock or Therma-Cel by Nomaco.
 - b. Joint Sealant:
 - 1) Acceptable Products:
 - a) Armacell 520.
 - b) Nomaco K-Flex R-373.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Above Grade Piping:
 - 1. Apply insulation to clean, dry piping with joints tightly butted.
 - 2. Install insulation in manner to facilitate removal for repairs. Place sections or blocks so least possible damage to insulation will result from inspection or repairs of piping or equipment.
 - 3. Piping up to 1-1/4 inch Diameter:
 - a. Adhere 'factory applied vapor barrier jacket lap' smoothly and securely at longitudinal laps with white vapor barrier adhesive.
 - b. Adhere 3 inch wide self-sealing butt joint strips over end joints.
 - 4. Piping 1-1/2 inches Diameter and Larger:
 - a. Use broken-joint construction in application of two-layer covering.
 - b. Fill cracks and depressions with insulating cement mixed to thick plastic paste.
 - 1) Apply by hand in several layers to make up total specified thickness.
 - 2) Final layer shall have smooth uniform finish before application of covering.
 - 5. Fittings, Valves, And Accessories:
 - a. Do not apply insulation over flanged joints or Victaulic couplings until piping has been brought up to operating temperature and flange bolts have been fully tightened. Insulate valves so wheel, stem, and packing nut are exposed.
 - b. Insulate with same type and thickness of insulation as pipe, with ends of insulation tucked snugly into throat of fitting and edges adjacent to pipe insulation tufted and tucked in.
 - c. Piping Up To 1-1/4 Inch Diameter:

- 1) Cover insulation with one piece fitting cover secured by stapling or taping ends to adjacent pipe covering.
- 2) Alternate Method:
 - a) Insulate fittings, valves, and accessories with one inch of insulating cement and vapor seal with two 1/8 inch wet coats of vapor barrier mastic reinforced with glass fabric extending 2 inches onto adjacent insulation.
- d. Piping 1-1/2 inches To 2-1/2 Inches:
 - 1) Insulate with hydraulic setting insulating cement or equal, to thickness equal to adjoining pipe insulation.
 - 2) Apply final coat of fitting mastic over insulating cement.
6. Pipe Hangers:
 - a. Do not allow pipes to come in contact with hangers.
 - b. Pipe Shield:
 - 1) Provide schedule 40 PVC by 6 inch long at each clevis and/or unistrut type hanger.
 - 2) Provide 16 ga by 6 inch long galvanized shields at each pipe hanger to protect pipe insulation from crushing by clevis hanger.
 - 3) Provide 22 ga by 6 inch long galvanized shield at each pipe hanger to protect insulation from crushing by Unistrut type hanger.
 - c. At Pipe Hangers:
 - 1) Provide rigid calcium silicate insulation 100 psi compressive strength at least 2 inches beyond shield.
- B. Below Floor Piping:
 1. Slip underground pipe insulation onto pipe and seal butt joints.
 2. Where slip-on technique is not possible, slit insulation, apply to pipe, and seal seams and joints.

END OF SECTION 22 0719

SECTION 22 1116 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Install new water piping systems as indicated on the drawings.
 - 2. Furnish and install potable water piping complete with necessary valves, connections, and accessories inside building and connect with existing domestic water service lines as described in Contract Documents.
- B. Special Needs Building: Existing domestic water piping in crawl space to be removed complete by Asbestos Abatement Contractor. Notify owner of any remaining domestic water piping encountered or if Asbestos Insulation is suspected. Do not proceed with installation of new domestic water piping systems until existing domestic water piping and associated pipe insulation has been removed.

1.2 REFERENCES

- A. Reference Standards:
 - 1. ASTM International:
 - a. ASTM B88-09, 'Standard Specification for Seamless Copper Water Tube'.
 - 2. NSF International Standard / American National Standards Institute:
 - a. NSF/ANSI 61-2012, 'Drinking Water System Components - Health Effects'.
 - b. NSF/ANSI 372-2011, 'Drinking Water System Components - Lead Content'.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's Literature:
 - 1) Above Grade: Domestic Water Copper Pipe and fittings.
 - 2) Below Floor: 2-1/2" thru 1-1/4". Polypropylene PP-R. Aquatherm Green Pipe
 - 3) Below Floor: 1" thru 1/2". PEX Crossed Linked Polyethylene. Sioux Chief Power PEX.
- B. Informational Submittals:
 - 1. Test And Evaluation Reports:
 - a. Written report of sterilization test.

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:

1. Meet NSF International Standards for materials or products that come into contact with drinking water, drinking water treatment chemicals, or both for chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Materials:

1. Design Criteria:

- a. All drinking water products, components, and materials above and below floor used in drinking water systems must meet NSF International Standards for Lead Free.

2. Pipe:

a. Copper:

1) Above-Grade:

- a) Meet requirements of ASTM B88, Type L.

2) Below-Grade:

- a) 2-1/2 inches thru 1-1/4": Polypropylene Aquatherm Green Piping
- b) 1" thru 1/2": PEX tubing. Sioux Chief Power PEX or approved equal.

3. Fittings:

- a. For Copper Pipe: Wrought copper.
- b. For Polypropylene Pipe: thermal fusion weld pipe fittings per manufacturer.
- c. For PEX Tubing: Manufacturers standard fittings with crimp bands.

4. Connections For Copper Pipe:

a. Above-Grade:

- 1) Sweat copper type with 95/5 or 96/4 Tin-Antimony solder, Bridgit solder, or Silvabrite 100 solder. Use only lead-free solder.
- 2) Viega ProPress System

b. Below Grade:

- 1) Thermal fusion weld pipe fittings per manufacturers requirements for Polypropylene Aquatherm Green Pipe.
- 2) Crimp Fittings and Bands for PEX tubing.
- 3) Copper to plastic transitions for Copper to PEX tubing.
- 4) Copper to Brass or Copper to Steel Connections: AWS Classification BAg-5 Silver (45 percent silver).

5. Ball Valves:

- a. Use ball valves exclusively unless otherwise specified. Ball valves shall be by single manufacturer from approved list below.

- b. Valves shall be two-piece, full port for 150 psi SWP.
 - 1) Operate with flow in either direction, suitable for throttling and tight shut-off.
 - 2) Body: Bronze, 150 psig wsp at 350 deg F and 400 psig wog.
 - 3) Seat: Bubble tight at 100 psig under water.
 - c. Quality Standard: Nibco T585 or S585.
 - 1) Equal by Conbraco 'Apollo,' Hammond, Milwaukee, or Watts.
- 6. Combination Pressure Reducing Valve / Strainer:
 - a. Integral stainless steel strainer, or separate 'Y' strainer installed upstream of pressure reducing valve.
 - b. Built-in thermal expansion bypass check valve.
 - c. Quality Standard: Watts LFU5B:
 - 1) Equal by Cash Acme, Cla-Val Hi Capacity, Conbraco 36C, Honeywell-Braukmann, Spence Hi Capacity, Watts, or Wilkins.
- 7. Double Check Valve Back Flow Preventer Valve:
 - a. Designed to provide separation of building water system water from domestic cold water supply in accordance with Code.
 - b. Rated flow at 30 psi, pressure drop rated for 175 psi inlet pressure, and 140 deg F maximum operating temperature.
 - c. Brass body construction.
 - 1) Approved Manufacturers:
 - a) Hersey Beeco
 - b) ConBraco
 - c) Febco
 - d) Watts
 - e) Wilkins

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install hot and cold water lines and systems as indicated on the drawings.
- B. Pipe cold and hot water lines to all fixtures indicated on the drawings. Make all required connections to all plumbing equipment and fixtures for a complete and functional plumbing system.
- C. Locate cold water lines a minimum of 6 inches from hot water lines.

3.2 FIELD QUALITY CONTROL

- A. Field Tests:
 - 1. Before pipes are covered, test systems in presence of Architect/Engineer at 125 psig hydrostatic pressure for four (4) hours and show no leaks.
 - 2. Disconnect equipment not suitable for 125 psig pressure from piping system during test period..

3.3 CLEANING

- A. Sterilize potable water system with solution containing 200 parts per million minimum of available chlorine and maintaining pH of 7.5 minimum. Introduce chlorinating materials into system in manner approved by Architect/Engineer. Allow sterilization solution to remain for twenty four (24) hours and open and close valves and faucets several times during that time.
- B. After sterilization, flush solution from system with clean water until residual chlorine content is less than 0.2 parts per million. Water system will not be accepted until negative bacteriological test is made on water taken from system. Repeat dosing as necessary until such negative test is accomplished.

END OF SECTION 22 1116

SECTION 22 1119 - DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install miscellaneous potable water piping specialties as described in Contract Documents.

PART 2 - PRODUCTS

2.1 ACCESSORIES

A. Materials:

1. Pressure Reducing Station:
 - a. Design Criteria:
 - 1) Meet NSF International Standards for Lead Free.
 - b. Pressure Gauges:
 - 1) Gauges shall have following features:
 - a) Cast aluminum case.
 - b) Chrome plated ring.
 - c) Impact resistant window.
 - d) Phosphor bronze alloy steel bourdon tube.
 - e) 1/2 percent scale range accuracy.
 - f) 4-1/2 inch diameter dial face.
 - g) Range 0 to 100 psig.
 - 2) Quality Standard: 500X by H O Terrice.
 - a) Equal by Ashcroft or Weiss.
 - c. Brass Gauge Cocks:
 - 1) Approved Products:
 - a) 1092 by Ashcroft.
 - b) 865 by H O Terrice.
2. Exterior Hydrants:
 - a. Design Criteria:
 - 1) Provide with integral anti-siphon device. Key-operated.
 - 2) Non-freeze.

- b. Approved Products:
 - 1) Jay R. Smith: 5509-QT.
 - 2) Woodford: B65
 - 3) Additional Approved Manufacturers Include: Zurn, Josam, Wade, Watts:
- 3. Water Hammer Arrestors:
 - a. Design Criteria:
 - 1) Meet NSF International Standards for Lead Free.
 - 2) Nesting type, air pre-charged bellows with casing.
 - 3) Bellows constructed of stabilized 18-8 stainless steel.
 - b. Approved Products:
 - 1) Josam: 75003.
 - 2) Jay R. Smith: 5020.
 - 3) Sioux Chief: 660 Series.
 - 4) Wade: 20.
- 4. Double-Check Backflow-Prevention Assemblies
 - a. Standard: ASSE 1015.
 - b. Operation: Continuous-pressure applications, unless otherwise indicated.
 - c. Body: Bronze for NPS 2 and smaller; with AWWA C550
 - d. End Connections: Threaded for NPS 2 and smaller.
 - e. Configuration: Designed for horizontal, straight through flow.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- 1) Ames Co.
 - 2) Conbraco Industries, Inc.
 - 3) Watts Industries, Inc.; Water Products Div.
 - 4) Zurn Plumbing Products Group; Wilkins Div.
- 5. Water Hammer Arrestors:
 - a. Design Criteria:
 - 1) Meet NSF International Standards for Lead Free.
 - 2) Nesting type, air pre-charged bellows with casing.
 - 3) Bellows constructed of stabilized 18-8 stainless steel.
 - b. Approved Products:
 - 1) Josam: 75003.
 - 2) Jay R. Smith: 5020.
 - 3) Sioux Chief: 650 Series.
 - 4) Wade: 20.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install Pressure Reducing Stations complete with isolation valves, gauges, thermometers, pressure reducing valve and double check valve assembly in accordance with codes and ordinances. Provide building drain valve and threaded hose connection with cap.

- B. Provide double check valve assembly upstream of Pressure reducing station.
- C. Gauges: Connect to pipe with 1/4 inch connections utilizing gauge cocks.
- D. Install Wall Hydrants where indicated and in accordance with manufacturers written instructions.
- E. Install Water Hammer Arrestors at each group of fast acting solenoid valves or flush valves.

END OF SECTION 22 1119

SECTION 22 1313 - FACILITY SANITARY SEWERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. **Special Education Building:** Existing sanitary sewer and vent to remain intact and be re-used. Where new plumbing fixtures are indicated, Contractor shall connect new sanitary sewer and vent piping from new plumbing fixture to existing sanitary sewer and existing vent system. Provide new vent piping and vent through roof for all new plumbing fixtures where existing vent piping is not available.
 - 2. **Annex Building:** Existing sanitary sewer and vent to remain intact and be re-used. No work required unless otherwise noted.
 - 3. Furnish and install soil, waste, and vent piping systems within building and connect to existing soil, waste and vent piping where indicated or where applicable.

1.2 REFERENCES

- A. Reference Standards:
 - 1. ASTM International:
 - a. ASTM D2321-11, 'Standard Practice for Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications'.
 - 2. International Code Council:
 - a. ICC IPC-2018, 'International Plumbing Code'.

PART 2 - PRODUCTS

2.1 SYSTEMS

- A. Performance:
 - 1. Design Criteria:
 - a. Minimum size of waste or drain piping installed under floor in basement and crawl spaces shall be 2 inches.
- B. Materials - Facility Sanitary Sewers, Waste and Vent:
 - 1. Piping And Fittings: PVC Schedule 40 solid wall ASTM D 2665 plastic pipe and socket type fittings made to ASTM D 3311, drain, waste and vent patterns. Joined using cement primer meeting requirements of ASTM F656 and pipe cement meeting requirements of ASTM D2564.
 - 2. Piping And Fittings: ABS Schedule 40 solid wall ASTM D2661 plastic pipe and socket type fittings, made to ASTM D 3311 drain, waste and vent patterns. Joined using pipe cement meeting requirements of ASTM 2235.

3. Above Grade Piping and Fittings: Service weight, no-hub type cast iron soil pipe and fittings meeting requirements of ASTM A74 with neoprene gaskets and 304 stainless steel cinch bands.

C. Miscellaneous Fittings and Devices

1. Cleanouts:
 - a. Furnish wall and floor cleanouts with chrome wall cover and screw.
 - b. Furnish floor cleanouts with threaded bronze cover.
 - c. Furnish in line cleanouts in crawl spaces or basement areas as needed.
 - d. Acceptable Products: Josam, J.R. Smith, Mifab, Wade, Watts and Zurn

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verification:

1. Verify location of existing waste and vent systems shown on drawings. Piping systems indicated on the drawings are taken from existing drawings and may or may not show exact routing and location of existing waste and vent systems. Contractor shall visit project site prior to bidding to familiarize themselves with existing conditions, locations and conditions related to the existing waste and vent piping systems.

B. Core Drilling:

1. General: Core drill existing foundation walls and floors as needed to facilitate installation of new waste and vent systems. Do not cut structural members unless otherwise noted or permitted. In crawl spaces route new waste and vent piping accordingly to make use of existing foundation wall openings.
2. Exterior Foundation Walls: Where existing exterior foundation walls are core drilled, contractor shall infill around pipe with non-shrinking grout. Provide water proof protection of foundation wall penetrations.

C. Thermoplastic Pipe and Fittings:

1. General: Piping and joints shall be clean and installed according to Manufacturer's recommendations. Break down contaminated joints, clean seats and gaskets and reinstall.

D. Cast Iron Pipe and Fittings:

1. Above Grade: Locate pipe hangers every 4 feet on center maximum and at elbows.
2. Below Grade in Basement and Crawl Spaces.
3. Install in accordance with Manufacturer's recommendations and ASTM D2321.
4. Below Grade: Locate pipe hangers every 8 feet on center maximum and at elbows.

E. Install piping so cleanouts may be installed as follows:

1. Where indicated on the drawings or at every 135 degrees of accumulative change in direction for horizontal lines.
2. Every 50 feet of horizontal run.
3. Extend piping to accessible surface. Do not install piping so cleanouts must be installed in carpeted floors. In such locations, configure piping so wall type cleanouts may be used.

- F. Each fixture and appliance discharging water into sanitary sewer or building sewer lines shall have seal trap in connection with complete venting system, so gasses pass freely to atmosphere with no pressure or siphon condition on water seal.

- G. Vent entire waste system to atmosphere. Join lines together in fewest practicable numbers before projecting above roof. Set back vent lines so they will not pierce roof near edge or valley. Vent line terminations shall be:
 - 1. 24 inches minimum above roof and 12 inches minimum from any vertical surface.
 - 2. Same size as vent pipe.
- H. If test Tees are used for testing, plug Tees so wall finish can be installed. Do not leave as exposed cleanouts.

3.2 FIELD QUALITY CONTROL

- A. Field Tests:
 - 1. Conduct tests for leaks and defective work. Notify Architect before testing.
 - 2. Thermoplastic and Cast Iron Pipe System:
 - a. Fill waste and vent system with water to roof level or 10 feet minimum and show no leaks for two hours. Correct leaks and defective work.

END OF SECTION 22 1313

SECTION 22 1319 - FACILITY SANITARY SEWER SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Requirements:
 - 1. Section 22 0501: 'Common Plumbing Requirements'.
 - 2. Section 22 1313: 'Facility Sanitary Sewers' for installation of miscellaneous sanitary sewer specialties.

PART 2 - PRODUCTS

2.1 SYSTEMS

- A. Components:
 - 1. Drains And Drain Accessories:
 - a. Floor Drain FD-1:
 - 1) Approved types with deep seal trap and chrome plated strainer.
 - 2) Approved Products:
 - a) J. R. Smith: 2005-B
 - b) Additional Approved Manufacturers Include: Josam, Sioux Chief, Wade, Watts, Zurn
- B. Accessories:
 - 1. Drain Accessories:
 - 2. Trap Guard Trap Seal:
 - a. Approved Products:
 - 1) Trap Guard by Proset:
 - a) Install per Manufacturer's recommendations.
 - b) Provide model number to match floor drain.
 - 2) Sure Seal by Sure Seal:
 - a) Install per Manufacturer's recommendation.

PART 3 - EXECUTION:

3.1 INSTALLATION

- A. Install floor drains where indicated and in accordance with architectural drawings. Slope floor to floor drain.

- B. Install floor drain accessories including strainer tight and flush with finished floor elevation.
- C. Install trap guards in each floor drain outlet. Verify operation.
- D. Install floor, wall and cleanout to grade accessories where indicated on the drawings and at each change of 90 degrees or greater in piping direction.
- E. Install cleanout covers flush with wall, floor or grade.

END OF SECTION 22 1319

SECTION 22 3423 – DOMESTIC GAS WATER HEATERS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install gas, tank type, high efficiency water heater as described in Contract Documents.

B. Related Requirements:

1. Section 22 0501: 'Common Plumbing Requirements'.
2. Section 22 1116: 'Domestic Water Piping'.

1.2 SUBMITTALS

A. Closeout Submittals:

1. Include following in Operations and Maintenance Manual specified in Section 01 7800:
 - a. Operations and Maintenance Data:
 - 1) Maintenance and operational instructions.
 - b. Warranty Documentation:
 - 1) Final, executed copy of Warranty.
 - c. Record Documentation:
 - 1) Manufacturers documentation:
 - a) Manufacturer's literature or cut sheet.

1.3 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:

1. Meet NSF International Standards for materials or products that come into contact with drinking water, drinking water treatment chemicals, or both for chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems.

1.4 WARRANTY

A. Manufacturer Warranty:

1. Gas Water Heater:
 - a. 6 year factory warranty on tank and 6 years on other parts.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

- A. Gas Water Heater
- B. Glass lined storage tank, high efficiency type, pressure tested and rated for 150 psi w.p complete with thermostat, high limit control, gas valve, gas pressure regulator, 100 percent safety shut-off, and combustion air and flue connections. AGA approved.
 - 1. Include P&T Valve
 - 2. Include PVC Schedule 40 vent and combustion air piping and fittings. Provide concentric flue roof kit.
 - 3. All domestic water wetted components must be Lead Free and certified to NSF Lead Free standards.
 - 4. Approved Products: Provide type and capacity noted on the drawings.
 - a) State GHX-50-130-N by State Industries (50 gallons).
 - 5. Additional Approved Manufacturers Include: Rheem, A.O. Smith, State or as approved by engineer prior to bidding.
- C. Recirculation Pump and Circulation Pump Control:
 - 1. Hot water demand control type.
 - 2. Acceptable Products:
 - a. Taco 006-IFC
- D. Thermal Expansion Absorbers:
 - 1. Bladder type for use with potable water systems.
 - 2. Acceptable Products:
 - a. Therm-X-Trol ST-12 by Amtrol Inc.
 - b. Equal as approved by Architect before bidding.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Water Heaters:
 - 1. Water heaters shall have pressure and temperature relief valve sized to match heat input and set to relieve at 120 psi.
 - 2. Install temperature-pressure relief valve on hot water heater and pipe discharge directly to floor drain.
 - 3. Install water heater on concrete sweep pad where indicated. Provide 2" high stainless steel drain pan with drain pipe connection. Elevate water heater 1/2" above bottom of drain pan using neoprene pads.

3.2 ADJUSTING

- 1. Adjust water heater thermostat to 120 deg F
- 2. Seismic Anchoring System:
 - a. Required for Seismic Design Category (SDC) C, D, E, or F or where authority having jurisdiction (AHJ) requires seismic protection use for water heater seismic anchoring systems.
 - b. Anchor water heaters to wall using two anchoring straps and specified screws.
 - c. Anchors shall be installed with one on vertical upper 1/3 and one on lower 1/3 of water heater.

END OF SECTION 22 3423

SECTION 22 4200 - COMMERCIAL PLUMBING FIXTURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install commercial plumbing fixtures as described in Contract Documents.

1.2 REFERENCES

- A. Reference Standard:
 - 1. American National Standards Institute / International Code Council:
 - a. ANSI/ICC A117.1-2009, 'Standard for Accessible and Usable Buildings and Facilities'.
 - 2. NSF International Standard / American National Standards Institute:
 - a. NSF/ANSI 61-2012, 'Drinking Water System Components - Health Effects'.
 - b. NSF/ANSI 372-2011, 'Drinking Water System Components - Lead Content'.
 - 3. International Code Council:
 - a. ICC IPC-2018, 'International Plumbing Code'.

1.3 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Handicap Accessible Products to meet ANSI/ICC A117 Accessible requirements.
 - 2. Meet NSF International Standards for materials or products that come into contact with drinking water, drinking water treatment chemicals, or both for chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems.
- B. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.
- C. Comply with the following applicable standards and other requirements specified for plumbing fixtures:
 - 1. Enameled, Cast-Iron Fixtures: ASME A112.19.1M.
 - 2. Porcelain-Enameled, Formed-Steel Fixtures: ASME A112.19.4M.
 - 3. Stainless-Steel Sinks: ASME A112.19.3.
 - 4. Vitreous-China Fixtures: ASME A112.19.2M.
 - 5. Backflow Protection Devices for Faucets
 - 6. Faucets: ASME A112.18.1.
 - 7. Hose-Connection Vacuum Breakers: ASSE 1011.
 - 8. Integral, Atmospheric Vacuum Breakers: ASSE 1001.
 - 9. NSF Potable-Water Materials: NSF 61.
 - 10. Supply Fittings: ASME A112.18.1.
 - 11. Brass Waste Fittings: ASME A112.18.2.

12. Thermostatic Mixing Valves: ASSE 1070
13. Atmospheric Vacuum Breakers: ASSE 1001.
14. Brass and Copper Supplies: ASME A112.18.1.
15. Flushometers: ASSE 1037 and UL 1951.
16. Flexible Water Connectors: ASME A112.18.6.
17. Plastic Toilet Seats: ANSI Z124.5.

1.4 SUBMITTALS

- A. Action Submittals:
- B. Product Data: For each type of product indicated.
- C. Manufacturer's Literature:
 1. Plumbing Fixtures
 2. Plumbing Fixture Accessories
- D. Informational Submittals:
 1. Test And Evaluation Reports
 2. Documentation indicating flow and water consumption requirements.
- E. Shop Drawings: Diagram power, signal, and control wiring.
- F. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Approved Manufacturers:
 1. Water Closets: Kohler, Crane, Zurn, Toto, American Standard
 2. Urinals: Kohler, Crane, Zurn, Toto, American Standard
 3. Lavatories: Kohler, Crane, Zurn, Toto, American Standard
 4. Sinks: Elkay, Just , Dayton, American Standard
 5. Handwash Sinks: Elkay, Just , Dayton, American Standard
 6. Drinking Fountains: Elkay, Just, Oasis, Haws
 7. Floor Drains: JR Smith, Zurn, Josam, Wade, Sioux Chief
 8. Hose Bibbs and Hydrants: Woodford, JR Smith, Watts, Josam
 9. Mixing Valves: Symmons, Watts, Leonard
 10. Sink Faucets: Elkay, Moen, Chicago, Delta, Grohe
 11. Lavatory Faucets: Delta, Moen, Chicago
 12. Flush Valves: Sloan, Zurn, American Standard, Toto
 13. Washer Boxes and Ice Maker Boxes; Guy Gray, Oatey
 14. Misc: American Standard, Kohler, Bemis, Church, Mcguire, T&S Brass

2.2 ASSEMBLIES

- A. Performance:
 1. Design Criteria:

- a. Interior exposed pipe, valves, and fixture trim, including trim behind custom casework doors, shall be chrome plated.
- b. Minimum size of waste piping installed under floor slab on grade shall be 2 inches.

B. Plumbing Fixtures:

WC/1	Water Closet:	Kohler Highcliff K-96057. Handicap Accessible Fixture. Vitreous white china, floor mounted, elongated bowl, 1-1/2" top spud, K-4731-CA-0 open front seat with stainless steel check hinges, Sloan G2 Optima Plus 8111(TP), sensor operated, 1.6 GPF battery powered flush valve. Furnish with water closet flange and bolts, wax sealing ring and bolt caps.
WC/2	Water Closet:	Kohler Welcomme K-96053. Vitreous white china, floor mounted, elongated bowl, 1-1/2" top spud, K-4731-CA-0 open front seat with stainless steel check hinges, Sloan G2 Optima Plus 8111(TP), sensor operated, 1.6 GPF battery powered flush valve. Furnish with water closet flange and bolts, wax sealing ring and bolt caps.
L/1	Lavatory:	Kohler Kingston K-2005. Handicap Accessible Fixture. 21.25" L x 18.25" W x 6.1" H, Vitreous china, wall mounted, single hole punched for Delta 583LF-SSWF faucet, with single lever handle, stainless steel finish, 0.5 GPM with chrome plated grid strainer, tailpiece and flexible supplies w/ quarter turn chrome plated stops; cast brass chrome plated P- trap with cleanout. Furnish with wall carrier and ADA insulated piping covers equal to IPS Lavguard 2.
L/2	Lavatory:	Kohler Brookline K-2202-1. Drop in type, counter mounted. 19" D" x 6.1" H, Vitreous china with overflow, 4 inch center set faucet Delta 505LF-SSWF faucet, with single lever handle, chrome finish, 0.5 GPM with chrome plated grid strainer, tailpiece and flexible supplies w/ quarter turn chrome plated stops; cast brass chrome plated P- trap with cleanout.
U/1	Urinal:	Kohler Stanwell K-25048-ET. Handicap Accessible Fixture. Vitreous white china, wall mounted, extended lip, 3/4" top spud, Sloan G2 Optima Plus 8186(TP), sensor operated, 1.0 GPF battery powered flush valve. Furnish with floor mounted wall carrier. Refer to architectural interior elevation drawings for mounting height.
U/2	Urinal:	Same as U/1. Non-ADA. Refer to architectural interior elevation drawings for mounting height.
FD/1	Floor Drain:	J. R. Smith 2005B. Cast iron body with square nickel bronze top, deep seal P-trap with Proset Trap Guard.
DF/1	Drink Fount:	Elkay LZS8WSIK. Handicap Accessible Fixture. Wall mounted, stainless steel, single level basin with bottle filler, air cooled, refrigerated type, to cool 8 gal/hr. from 80° F. to 50° F. with 90° F. EAT. 1/5 HP hermetic compressor, 120/1/60 power requirement. chrome plated bubblers with flex guard, push bar activation front and sides, LED filter status, NSF 42 filter. Cabinet shall be bonderized steel with stainless steel finish. Cut electrical cord at time of installation to suit electrical outlet provided.
HS/1	Handwash Sink:	Kohler Kingston K-2005. Handicap Accessible Fixture. 21.25" L x 18.25" W x 6.1" H, Vitreous china, wall mounted, single hole punched for Delta 583LF-SSWF faucet, with single lever handle, stainless steel finish, 0.5 GPM with chrome plated grid strainer, tailpiece and flexible supplies w/ quarter turn chrome plated stops; cast brass chrome plated P- trap with cleanout. Furnish with wall carrier and ADA insulated piping covers equal to IPS Lavguard 2.

S/1	Wash Tub Sink:	Elkay DLSR272210, Stainless Steel, single bowl, drop-in sink, 10 inches deep, 18 gauge 304 stainless steel, brushed satin finish, 27"x 22" x 10", single hole punch for faucet, center drain with crumb cup and tailpiece. Provide P-trap and 1/4 turn wheel handle angle stops. Faucet shall be Grohe Zedra 32226. Single lever deck mount faucet, ceramic cartridge, brushed chrome finish goose neck with pulldown dual spray, 1.75 GPM, stainless steel flex supplies.
S/2	Breakroom Sink:	Elkay ELUH197DBG, Stainless Steel, single bowl, drop-in sink, 7.5 inches deep, 18 gauge 304 stainless steel, brushed satin finish, 21"x 18" x 7.5", center drain with crumb cup and tailpiece. Provide P-trap and 1/4 turn wheel handle angle stops. Faucet shall be Grohe Zedra 32226. Single lever deck mount faucet, ceramic cartridge, brushed chrome finish goose neck with pulldown dual spray, 1.75 GPM, stainless steel flex supplies.
HB/1	Hose Bibb:	Woodford Model B65. Flush, non-freeze, wall mount hose bibb with intergal vacuum breaker, chrome box, hinged door, loose key handle, AMD type C inlet.
MV/1	Mixing Valve;	Watts LFMMV. ASSE 1070 Compliant, thermostatic mixing valve, under lavatory mount, 150 psi rated, stainless steel disk, lead free construction, 3/8" cw and hw inlets, 1/2" tempered outlet.
IMB/1	Ice Maker Box:	Oatey 39152, Polystyrene construction, ASME A112 Valve, NSF, with Water Hammer Arrestor, recessed type, flanged frame.
WB/1	Washer Box:	Oatey 38993. Commercial grade 20 gauge steel, white painted, metal washer box with 2 inch outlet, 1/4 turn hot and cold water brass ball valves, copper sweat connections, ,

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install each fixture in accordance with manufacturers written instructions and IPC requirements.
- B. Install fixtures with individual drain and vent lines where required. Connect drain and vent lines to existing drain and vent located in crawl spaces or above ceiling.
- C. Ensure provisions are made for proper support of fixtures and that rough-in piping is accurately set and protected from movement and damage.
- D. Seal wall-mounted fixtures around edges to wall with sealant specified.
- E. Attach wall-hung fixtures to wall carriers. Support fixture hanger or arm free of finished wall.
- F. Install fixture accessories and appurtenances furnished with or provided by others.
- G. Adjust flush valves and faucets for proper flow.
- H. Provide each individual fixture supply with chrome-plated quarter turn stop valve with hand wheel.
- I. Install fixtures with accessible stop or control valve in each branch supply line.
- J. Make fixture floor connections with approved brand of cast iron floor flange, soldered or caulked securely to waste pipe. Make joints between fixtures and floor flanges tight with approved fixture setting compound or gaskets. Caulk between fixtures and floor with sealant.

- K. Install flush valves level and plumb.

3.2 CLEANING

- A. Polish chrome finish at completion of Project.

END OF SECTION 22 4200

DIVISION 23 - HEATING, VENTILATING, AND AIR-CONDITIONING:

23 0501	General Mechanical Requirements
23 0529	Mechanical Hangers and Supports
23 0553	Mechanical Identification
23 0713	Duct Insulation
23 0719	HVAC Refrigeration Piping Insulation
23 0933	Electric and Electronic Control System for HVAC
23 0981	Testing and Balancing
23 1123	Facility Natural Gas Piping
23 2600	Condensate Drain Piping
23 3001	General Duct Requirements
23 3114	Low-Pressure Metal Ducts
23 3300	Air Duct Accessories
23 3346	Flexible Duct
23 3401	Exhaust Fans
23 3713	Diffusers, Registers, and Grilles
23 7413	Packaged, Roof Top Units
23 8126	Heat Pumps

SECTION 23 0501 - GENERAL MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To

1. General requirements and procedures for mechanical systems.
2. Responsibility for proper operation of electrically powered equipment furnished under this division.
3. The mechanical contractor shall be responsible for installation and wiring of controls furnished with mechanical equipment that requires field installation of control wiring for both low and line voltage.
4. Interface with testing and balancing agency.
5. Furnish and install sealants relating to installation of systems installed under this division.
6. Furnish and install firestop penetration systems for mechanical system penetrations.

B. Scope

1. It shall be the work of this section to furnish all labor and materials for all Division 23 work required on the entire project.
2. The general provision of the contract, including the conditions of the contract (general, supplementary and other conditions) and Division 1 apply to work specified in this section.
3. Section 23 0501 is part of and shall apply to all sections of Division 23.

C. Permits and Fees

1. Any fees required for permits, hook-up, inspections in connection with this work shall be paid by Division 23 contractor.

D. Request for Substitution

1. Subject to compliance with space requirement limitations, specifications, and drawings alternate approved manufacturers may bid their equipment with the stipulation that it does not constitute prior approval due to the inability to review complete equipment specifications prior to bid.
2. It is the responsibility of the supplier to verify that the requested substitution meets all the requirements of the specifications and space allocations.
3. Any changes required to the building, structure, or electrical trades to accommodate a deviation from plans or specifications, including engineering costs will be the responsibility of the supplier.
4. Requests for Substitute Equipment, Products or Materials shall be made (3) three days prior to bid date. Request for Substitute Equipment, Products or Materials shall include model of equipment and a list of exceptions to the specifications, if any, or shall include a statement that the equipment proposed meets the requirements of the contract drawings and specifications.
5. Requests for Substitute Equipment, Products or Materials made less than (3) three days prior to bid date will not be considered.
6. Ensure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of contract documents. If review for considerations is received by addendum or change order to use other than originally specified items, be responsible for specified capacities and for ensuring that items to be furnished will fit space available and connect to duct and pipe systems as shown on contract documents.
7. Reference in this specification to any product or material by name, make or catalog number does not give final approval of named equipment without showing compliance with contract drawings and specifications.

1.2 SUBMITTALS

A. Product Data

1. Manufacturer's catalog data for each manufactured item.
 - a. Provide section in submittal for each type of item of equipment. Include Manufacturer's catalog data of each manufactured item and enough information to show compliance with contract document requirements. Literature shall show capacities and size of equipment and be marked indicating each specific item with applicable data highlighted
 - b. Capacities shown for equipment in the specifications and on the drawings are the minimum acceptable and no equipment will be considered as an alternate that has capacities or performance less than that of design equipment.
 - c. Include name, address, and phone number of each supplier.

B. Shop Drawings and Product Data

1. Submit complete shop drawings and product data on all equipment and materials to be used in the installation of the mechanical system for this project. Written approval shall be obtained before ordering, purchasing, acquiring, or installing any such equipment or materials for the project.
 - a. State sizes, capacities, brand names, motor HP, accessories, materials, gauges, dimensions, and other pertinent information.
 - b. List on catalog covers page numbers of submitted items.
 - c. Highlight applicable data using yellow or pink felt tip hi-lighter.
2. If material or equipment is not as specified or submittal is not complete, it will be rejected by architect/engineer. Catalog data or shop drawings for equipment which are noted as being reviewed by architect or the engineer shall not supersede contract documents.
3. Review comments of architect or engineer shall not relieve contractors or subcontractors under this division from responsibility for deviations from contract documents unless architect's and engineer's attention has been called to such deviations in writing at time of submission, nor shall they relieve this division from responsibility for errors in items submitted.
4. A minimum period of two weeks, exclusive of transmittal time, will be required each time a shop drawing and/or brochure is submitted or resubmitted for review. This time period shall be considered by the contractor when scheduling submittal data.
5. Prior to submission of the shop drawings and project data, the contractor shall review and verify that they are in compliance with the contract documents. Verify all dimensional information to insure proper clearance for installation of equipment. Check all materials and equipment after arrival on the job site and verify compliance with the contract documents.
6. Engineers review of shop drawings or product data and brochures shall not relieve the contractor of responsibility for dimensions and/or errors that may be contained therein, or deviations from the contract document's requirements. It shall be clearly understood that the noting of some errors but overlooking others does not grant the contractor permission to proceed in error. Regardless of any information contained in the shop drawings and brochures, the requirements of the contract documents shall govern and are not waived, or superseded in any way by the review of the shop drawings and brochures.
7. Architect/engineer approval is for general conformity with contract documents. Approval by the architect/engineer does not alleviate the responsibility of the contractor to provide equipment and materials that meet the requirements of the specifications and drawings. Equipment shall fit the space allotted including manufacture's recommended access clearance and shall not exceed dimensions if specified on the equipment schedules.
8. Access clearance to equipment shown on the drawings or manufactures recommended clearance or as required by code is the minimum acceptable requirement and no equipment will be considered which reduces or restricts accessibility to equipment.
9. Factory wired equipment shall include shop drawings of all internal wiring to be furnished with the unit.

C. Closeout

1. The contractor shall furnish to the architect complete operating and maintenance instructions and supplier literature covering all units of equipment and systems herein specified, together with parts lists. Four copies complete shall be furnished and shall be suitably bound using three ring, hard back binder, tabbed and indexed. Cover shall be printed listing project name.
 - a. Include manufacturers' representatives' names and addresses.
 - b. Include testing and balance reports.
 - c. Include contractor, engineer, and architect names and addresses.
 - d. Furnish complete list of instruction, brochures, etc., for all items furnished under Division 23.
 - e. Include other items as required for a complete reference for the building mechanical operating system.
 - f. Include written description of mechanical systems, operation and startup procedures and maintenance requirements.
 - g. Include temperature control system diagrams and temperature set points of temperature controllers.
 - h. Include equipment submittal data.

1.3 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies

1. Comply with all current codes, rules, regulations, and ordinances of city, county, and the State of Utah, including the Occupational Safety and Health Act, NFPA 90A, current International Building Code, current International Mechanical Code, ADA accessibility guidelines, and current International Plumbing Code as they may apply. Provide materials and labor necessary to comply with rules, regulations, and ordinances.
2. In case of differences between building codes, state laws, local ordinances, utility company regulations, and contract documents, the most stringent shall govern. Promptly notify architect in writing of such differences.

B. Identification

1. Motor and equipment name plates as well as applicable UL and AGA labels shall be in place when project is turned over to owner.
2. Materials shall bear manufacturer's name and trade name. Equipment and materials of same general type shall be of same make throughout work to provide uniform appearance, operation, and maintenance.

C. Materials, Quality

1. All materials installed shall be new and undamaged.
2. All materials incorporated into the work shall be new.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Storage

1. All materials and equipment shall be stored under cover and protected from damage. Store materials in original containers until ready for use. Packages showing evidence of water or other damage shall be rejected.

1.5 WARRANTY

- A. Guarantee heating, cooling, and plumbing systems to be free from noise in operation that may develop from failure to construct system in accordance with contract documents.
- B. Provide certificates of warranty for each piece of equipment made out in favor of owner. On certificate clearly record 'start-up' date of each piece of equipment.

1.6 RECORD DRAWINGS

- A. During the course of construction, the contractor shall maintain a set of "Record" drawings upon which all deviations from the original layout are recorded. Upon completion of contract and before final payment, this shall be delivered to the mechanical consultant.

1.7 OWNER'S INSTRUCTIONS

- A. Instruct owners maintenance personnel and in operation and maintenance of mechanical systems utilizing operation and maintenance manual when so doing.
 - 1. Minimum Instruction periods shall not be less than 8 hours.
 - 2. Instruction periods shall occur after substantial completion inspection when systems are properly working and before final payment is made.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Site Inspection
 - 1. Examine premises to understand conditions which may affect performance of work of this division before submitting proposals for this work. Examine adjoining work on which mechanical work is dependent for deficiencies and report work which requires correction.
 - 2. No extra payment will be allowed for work required to meet the intent of the drawings and specifications that could be determined by visiting the site to observe conditions both prior to start of construction and during ongoing construction.
- B. Drawings
 - 1. The mechanical drawings do not attempt to show complete details of building construction. Contractor is referred to the architectural, structural, and electrical drawings.
 - 2. Drawings shall not be scaled for rough-in dimensions nor quantity take-offs. Refer to architectural drawings for dimensions.
 - 3. Drawings are diagrammatic and do not necessarily show exact details of pipe and duct locations. No extra payment will be allowed where piping or duct work offsets are required to avoid other work or where minor changes are required to facilitate installation. Make field measurements before shop fabrication of fittings. Do not fabricate duct work before field measuring and verification.
 - 4. Plumbing and mechanical drawings show general arrangement of piping, duct work, equipment, etc. Follow as closely as actual building construction and work of other trades will permit.
 - 5. Consider architectural and structural drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over plumbing and mechanical drawings.
 - 6. Because of small scale of drawings, it is not possible to indicate all offsets, fittings, and accessories which may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.
- C. Ensure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true

intent and meaning of contract documents. If approval is received by addendum or change order to use other than originally specified items, the contractor shall be responsible for specified capacities and for ensuring that items to be furnished will fit space available.

3.2 PREPARATION

- A. Check that slots and openings provided under other divisions through floors, walls, ceilings, and roofs are properly located. Perform cutting and patching caused by neglecting to coordinate with divisions providing slots and openings at no additional cost to owner.
- B. Changes Due To Equipment Selection
 - 1. Where equipment specified or otherwise approved requires different arrangement or connections from that shown in contract documents, submit drawings, if requested by architect, showing proposed installations.
 - 2. If proposed changes are approved, install equipment to operate properly and in harmony with intent of contract documents. Make incidental changes in piping, duct work, supports, installation, wiring, heaters, panelboards, and as otherwise necessary.
 - 3. Provide any additional motors, valves, controllers, fittings, and other additional equipment required for proper operation of the system resulting from selection of equipment, including all required changes in affected trades.
 - 4. Be responsible for the proper location of roughing-in and connections provided under other divisions that affect the mechanical system.

3.3 INSTALLATION

- A. Interface With Other Work
 - 1. Electrical: Furnish exact location of electrical connections and complete information on motor controls to installer of electrical system.
 - 2. It shall be the responsibility of Division 23 to carefully evaluate and coordinate the installation of devices, equipment, piping, ducts, registers, etc., required under this section and to be installed by others. Mechanical and electrical drawings, for example are diagrammatic and in some cases, the two crafts may tend to interfere with each other. Early conferences with other crafts and frequent conferences during construction will alleviate fixture pile-up and conflict. Coordinate mechanical equipment with mill work as shown on architectural drawings. In most cases sheet metal duct work locations are to take precedence over piping.
 - 3. Testing and Balancing
 - a. It will be the responsibility of the mechanical contractor to place the mechanical systems in operation which includes a complete and operational control system and make adjustments to the system in preparation for the test and balance contractor to complete the final test and balance of the system. Make adjustments to system as directed by the test and balance contractor.
 - b. Make changes in fan speeds, and dampers or add dampers as required for correct balance as recommended by the test and balance contractor and at no additional cost to owner.
- B. Cut carefully to minimize necessity for repairs to previously installed or existing work. Do not cut beams, columns, or trusses.
- C. Locating Equipment
 - 1. Arrange pipes, ducts, and equipment to permit ready access to valves, cocks, unions, traps, filters, starters, motors, control components, and to clear openings of doors and access panels.
 - 2. Adjust locations of pipes, ducts, switches, panels, equipment, and fixtures to accommodate work to interferences

anticipated and encountered. Install mechanical work to permit removal of equipment and parts of equipment requiring periodic replacement or maintenance without damage to or interference with other parts of equipment or structure.

3. Determine exact route and location of each pipe and duct prior to fabrication.

- a. Right-of-Way

- 1) Lines which pitch shall have right-of-way over those which do not pitch.
- 2) Lines whose elevations cannot be changed shall have right-of-way over lines whose elevations can be changed.

- b. Offsets, Transitions, and Changes in Direction

- 1) Make offsets, transitions, and changes in direction in pipes and ducts as required to maintain proper head room and pitch of sloping lines whether or not indicated on drawings.

- D. Penetration Firestops: Install penetration firestop system appropriate for penetration at mechanical system penetrations through walls, ceilings, roofs, and top plates of walls.

- E. Sealants

1. Seal openings through building exterior caused by penetrations of elements of mechanical systems.
2. Furnish and install fire caulk sealant around penetrations through fire rated walls, ceilings, and floors.

3.4 EXPOSED MECHANICAL SYSTEM FASTENERS

- A. Screws, bolts, and fasteners removed from mechanical equipment in the course of construction shall be replaced. Fasteners that are lost shall be replaced with fasteners to match the original.
- B. Screws used to secure mechanical items on finished room surfaces shall be round head screws painted to match the item being secured.
- C. Hex head sheet metal screws or grabber screws shall not be used in finished rooms.

3.5 CUTTING AND PATCHING

- A. Cutting and core drilling required for mechanical systems shall be work of Division 23. Any cutting and patching of finished surfaces will be accomplished by the proper trade. Cutting through concrete or masonry for pipe installation shall be by core drilling or saw cutting. Do not cut beams, joists, or other structural members. All cutting to be done under the direction of the architect.
- B. Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown. Surface finishes shall exactly match existing finishes of same materials.
- C. Expense of cutting, patching, repairing, and replacing of work is the responsibility of the division/section installing the work.

3.6 TESTS

- A. Test all piping systems prior to concealing or installation of insulation or covering in the presence of the engineer. Isolate the section of piping being tested from all equipment which might be damaged by the test pressures.

3.7 TOUCH UP PAINTING

- A. Touch up any damaged factory finish.

3.8 CLEANING

- A. Clean exposed piping, ductwork and equipment.
- B. Replace filters in equipment for moving air with new filters no more than one week before final inspection or test and balance.

3.9 PROTECTION

- A. Do not operate pieces of equipment used for moving supply air without proper air filters installed properly in system.

END OF SECTION 23 0501

SECTION 23 0529 - MECHANICAL HANGERS AND SUPPORTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Common hanger and support requirements and procedures for mechanical piping and HVAC systems including gas and refrigerant piping systems.
- B. Additional Products Installed and Furnished Under This Section:
 - 1. Paint identification for gas piping used in HVAC equipment.

1.2 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's catalog data for each manufactured item.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Anvil International, Portsmouth, NH www.anvilintl.com.
 - b. Cooper B-Line, Highland, IL www.b-line.com.
 - c. Unistrut, Wayne, MI www.tyco-unistrut.com.
- B. Materials:
 - 1. Hangers, Rods, And Inserts
 - a. Galvanized and UL approved for service intended.
 - b. Support horizontal piping from hangers except where trapeze type hangers are explicitly shown on Drawings. Hangers shall have double nuts.
 - 1) Support pipes 2 inches in diameter and smaller with adjustable swivel ring hanger.
 - a) Acceptable Products:
 - (1) Swivel Ring Hanger: Anvil Fig. 69.
 - (2) Equals by Cooper B-Line.
 - c. Support rods for single pipe shall be in accordance with following table:

Rod Diameter	Pipe Size
3/8 inch	2 inches and smaller
1/2 inch	2-1/2 to 3-1/2 inches

d. Riser Clamps For Vertical Piping:

1) Acceptable Products:

- a) Anvil Fig. 261.
- b) Equals by Cooper B-Line.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Piping:

1. Properly support HVAC gas and refrigerant piping and make adequate provisions for expansion, contraction, slope, and anchorage.
 - a. Suspend piping from roof or floor structure or clamp to vertical walls using Unistrut and clamps. Do not hang pipe from other pipe, equipment, or ductwork. Laying of piping on any building element is not allowed.
 - b. Supports For Horizontal Piping:
 - 1) Support metal piping at 96 inches on center maximum for pipe 1-1/4 inches or larger and 72 inches on center maximum for pipe 1-1/8 inch or less.
 - 2) Provide support at each elbow. Install additional support as required.
 - c. Supports for Vertical Piping:
 - 1) Securely support clamps by structural members, which in turn are supported directly from building structure.
 - 2) Provide clamps as necessary to brace pipe to wall.
 - d. Insulate hangers for copper pipe from piping by means of at least two layers of Scotch 33 plastic tape.
2. Gas piping Identification:
 - a. Apply paint identification for gas piping used with HVAC equipment as specified in Section 23 0553.

END OF SECTION 23 0529

SECTION 23 0553 - MECHANICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But not Installed Under This Section:

1. Identification of piping and equipment as described in Contract Documents including:
 - a. Paint identification for gas piping used in HVAC equipment.
 - b. Refer to specification section 22 0553 "Plumbing Identification" for additional requirements.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Description:

1. Abbreviations for Pipe Stencils and Equipment Identification and Band Colors for Pipe Identification:
 - a. Apply snap on labels and continuous painting as follows:

Pipe Type	Pipe Color	Symbol
Gas	Yellow Paint	GAS

B. Materials:

1. Approved Products and Manufacturers.
 - a. Products listed in edition of MPI Approved Product List current at time of bidding and later are approved, providing they meet VOC requirements in force where Project is located.
2. Description:
 - a. Ferrous Metal:
 - 1) New Surfaces: Use MPI(a) INT 5.1B Waterborne Light Industrial Finish system.
3. Performance Requirements:
 - a. New Surfaces: MPI Premium Grade finish requirements.
 - b. Maintain specified colors, shades, and contrasts.
4. Paint:
 - a. Primer:
 - 1) Ferrous Metal:
 - a) MPI 107, 'Primer, Rust-Inhibitive, Water Based'.

(1) Color: Yellow.

b. Finish Coat:

1) Ferrous Metal:

a) MPI 153, 'Light Industrial Coating, Exterior, Water Based, Semi-Gloss (MPI Gloss Level 5)'.

b) Color: Yellow

5. Labels:

a. Equipment Identification:

1) Black formica, with white reveal when engraved.

2) Lettering to be 3/16 inch high minimum.

PART 3 - EXECUTION

3.1 APPLICATION

A. Painting:

1. New Surfaces:

- a. Remove rust spots by sanding and immediately spot prime. If all traces of rust cannot be removed, apply rust blocker recommended by Paint Manufacturer before applying full primer coat.
- b. Paint all exposed gas piping above the roof with two coats of yellow paint. Upon curing of paint, stencil "GAS" in black lettering on the gas pipe at 10'-0" on center.

2. Leave equipment in like-new appearance.

3. Only pre-printed color bands and pipe identification are acceptable.

4. Locate identifying legends, directional arrows, and color bands at following points on exposed piping of each piping system:

- a. Adjacent to each item of equipment.
- b. At point of entry and exit where piping goes through wall.
- c. On each riser and junction.
- d. Every 25 feet on long continuous lines.

5. Equipment Labels:

a. Label the following equipment:

- 1) Roof Top Units
- 2) Exhaust Fans
- 3) Thermostats
- 4) Heat Pumps

END OF SECTION 23 0553

SECTION 23 0713 - DUCT INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install thermal wrap duct insulation as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 23 3114: 'Low-Pressure Metal Ducts'.
 - 2. Section 23 3300: 'Air Duct Accessories' for acoustic and thermal duct liner.
- C. Insulate all supply, return, exhaust and outside air ducts.
- D. Ducts that are complete with internal thermal and acoustic duct liner and that are located within the building insulation envelope do not need to be insulated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Approved manufacturers of duct insulation include: Johns-Manville, Certainteed, Owens-Corning and Manson Industries.

2.2 MATERIALS

- A. Thermal Wrap Duct Insulation:
 - 1. 1-1/2 inch or 3 inch thick fiberglass with factory-laminated, reinforced aluminum foil scrim kraft facing and density of 0.75 lb / per cu ft.
 - 2. Thermal Conductivity: 0.27 BTU in/HR SF deg F at 75 deg F maximum.
 - 3. Acceptable Products:
 - a. Type 75 standard duct insulation by Certainteed St Gobain.
 - b. Microlite FSK by Johns-Manville.
 - c. Duct Wrap FSK by Knauf Fiber Glass.
 - d. Alley Wrap FSK by Manson Insulation Inc.
 - e. FRK by Owens-Corning.
 - f. Equal as approved by Architect before bidding.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Thermal Wrap Duct Insulation:
 - 1. Install insulation as follows:

- a. Within Building Insulation Envelope below attic insulation:
 - 1) 1-1/2 inches thick on all round branch ducts and ducts not insulated with internal duct liner.
 - b. Lined ductwork above attic insulation:
 - 1) 1-1/2 inch thick on all lined rectangular and square duct.
 - c. Round or rectangular ductwork above attic insulation:
 - 1) 3 inches thick.
2. Wrap insulation tightly on ductwork with circumferential joints butted and longitudinal joints overlapped minimum 2 inches.
- a. Do not compress insulation except in areas of structural interference. Minimum thickness at corners shall be one inch thick.
 - b. Remove insulation from lap before stapling.
 - c. Staple seams at approximately 16 inches on center with outward clenching staples.
 - d. Seal seams with foil vapor barrier tape or vapor barrier mastic. Seal penetrations of facing to provide vapor tight system.
- B. Insulate outside of ceiling diffusers and diffuser drops same as ductwork.

END OF SECTION 23 0713

SECTION 23 0719 - HVAC REFRIGERATION PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install insulation on refrigerant piping and fittings as described in Contract Documents.

1.2 DELIVERY, STORAGE, AND HANDLING

A. Storage And Handling Requirements:

1. Keep materials and work dry and free from damage.
2. Replace wet or damaged materials at no additional cost to Owner.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Materials:

1. Refrigeration Piping System:

a. Thickness:

Pipe Size, Outside Diameter	Insulation Thickness
One inch and smaller	1/2 Inch
1-1/8 to 2 inch	3/4 Inch

- 1) One inch sheet for fittings as recommended by Manufacturer.
- 2) Approved Products:

- a) AP Armaflex 25/50 by Armacell.
- b) Nitrolite by Nitron Industries. White only for exterior.
- c) Nomaco K-Flex.

b. Joint Sealer:

- 1) Approved Products:

- a) Armacell 520 by Armacell.
- b) Namaco K-Flex R-373.

c. Insulation Tape:

- 1) Approved Products:

- a) Armaflex AP Insul Tape by Armacell.
- b) FT182 Tape by Nitron Industries.

- c) Elastomeric Foamtape by Nomac K-Flex.
- d. Exterior Finish:
 - 1) For application to non-white, exterior insulation.
 - 2) Approved Products:
 - a) WB Armaflex Finish by Armacell.
 - b) R-374 Protective Coating by Nomaco K-Flex.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before application of insulating materials, brush clean surfaces to be insulated and make free from rust, scale, grease, dirt, moisture, and any other deleterious materials.
- B. Use drop cloths over equipment and structure to prevent adhesives and other materials spotting the work.

3.2 INSTALLATION

- A. Refrigeration System Piping System:
 - 1. General:
 - a. Install insulation in snug contact with pipe.
 - 1) Insulate flexible pipe connectors.
 - 2) Insulate thermal expansion valves with insulating tape.
 - 3) Insulate fittings with sheet insulation and as recommended by Manufacturer.
 - b. Slip insulation on tubing before tubing sections and fittings are assembled keeping slitting of insulation to a minimum.
 - c. Do not install insulation on lines through clamp assembly of pipe support. Butt insulation up against sides of clamp assembly.
 - d. Stagger joints on layered insulation. Seal joints in insulation.
 - e. Install insulation exposed outside building so 'slit' joint seams are placed on bottom of pipe.
 - f. Paint exterior exposed, non-white insulation with two coats of specified exterior finish.
 - 2. System Requirements:
 - a. Install insulation on above ground refrigerant suction piping and fittings, including thermal bulb, from thermal expansion valve.

END OF SECTION 23 0719

SECTION 23 0933 - ELECTRIC AND ELECTRONIC CONTROL SYSTEM FOR HVAC

PART 1 - GENERAL

1.1 SUMMARY

A. **Special Education Building:** Includes but Not Limited To:

1. Furnish and install a Utah-Yamas (Control Systems International) automatic temperature control system as described in Contract Documents for roof top units control. Integrate all controls into the Ogden School District (OSD) wide control system. Install a new complete, fully programmable, customized Direct Digital Control (DDC) system for control of the systems. The entire building automation system shall be BACnet compatible and connect into the OSD LAN Network. The ATC contractor shall include all software and hardware to permit district wide network and complete intranet access to the DDC system. This includes graphic pages, monitoring, alarming, trending, programming, database modifications, setpoint changes, DDC programming. All aspects and elements of the DDC control system shall be available across the entire district network.
2. The system shall be as indicated on the drawings and specified herein. Building HVAC systems and unitary devices shall be entirely controlled by the DDC system. System shall include local DDC controllers mounted at each roof top unit fan system, exhaust fan system, and other devices. Local DDC controllers shall be interconnected by a 2-wire or 3-wire LAN (local area network) with a master/central DDC controller located in the IT/Storage room as directed by the owner. The master/central DDC controller, in turn, shall communicate with both the existing school district host computer located in the district offices and the existing man-machine interface device or computer located in the IT/Storage room. All digital output points shall have override capability. All screens shall be password protected. All of the above screens, data and features shall also be available for monitoring and modification from the Host computer located in the District offices via Networking wireless connections.
3. The DDC/Energy system will be capable of different access levels for the different control and engineering functions of the system. The Ogden School District maintenance staff will have access at the highest level to allow for DDC program, graphic pages, and other changes and additions.
4. Furnish and install conductors, raceway, conduit, and junction boxes, including pull wires, for temperature control system. Make connections to control devices, motors, and associated equipment. Furnish and install motorized dampers and zone thermostats as indicated or required.
5. The DDC/Energy Management system will have dynamic alarm display capability.
6. The system shall have graphic interface floor plan(s) which will show the location of rooms, room sensors, etc., and will give a "live" display of the current condition of that location. Room temperatures will be adjustable from this graphic. Outside air temperature and other temperature variables will also display on this graphic.
7. All system and unitary controls shall be of the direct digital type (DDC). Self tuning PID (Proportional, Integral, Derivative) control algorithms shall be applied where applicable on all applications. The control system shall be a networked, distributed intelligence system, with the control loops for each system being capable of stand-alone operation.
8. The ATC contractor shall work closely with the Mechanical Contractor to ensure that all mechanical equipment is provided with or furnished with applicable and compatible BACnet boards, processors and interface points to allow for complete control and monitoring of the mechanical systems. The ATC contractor shall furnish any and all BACnet controls, not furnished by the equipment manufacturers, for complete integration of all mechanical systems with the OSD DDC building control system.

B. **Annex Building:** Includes but Not Limited To:

1. Furnish and install a stand alone, LED, color graphic, 7- day programmable digital, averaging type thermostat control system as part of the furnace and condensing unit manufacturer's control system.
2. Furnish and install conductors and make connections to control devices, motors, and associated equipment.
3. Furnish and install motorized dampers and zone thermostats as indicated or required.
4. Assist in air test and balance procedure.

5. Furnishing and installing of raceway, conduit, and junction boxes, including pull wires, for temperature control system.
- C. Additional Requirements:
1. Section 23 0501: Common HVAC Requirements.
 2. The ATC contractor is required to supply and install a EMTconduit system for the DDC control system throughout the areas of work. Plenum rated cable is acceptable means of installation above ceilings.
 3. The ATC contractor shall furnish & install all necessary electrical control wiring and conduit of all temperature controls, heating, cooling and ventilating equipment motor starting circuit controls, all electrical control interlocks for packaged roof top equipment.
 4. All ATC rough-in boxes shall be identified with the letters "ATC" written across the inside of the box. In addition, each ATC cover plate shall be painted white with the letters "ATC" stenciled in black.
- D. WARRANTY:
1. Provide an unconditional TWO YEAR parts and service warranty. This warranty shall commence at the time of substantial completion of the various portions of the system

1.2 SUBMITTALS

- A. Action Submittals:
1. Product Data:
 - A. Installer to provide product literature or cut sheets for all products specified in Project.
 - B. Installer to provide control equipment locations to Mechanical Engineer prior to installation.
 - C. Control system wiring diagrams.
 - D. Master DDC Control Panel
 - E. Local DDC Control Panels
 - F. ATC Interface Panels
 - G. Local Area Network Wiring & Setup
 - H. Exhaust Fan Control
 - I. Building Fire Alarm Interlocks

PART 2 - PRODUCTS

2.1 SYSTEMS

- A. Performance:
1. Design Criteria:
 - a. Automatic Temperature Control System design concept utilizes communicating thermostats, sensors and relays located near roof top units, with electronic sensors and electric / electronic actuation of dampers.
 - b. Manufacturer: Constrol System Internation (CSI) as installed by Utah-Yamas Inc.
 - c. Plug-and-play configurable panels and controllers for HVACR equipment.
 - B. Advanced direct digital control (DDC) controllers bundled with single packaged unit actuators, sensors, and damper assemblies. System monitors the devices through the supervisory controller. Access to the system using either a laptop, smart phone, or tablet.
 - C. Easy-to-use intuitive user interface, supported devices, plug and play type with automatic point connections for alarm, trend, and graphical definitions.
 - D. Access to all identifiable devices connected to the BACnet® MS/TP trunk.
 - E. Ability to view alarms, events, and trends; modify schedules and commission devices. Browser-based remote building management–Remote management of building systems. Simple interlocks to IOM controllers using full connectivity.
 - F. Schedule synchronization–Combines common schedules with a schedule synchronization feature.
 - G. Provides access to all identifiable and supported devices connected to the field bus.

2.2 TEMPERATURE CONTROL

A. Thermostats:

1. **Design Criteria – Special Education Building:** Roof Top Units shall be controlled from wall-mounted space temperature thermostats integrated into the OSD district wide temperature control system. Space Thermostats shall have a manual adjustment interface that can be given a programmable setpoint adjustment range of +/- 2 deg. F. by room occupant. Setpoint range shall be adjustable by OSD through building control system. Thermostats shall be approved by OSD prior to ordering.
2. **Heat Pump Control:** Heat pumps serving Office Areas and Conference Rooms shall be controlled from wall-mounted space temperature thermostat integrated into the OSD district wide temperature control system. Space Thermostat shall have a manual adjustment interface that can be given a programmable setpoint adjustment range of +/- 2 deg. F. by room occupant. Setpoint range shall be adjustable by OSD through building control system. Thermostats shall be approved by OSD prior to ordering.
3. **Air Conditioning Unit Control:** Air Conditioning Units serving IT Rooms shall be controlled from wall-mounted, stand alone fan speed and thermostat controller. Controller shall be hard wired to the AC roof top and interior unit for complete cooling control of the space. Integrate system failure alarm into building control system to notify OSD should AC Unit fail to start or maintain setpoint temperature inside the IT room.
4. **Design Criteria – Annex Building:** Wall-mounted space temperature master and averaging thermostats shall control the furnace heating and condensing unit cooling systems. Master thermostats shall be equipped with on the face bush button override to provide for 3 hour override of furnace system during unoccupied hours. Thermostat shall have an adjustment interface that can be given a programmable setpoint adjustment range of +/- 2 deg. F. by room occupant. Setpoint range shall be adjustable by OSD through building control system. Thermostats shall be furnace manufacturers standard, digital color LED faced thermostat, programmable type for stand alone operation.
5. **Averaging Thermostats:** Thermostat Controllers Low voltage type provided with automatic change-over feature for both heating and cooling stages, integrated into Master Thermostat control to provide for temperature averaging in the spaces served by the Furnace system.

2.3 ADDITIONAL DEVICES

A. Miscellaneous:

1. Transformers:
 - a. 120 / 24 V, 50VA
 - b. 120 / 24 V, 75VA
2. Damper Actuators (Where Required):
 - a. Electric type equipped for Class I wiring.
 - b. Shall not consume power during UNOCCUPIED cycle or use chemicals or expandable media.
 - c. Have built in spring return.
 - d. Approved Product:
 - 1) Honeywell MS8105A1030/U.
 - 2) Honeywell MS8105A1130 w/ End switch.
3. Conductors:
 - a. Color-coded and No. 16 and No. 12 AWG Type TWN, TFN, or THHN, stranded.
 - b. Thermostat Cable: 12, 8, or 4 conductor, 18AWG solid copper wire, insulated with high-density polyethylene. Conductors parallel enclosed in brown PVC jacket (22 AWG cable not allowed).

4. Local DDC control panels shall be located near mechanical systems as necessary to provide both digital and analog input and output points as specified and/or required to achieve specified system performance.
5. Each local DDC control panel shall provide all control functions for the mechanical equipment specified to be controlled from that panel.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. **Special Education Building:** Install the CSI control systems in accordance with the manufacturer's written instructions and approved wiring diagrams for a complete and functional control system. Integrate thermostat controls with roof top units to provide for complete heating and cooling control of spaces served.
- B. **Annex Building:** Install compatible, stand alone, programmable thermostats where indicated. Mount thermostats 48" above finished floor. Integrate thermostat controls with furnaces, condensing units and zone dampers to provide for complete heating and cooling control of spaces served.
- C. Roof top units shall be equipped with a integrated roof top unit control with open protocol for interfacing with the CSI Control System. The controls contractor shall work and coordinate with the mechanical contractor to verify open protocol for all roof top unit systems.
- D. Install controllers and dampers where indicated. Install damper actuators, where not furnished with the roof top equipment, for all roof top units. Install duct pressure and temperature sensors
- E. Install all temperature control wiring located in walls and above inaccessible ceiling spaces in conduit. Temperature control wiring above accessible ceilings may be plenum rated control wiring; neatly bundled and supported.
- F. Install averaging type thermostats for the Annex Building. Complete all averaging control wiring and connections for a complete and functional averaging temperature control system.
- G. Locate master thermostats where indicated. Master thermostats shall have optional 3 hour override button on the face for activating the furnace heating and cooling system during unoccupied hours.
- H. Interface With Other Work:
 1. Program room thermostats during or before air test and balance. Insulate sensor J-box with fiberglass insulation; expandable/ foam insulation is NOT acceptable
 2. Instruct air test and balance personnel in proper use and setting of control system components.
 3. Install low voltage electrical wiring in accordance with Division 26 of these Specifications.
- I. Safety Controls:
 1. Interlock gas valves with cooling compressors and supply air fan.
 2. Gas valves shall obtain their electrical control power from same circuit as supply fan motor.
 3. Check high limit thermostats furnished with heating equipment for correct operation. Gas valves shall close when duct temperature exceeds high limit setting. Perform this work immediately after wiring burner controls.
 4. Wire roof top unit thermostatic switches to dissipate all heat in combustion chambers.
 5. Outside air dampers shall close on fan shut-down, power failure, open fan motor disconnect switch, and when thermostat is in UNOCCUPIED mode.
 6. Gas burner safety controls furnished with roof top units shall be incorporated in control circuits for all modes of operation.

3.2 SEQUENCE OF OPERATION – SPECIAL EDUCATION BUILDING

- A. **Roof Top Units:** Thermostats shall control unoccupied and occupied status of fan systems based on adjustable building schedule. Roof Top Unit fans shall run continuously in occupied mode and cycle in unoccupied mode. Coordinate programming of building schedule and temperature setpoints with owner. Thermostat shall be wired directly to the roof top unit and the Bacnet bus and shall control supply fan, economizer, two stage cooling, two stage heating sequences to maintain space set point temperature. Thermostat shall provide for automatic change over between heating and cooling.
- B. Thermostats in office areas provides optional opening and closing of motorized zone damper. During occupied mode the damper shall open. During unoccupied mode, damper shall close.
- C. Initial programmed setpoints for all roof top units and spaces served shall be set to 72 degrees for heating and 75 degrees for cooling.
- D. All roof top units shall be wired to the Bacnet bus allowing start/stop control of the roof top units from the OSD building control system. The Building Schedule shall be programmed by the ATC contractor in coordination with the OSD.
- E. Building Schedule shall be set for Occupancy from 6:00 a.m. to 5:00 p.m Mon-Fri.
- F. **Restroom Exhaust Fans:** A programmable building schedule acting through the local control panel operating the exhaust fan shall control the fan operation. The motorized back-draft damper furnished by the ATC contractor shall open and the fan shall start and run continuously based upon the following schedule: Occupancy from 6:00 a.m. to 5:00 p.m Mon-Fri. The motorized back-draft damper shall close whenever the exhaust fan is de-energized.
- G. **Exhaust Fans:** A wall mounted, manual, 5-10-15-30 minute, multi button timer control shall control operation of the exhaust fan. Leviton LTB30-1LZ or equal line voltage timer.
- H. **Heat Pumps:** Heat pumps serving Office Spaces and Conference Rooms shall be controlled similar to the Roof Top Units. Thermostats shall control unoccupied and occupied status of fan systems based on adjustable building schedule. Heat pumps and interior cassette fans shall run continuously in occupied mode and cycle in unoccupied mode. Coordinate programming of building schedule and temperature setpoints with owner. Thermostat shall be wired directly to the heat pump unit and the Bacnet bus and shall control heat pump, cooling, heating sequences to maintain space set point temperature. Thermostat shall provide for automatic change over between heating and cooling.
- I. **AC Units:** A programmable thermostat located in the IT room shall control the heating and cooling sequence for the AC unit. When zone temperature rises above programmable setpoint the AC unit operating in cooling mode shall start and shall continue to run until setpoint temperature is reached.

3.3 SEQUENCE OF OPERATION – ANNEX BUILDING

- A. **Furnaces:** Thermostats shall control unoccupied and occupied status of furnace fan systems based on programmed building schedule. Furnace fans shall run continuously in occupied mode and cycle in unoccupied mode. Coordinate programming of thermostat building schedule and temperature setpoints with owner. Thermostat shall be wired directly to the furnace and shall control supply fan, condensing unit, cooling, heating sequences to maintain space set point temperature. Thermostat shall provide for automatic change over between heating and cooling. Furnace systems shall be subject to 3 hour override control through the master thermostat.
- B. Averaging Thermostats shall sense and average temperature input to the master thermostat.
- C. **Exhaust Fans:** A wall mounted, manual, 5-10-15-30 minute, multi button timer control shall control operation of the exhaust fan. Leviton LTB30-1LZ or equal line voltage timer.

3.4 FIELD QUALITY CONTROL

- A. Field Tests:
 - 1. Calibrate, adjust, and set controls for proper operation, operate systems, and be prepared to prove operation of any part of control system. This work is to be completed before pre-substantial completion inspection.
 - 2. Test each individual heating, cooling, and damper control for proper operation using control system.

3.5 SYSTEM STARTUP

- A. Systems:
 - 1. Contractor is responsible configuring all thermostats and zone dampers with proper zone names, zone scheduling, proper holiday scheduling, all to be coordinated with owner. Set proper clock setting including day/month/year.

3.6 ADJUSTING

- A. Program minimum of seven (7) day's operation into thermostat memory function.

3.7 CLOSEOUT ACTIVITIES

- A. Instruction Of Owner:
 - 1. Include the following training:
 - a. Training shall be by personnel of installing company and utilize operator's manuals and as-built documentation.
 - b. Provide training in (1) one session:
 - 1) Session will occur between system completion and Substantial Completion.
 - c. Training shall include sequence of operation review, selection of displays, modification of schedules and setpoints, troubleshooting of sensors, etc, as follows:
 - 1) Control System Overview:
 - a) Show access to system through individual thermostats. Demonstrate scheduling.
 - 2) Thermostat Programming from Owners Interface or Thermostats Keypad: Instructions on developing setpoints and schedules and adjusting local zone temperatures.

END OF SECTION 23 0933

SECTION 23 0981 - TESTING AND BALANCING

PART 1 - GENERAL

1.1 SUBMITTALS

- A. The Test and balance Agency shall submit an agenda describing procedures for:
 - 1. An overview of system Test and balance procedures.
 - 2. System testing which will include what traverses will be made, instrumentation to be used, how correction factors for grille and diffuser will be obtained, how measurements will be verified at maximum and minimum, and how control components will be verified.
 - 3. Report forms with each systems components identified and numbered.

1.2 PERSONNEL

- A. All personnel used on the project will be employees of the Agency. All work will be performed under the direct supervision of the Test & Balance Engineer. Resumes including education and experience of each person on the project will be submitted.

1.3 CONTRACTORS

- A. Air systems test and balance shall be accomplished by a test and balance contractor approved by the Architect's Engineer.
- B. Approved contractors are: Flo-Rite, Certified Test and Balance, R&S Test and Balance, Bonneville Test and Balance, BTC Services, and Intermountain Test and Balance.

1.4 WARRANTY

- A. The test and balance agency shall submit a Project Performance Guaranty.

1.5 SCOPE OF WORK

- A. The work included in this Section consists of the furnishing of all labor, instruments, tools and services requires in connection with the Total System Balancing of the Heating, Ventilating and Air Conditioning (HVAC) systems as described in the mechanical specifications and/or shown on the mechanical plans.
- B. The Test and balance personnel shall check, adjust, and balance the components of the HVAC system which will result in the optimal performance of the equipment. This is intended to be accomplished after the system components are installed and operating as provided for in the contract documents. It is the responsibility of the Contractor to place the equipment into service.
- C. The Test and balance firm personnel on the job shall act a liaison between the Architect, the Engineer, and the General Contractor.
- D. After the system is balanced and the building has been occupied under working conditions in both summer and winter, the Contractor shall provide a minimum of four hours on site of system fine tuning to eliminate hot and cold spots in occupied zones. Provide written report stating adjustments made and work accomplished.
- E. The following components of the HVAC systems shall be tested, adjusted, and balanced:
 - 1. Packaged Roof Top Units.
 - 2. Air Distribution Systems
 - 3. Control Systems Verifications
 - 4. Exhaust Systems
 - 5. Heat Pump Systems
- F. The work includes coordinating with the automatic temperature controls contractor in the installation and operation of the

roof top units. Ensure complete and functional operation of the system in maintaining the setpoint temperature for the zoned spaces.

1.6 INSTRUMENTATION

- A. All instruments used will be currently calibrated and listed in the Test and Balance report showing instrument description, serial number, and date of calibration.
- B. The accuracy of instruments used will be as shown in the current AABC National Standards.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 RESPONSIBILITIES OF THE MECHANICAL CONTRACTOR

- A. The Mechanical Contractor shall be responsible for the complete and functional installation of all mechanical equipment, ductwork, controls, dampers, components, and appurtenances. Mechanical and control systems shall be complete in every detail prior to notifying the Test and Balance Contractor in the performance of their work.
- B. The Mechanical Contractor shall correct all abnormalities and malfunctions of mechanical equipment or components discovered by the Test and Balance personnel.
- C. The Mechanical Contractor shall make adjustment to drives and provide sheaves and belts for Mechanical Equipment as needed to meet the airflow capacities required.
- D. The Mechanical Contractor shall work closely with the Test and Balance Contractor to verify that airflow and design capacities indicated on the drawings are met. Verify that all motorized and manual dampers are complete and functional.

3.2 RESPONSIBILITIES OF THE TEST AND BALANCE AGENCY

- A. Liaison and Early Inspection - The following reviews (observations) and tests shall be preformed by the Test and balance Agency:
 - 1. During construction, review all approved HVAC submittals such as control diagrams, air handling devices, etc., that pertain to Test and balance work.
- B. Perform a pre-balance site review and submit a written report.
- C. During the balancing process, as abnormalities and malfunctions of equipment or components are discovered by the Test and balance personnel, the Architect, and Engineer shall be advised in writing so that the condition(s) can be corrected by the General Contractor. The written document need not be formal, but must be understandable and legible. The Test and balance Firm shall not instruct or direct the General Contractor in any of the work, but will make reports as are necessary to the Architect, and Engineer.

3.3 FINAL AIR BALANCE

- A. When systems are complete and ready for operation, the Test and balance Agency will perform a final air balance for all air systems and record the results. The volume of air for the supply return, exhaust, and outside air equipment and terminals will be tested and balanced. Air handling and fan volumes shall be adjusted by changing fan speed. Duct volume dampers and motorized zone dampers shall be adjusted to provide air volume to branch ducts where such dampers are shown. The general scope of balancing by the Test and balance Agency will include, but in not limited to, the following:

1. Filter: Check air filters and filter media and balance only systems with essentially clean filters and filter media.
2. Fan Speed: Measure and record RPM at each fan speed.
3. Voltage and Amperage Readings: Measure and record the final operating amperages and voltage for each motor.
4. Static Pressure Profile: Static pressure profiles shall be measured and recorded across each supply fan, cooling coil, filter and exhaust fan, and at the furthest air device or terminal unit from the air handler supplying that device. Static pressure profiles shall also be provided for systems which do not perform as designed.
5. Equipment Air Flow: Adjust and record exhaust, return, outside, and supply air CFM and temperatures, as applicable, at each fan and coil.
6. Zone Air Flow: Adjust each HVAC terminal unit, and air handling unit for design CFM
7. Outlet Air Flow: Adjust each exhaust inlet and supply diffuser, register and grille to within 5% of the air flow shown on the contract drawings. Include all terminal points of air supply and all points of exhaust.
8. Pitot Tube Traverses: For use in future troubleshooting by maintenance personnel, all exhaust ducts, main supply ducts, outside air, and return ducts shall have air velocity and volume measured and recorded by the Pitot tube traverse method shown in the AABC Standard. Locations of these traverse test stations shall be described on the sheet containing the data.

3.4 TESTING OF TEMPERATURE CONTROL SYSTEMS

- A. Verify that all control devices are properly connected and operated by the intended controller. Verify that the temperature control systems are programmed and functional. Verify that all motorized control dampers are controlling as noted in the Sequence of Operations.

3.5 NON-COMPLIANT SYSTEMS

- A. During the Testing and Balancing work, when mechanical systems including roof top units, temperature controls, motorized dampers, manual dampers and exhaust fans are discovered to be inoperable or non-compliant in any manner or function that would preclude the final Test and Balance procedure from being completed; the Test and Balance Contractor shall note such systems in an informal report and the cause or discrepancies regarding the operation of the system in question. The informal report shall be submitted to the General and Mechanical Contractor for action required to remedy the systems in question.
- B. Inoperable systems noted in the informal report shall be investigated by the Mechanical Contractor and repaired or replaced as needed. Whereupon the Test and Balance Contractor shall perform the final Test and Balance procedure again and submit a complete and final report to the architect for review.

3.6 REPORTS

- A. The Test and balance activities described shall culminate in a formal report neatly typed and arranged. Include with the data the date tested, personnel present, records of test instruments used, and a list of all measurements taken. The intent of the final report is to provide a reference of actual operating conditions for the Owner's operations personnel.
- B. All measurements and recorded readings (of air, electricity, etc.) that appear in the reports shall be certified by the Agencies Test and Balance Engineer. Submit reports in PDF format on forms approved by the Engineer. Include a summary of actual operating data and any abnormal operating conditions. The report will contain all required information as described within the specification, including the information formatted and shown in the AABC Standard.
- C. Do Not Submit Incomplete Reports. Test and Balance Reports that are submitted for review to the Architect which are incomplete in any manner or category will be rejected.

END OF SECTION 23 0981

SECTION 23 1123 - FACILITY NATURAL-GAS PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install gas piping and fittings within building and on building roof as described in Contract Documents.
2. Coordinate gas service and meter installation with Dominion Energy Co and pay all associated costs.
3. Paint exposed gas pipe on roof.

1.2 REFERENCES

A. Reference Standards:

1. ASTM International:
 - a. ASTM A53/A53M-12, 'Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless'.
 - b. ASTM A234/A234M-11a, 'Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service'.

1.3 QUALITY ASSURANCE

PART 2 - PRODUCTS

2.1 SYSTEM

A. Materials:

1. Above-Ground Pipe And Fittings:
 - a. Black carbon steel, butt welded, Schedule 40 pipe meeting requirements of A53/A53M.
 - b. Welded forged steel fittings meeting requirements of ASTM A234/A234M or standard weight malleable iron screwed.
2. Valves:
 - a. 125 psi bronze body ball valve, UL listed.
 - b. Approved Products.
 - 1) CIM 102.1 by Cimbrio Valve.
 - 2) Apollo Series 80-100 by ConBraCo.
 - 3) 'Red Cap' R602 by Jenkins NH Canada.
 - 4) Model T-204 by Jomar International.
 - 5) Model B-6000-UL by Watts Regulator.

3. Flexible Connector:
 - a. Type 304 stainless steel corrugated tube coated for corrosion protection.
 - b. Approved Products.
 - 1) Dormont Supr-Safe.
 - 2) BrassCraft Procoat.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Steel pipe installed through air plenums, in walls, and pipes 2-1/2 inches and larger shall have welded fittings and joints. Other steel pipe may have screwed or welded fittings.
- B. Make all required connections to gas fired roof top units, furnaces and appliances. Provide individual lb/oz gas regulators to regulate gas pressure to appliance.
- C. On lines serving gas-fired equipment, install gas cocks adjacent to equipment outside of equipment cabinet and easily accessible.
- D. Install 6 inch long minimum dirt leg, with pipe cap, on vertical gas drop serving each gas-fired equipment unit.
- E. Use fittings for changes of direction in pipe and for branch runouts.
- F. Install flexible connectors at each equipment connection.
- G. Paint all exposed gas piping on the roof with two coats of Yellow Enamel or Water Based paint. See Mechanical and Plumbing Identification Specification Sections.

3.2 FIELD QUALITY CONTROL

- A. Field tests:
 1. Subject all portions of gas piping system, in sections or in entirety, to air pressure of 75 psig and prove airtight for 4 hours.
 2. Disconnect equipment not suitable for 75 psig pressure from piping system during test period.

END OF SECTION 23 1123

SECTION 23 2600 - CONDENSATE DRAIN PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Installation of condensate drain piping as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 22 0501: 'Common Plumbing Requirements'.
 - 2. Section 23 0501: 'Common HVAC Requirements'.

1.2 REFERENCES

- A. Reference Standards:
 - 1. ASTM International:
 - a. ASTM D1785-12, 'Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120'.

PART 2 - PRODUCTS

2.1 SYSTEMS

- A. Materials:
 - 1. Condensate Drains:
 - a. Schedule 40 PVC for condensate drains from packaged roof top unit drain pans to roof.
 - b. Schedule 40 PVC for condensate drains from heat pump and air conditioning evaporator coils

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Condensate Drains:
 - 1. Support piping and protect from damage.
- B. Pipe condensate drain piping from each roof top unit to roof. Provide 3 inch deep cleanable p-trap at each point of connection.

- C. Pipe condensate drain piping from each indoor heat pump fan coil or cassette full size to floor drain or service sink.
Provide 3 inch deep cleanable p-trap at each point of connection.

END OF SECTION 23 2600

SECTION 23 3001 - GENERAL DUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To
 - 1. General procedures and requirements for ductwork.
 - 2. Repair leaks in ductwork at no additional cost to Owner.
- B. Related Sections
 - 1. Section 23 0501: General Mechanical Requirements
 - 2. Section 23 0981: Testing and Balancing

1.2 QUALITY ASSURANCE

- A. Requirements: Construction details not specifically called out in this Section shall conform to applicable requirements of SMACNA HVAC Duct Construction Standards.

PART 2 - PRODUCTS

2.1 FINISHES

- A. Finishes, where applicable, colors as selected by Architect.

2.2 HANGERS

- A. Duct Hangers
 - 1. One inch by 20 ga galvanized steel straps or steel rods as shown on Drawings and spaced not more than 96 inches apart. Do not use wire hangers.
 - 2. Nails not allowed. Attach to steel structure as shown on drawings.

2.3 FABRICATION

- A. Ducts
 - 1. Straight and smooth on inside with joints neatly finished.
 - a. Duct dimensions shown on the drawings are for free area inside duct liner insulation.
 - 2. Duct panels through 48 inch dimension having acoustic duct liner need not be crossbroken or beaded. Crossbreak unlined ducts, duct panels larger than 48 inch vertical and horizontal sheet metal barriers, duct offsets, and elbows, or bead 12 inches on center.
 - a. Apply cross-breaking to sheet metal between standing seams or reinforcing angles.
 - b. Center of cross-break shall be of required height to assure surfaces being rigid.
 - 3. Duct drops to diffusers shall be round, square, or rectangular as shown to accommodate diffuser neck. Drops shall be same gauge as branch duct.
 - a. Seal joints air tight.

4. Fabricate duct fitting to match adjoining ducts, and to comply with duct requirements as applicable to fittings. Except as otherwise indicated, fabricate elbows with center-line radius equal to associated duct width; and fabricate to include turning vanes in elbows where shorter radius is necessary. Limit angular tapers to 30° for contracting tapers and 20° for expanding tapers.
5. Seal duct work after installation, using specified sealer. Reseal any ducts showing leakage.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. During installation, protect open ends of ducts by covering with plastic sheet tied in place to prevent entrance of debris and dirt.
- B. Make necessary allowances and provisions in installation of sheet metal ducts for structural conditions of building. Revisions in layout and configuration may be allowed, with prior written approval of Architect. Maintain required airflows in suggesting revisions.
- C. Hangers And Supports
 1. Install pair of hangers close to each transverse joint and elsewhere as required by spacing indicated in table on Drawings.
 2. Install upper ends of hanger securely to floor or roof construction above by method shown on Drawings.
 3. Attach strap hangers to ducts with cadmium-plated screws. Use of pop rivets or other means will not be accepted.
- D. General: Assemble and install ductwork in accordance with recognized industry practices which will achieve air tight (1% leakage) and noiseless (no objectionable noise) systems, capable of performing each indicated service. Install each run with minimum of joints.
- E. Align duct work accurately at connections, within 1/8" misalignment tolerance and with internal surfaces smooth. Support ducts rigidly with suitable ties, braces, hangers and anchors of type which will hold ducts true-to-shape and to prevent buckling.
- F. Seal ductwork, after installation, in accordance with recommendations of SMACNA HVAC Duct Construction Standards Seal Class B.
- G. Complete fabrication of work at projects as necessary to match shop-fabricated work and accommodate installation requirements.
- H. Locate duct work runs, except as otherwise indicated, vertically plumb and horizontally level. Locate runs as indicated by diagrams, details and notations. Coordinate layout with suspended ceiling and lighting layouts and similar finished work.
- I. Where ducts pass through interior partitions, conceal space between construction opening and duct or duct-plus-insulation with sheet metal mitered flanges of same gage as duct. Overlap opening on four sides by at least 1-1/2".
- J. Coordinate duct installations with installation of accessories, dampers, equipment, controls and other associated work of duct work system.

3.2 CLEANING

- A. Clean ductwork internally, unit-by-unit as it is installed, of dust and debris. Clean external surfaces of foreign substances which might cause corrosive deterioration of metal or, where ductwork is to be painted, might interfere with painting, or cause paint deterioration.

- B. Temporary Closure: At ends of ducts which are not connected to equipment or air distribution devices at time of ductwork installation, provide temporary closure of polyethylene film or other covering which will prevent entrance of dust and debris until time connections are to be completed.

3.3 TESTING FOR LEAKAGE

- A. General: After each duct system is completed, test for duct leakage. Repair leaks and repeat test until total leakage is less than 1% of system design air flow. Requirements for pressure test may be waived at the discretion of the Engineer/Architect if there is no question as to the quality of workmanship of the ductwork.

END OF SECTION 23 3001

SECTION 23 3114 - LOW-PRESSURE METAL DUCTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install above-grade low-pressure steel ducts and related items as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 23 0981: Testing And Balancing
 - 2. Section 23 3001: 'General Duct Requirements'.
 - 3. Section 23 0933: 'Electric And Electronic Control System For HVAC':
 - a. Temperature control dampers and actuators.

1.2 REFERENCES

- A. Association Publications:
 - 1. Sheet Metal And Air Conditioning Contractors' National Association / American National Standards Institute:
 - 2. SMACNA, 'HVAC Duct Construction Standards - Metal and Flexible' (Third Edition).
- B. Reference Standards:
 - 1. ASTM International:
 - a. ASTM A653/A653M-13, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
 - b. ASTM E84-14, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
 - 2. Underwriters Laboratories, Inc.:
 - a. UL 723: 'Standard for Safety Test for Surface Burning Characteristics of Building Materials'; (2010 - Tenth Edition).

1.3 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Duct Sealer:
 - a. Meet Class A flame spread rating in accordance with ASTM E84 or UL 723.
 - b. Handle, store, and apply materials in compliance with applicable regulations and material safety data sheets (MSDS).

1.4 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:

1. Duct Sealer:
 - a. Handle, store, and apply materials in compliance with applicable regulations and material safety data sheets (MSDS).
 - b. Handle to prevent inclusion of foreign matter, damage by water, or breakage.
 - c. Store in a cool dry location, but never under 35 deg F or subjected to sustained temperatures exceeding 110 deg F or as per Manufacturer's written recommendations.
 - d. Do use sealants that have exceeded shelf life of product.

1.5 FIELD CONDITIONS

A. Ambient Conditions:

1. Duct Sealer:
 - a. Do not apply under 35 deg F or subjected to sustained temperatures exceeding 110 deg F or as per Manufacturer's written recommendations.
 - b. Do not apply when rain or freezing temperatures will occur within seventy two (72) hours.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Materials:

1. Sheet Metal:
 - a. Fabricate ducts, plenum chambers and casings of zinc-coated, lock-forming quality steel sheets meeting requirements A653/A653M, with G 60 coating.
2. Duct Sealer For Interior Ducts:
 - a. Approved Products:
 - 1) Duct Butter or ButterTak by Cain Manufacturing.
 - 2) DP 1010 by Design Polymerics
 - 3) PROseal, FIBERseal, EVERseal, or EZ-seal by Ductmate Industries, Inc
 - 4) 44-39 by Mon-Eco Industries Inc
 - 5) Airseal #22 Water Base Duct Sealer by Polymer Adhesive Sealant Systems Inc

B. Fabrication:

1. General:
 - a. Straight and smooth on inside with joints neatly finished.
 - b. Duct drops to diffusers shall be round, square, or rectangular to accommodate diffuser neck. Drops shall be same gauge as branch duct. Seal joints air tight.

2. Standard Ducts:
 - a. General:
 - 1) Ducts shall be large enough to accommodate inside acoustic duct liner. Dimensions shown on Drawings are net clear inside dimensions after duct liner has been installed.
 - b. Round Duct:
 - 1) Spiral Seam:
 - a) 28 ga minimum for ducts up to and including 14 inches in diameter.
 - b) 26 ga minimum for ducts over 14 inches and up to and including 26 inches in diameter.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Metal duct surface must be clean and free of moisture, contamination and foreign matter before applying duct sealer for interior and exterior ducts.

3.2 INSTALLATION

- A. Install internal ends of slip joints in direction of flow. Seal transverse and longitudinal joints air tight using specified duct sealer as per Manufacturer's written instructions. Cover horizontal and longitudinal joints on exterior ducts with two layers of specified tape installed with specified adhesive.
- B. Securely anchor ducts and plenums to building structure with specified duct hangers attached with screws. Do not hang more than one duct from a duct hanger. Brace and install ducts so they shall be free of vibration under all conditions of operation.
- C. Ducts shall not bear on top of structural members.
- D. Paint ductwork visible through registers, grilles, and diffusers flat black.
- E. Properly flash where ducts protrude above roof.
- F. Under no conditions will pipes, rods, or wires be allowed to penetrate ducts.

3.3 FIELD QUALITY CONTROL

- A. Non-Conforming Work:
 1. Reseal transverse joint duct leaks and seal longitudinal duct joint leaks discovered during air test and balance procedures at no additional cost to Owner.

END OF SECTION 23 3114

SECTION 23 3300 - AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install duct accessories in specified ductwork as described in Contract Documents.
 - 2. Install motorized zone dampers furnished by the ATC contractor.
- B. Related Requirements:
 - 1. Section 23 0933: 'Electric And Electronic Control System For HVAC'
 - 2. Section 23 3001: 'Common Duct Requirements'.

1.2 REFERENCES

- A. Reference Standards:
 - 1. ASTM International:
 - a. ASTM A653/A653M-11, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
 - b. ASTM C1071-12, 'Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material)'.
 - c. ASTM C1338-08, 'Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings'.

PART 2 - PRODUCTS

2.1 ACCESSORIES

- A. Materials:
 - 1. Acoustical Liner System:
 - a. Duct Liner:
 - 1) One inch thick, 1-1/2 lb density fiberglass conforming to requirements of ASTM C1071. Liner will not support microbial growth when tested in accordance with ASTM C1338.
 - 2) Approved Products.
 - a) ToughGard by CertainTeed.
 - b) Duct Liner E-M by Knauf Fiber Glass.
 - c) Akousti-Liner by Manson Insulation.
 - d) Quiet R by Owens Corning.
 - e) Permacote Linacoustic HP by Johns-Manville.
 - b. Adhesive:

- 1) Approved Water-Based Products.
 - a) Cain: Hydrotak.
 - b) Design Polymerics: DP2501 or DP2502 (CMCL-2501).
 - c) Duro Dyne: WSA.
 - d) Elgen Manufacturing: A-410-WB.
 - e) Hardcast: Coil-Tack.
 - f) Hercules Mighty Tough: MTA 500 or MTA 600.
 - g) Miracle / Kingco: PF-101.
 - h) Mon-Eco: 22-67 or 22-76.
 - i) Polymer Adhesive: Glasstack #35.
 - j) Techno Adhesive: 133.
 - k) McGill Airseal: Uni-tack.

2) Approved Solvent-Based (non-flammable) Products

- a) Cain: Safetak.
- b) Duro Dyne: FPG.
- c) Hardcast: Glas-Grip 648-NFSE.
- d) Miracle / Kingco: PF-91.
- e) Mon-Eco: 22-24.
- f) Polymer Adhesive: Q-Tack.
- g) Techno Adhesive: 'Non-Flam' 106.

3) Approved Solvent-Based (flammable) Products.

- a) Cain: HV200.
- b) Duro Dyne: MPG.
- c) Hardcast: Glas-Grip 636-SE.
- d) Miracle / Kingco: PF-96.
- e) Mon-Eco: 22-22.
- f) Polymer Adhesive: R-Tack.
- g) Techno Adhesive: 'Flammable' 106.

c. Fasteners:

- 1) Adhesively secured fasteners not allowed.
- 2) Approved Products.
 - a) AGM Industries Inc: 'DynaPoint' Series RP-9 pin.
 - b) Cain.
 - c) Duro Dyne.
 - d) Gripnails may be used if each nail is installed by 'Grip Nail Air Hammer' or by 'Automatic Fastener Equipment' in accordance with Manufacturer's recommendations.

2. Dampers And Damper Accessories:

a. Locking Quadrant Damper Regulators:

- 1) Approved Products.
 - a) Duro Dyne: KS-385.
 - b) Dyn Air: QPS-385.
 - c) Elgen Manufacturing: EQR-4.
 - d) Ventfabrics: Ventline 555.
 - e) Young: No. 1.

b. Volume Dampers:

1) Rectangular Duct:

- a) Factory-manufactured 16 ga galvanized steel, single blade and opposed blade type with 3/8 inch axles and end bearings. Blade width 8 inches maximum. Blades shall have 1/8 inch clearance all around.
- b) Approved Products.
 - (1) Air-Rite: Model CD-2.
 - (2) American Warming: VC-2-AA.
 - (3) Arrow: OBDAF-207.
 - (4) C & S: AC40.
 - (5) Cesco: AGO.
 - (6) Daniel: CD-OB.
 - (7) Greenheck: VCD-20.
 - (8) Nailor: 1810 or 1820.
 - (9) Pottorff: CD-42.
 - (10) Ruskin: MD-35.
 - (11) Utemp: CD-OB.

c. Motorized Outside Air Dampers:

1) General:

- a) Low leakage type. AMCA certified.
- b) Make provision for damper actuators and actuator linkages to be mounted external of air flow.

2) Rectangular Ducts:

a) Damper Blades:

- (1) Steel or aluminum airfoil type with mechanically locked blade seals, 8 inch blade width maximum measured perpendicular to axis of damper.
- (2) Jamb seals shall be flexible metal compression type.
- (3) Opposed or single blade type.

b) Approved Products:

- (1) Air Balance: AC 526.
- (2) American Warming: AC526.
- (3) Arrow: AFD-20.
- (4) C & S: AC50.
- (5) Cesco: AGO3.
- (6) Honeywell: D-643.
- (7) Nailor: 2020.
- (8) Pottorff: CD-52.
- (9) Ruskin: CD-60.
- (10) Tamco: Series 1000.

d. Motorized Zone Dampers:

1) General:

- a) Low leakage type. AMCA certified. Furnished by ATC contractor as part of the VVT zone control system.
- b) Make provision for damper actuators and actuator linkages to be mounted external of air flow.

- 2) Rectangular or Round Ducts:
 - a) Damper Blades:
 - (1) Steel or aluminum airfoil type with mechanically locked blade seals, 8 inch blade width maximum measured perpendicular to axis of damper.
 - (2) Jamb seals shall be flexible metal compression type.
 - (3) Opposed or single blade type.
- 3. Air Turns:
 - a. Single thickness vanes. Double thickness vanes not acceptable.
 - b. 4-1/2 inch wide vane rail. Junior vane rail not acceptable.
- B. Fabrication:
 - 1. Duct Liner:
 - a. Install mat finish surface on airstream side. Secure insulation to cleaned sheet metal duct with continuous 100 percent coat of adhesive and with 3/4 inch long mechanical fasteners 12 inches on center maximum unless detailed otherwise on Drawings. Pin all duct liner.
 - b. Accurately cut liner and thoroughly coat ends with adhesive. Butt joints tightly. Top and bottom sections of insulation shall overlap sides. If liner is all one piece, folded corners shall be tight against metal. Ends shall butt tightly together.
 - c. Coat longitudinal and transverse edges of liner with adhesive.
 - 2. Air Turns:
 - a. Permanently install vanes arranged to permit air to make abrupt turn without appreciable turbulence, in 90 degree elbows of above ground supply and return ductwork.
 - b. Quiet and free from vibration when system is in operation.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Duct Liner:
 - 1. Furnish and install acoustic lining in following types of square and rectangular ducts unless noted otherwise on Contract Documents:
 - a. Supply Air, Return Air, Exhaust Air.
 - b. Elbows, fittings, and diffuser drops.
- B. Motorized Zone Dampers:
 - 1. Furnish and install the motorized zone dampers furnished by the ATC contractor. Install motorized dampers where indicated on the drawings. Coordinate with ATC contractor for location and installation procedures.
 - 2. Install dampers in accessible ceiling locations; otherwise provide 24"x24" hinged, locking ceiling access door, painted to match ceiling color.
- C. Motorized By-Pass Dampers:

1. Furnish and install the motorized dampers furnished by the ATC contractor. Install motorized zone dampers for each roof top unit. Coordinate with ATC contractor for location and installation procedures.
- D. Air Turns:
1. Furnish and install turning vanes at each duct elbow.

END OF SECTION 23 3300

SECTION 23 3346 - FLEXIBLE DUCTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install supply air branch duct runouts to diffusers as described in Contract Documents.

B. Related Requirements:

1. Section 23 3001: Common Duct Requirements.

1.2 REFERENCES

A. Reference Standards:

1. National Fire Protection Association / American National Standards Institute:
 - a. NFPA 90A: 'Standard for the Installation of Air-Conditioning and Ventilating Systems' (2018 Edition).
2. Underwriters Laboratories:
 - a. UL 181, 'Factory-Made Ducts and Air Connectors' (10th Edition).
 - b. UL 181B, 'Closure Systems for Use With Flexible Air Ducts and Air Connectors' (3rd Edition).

PART 2 - PRODUCTS

2.1 SYSTEM

A. Materials:

1. Ducts:
 - a. Formable, flexible, circular duct which shall retain its cross-section, shape, rigidity, and shall not restrict airflow after bending.
 - b. Insulation:
 - 1) Nominal 1-1/2 inches, 3/4 lb per cu ft density fiberglass insulation with air-tight, polyethylene or polyester core, sheathed in seamless vapor barrier jacket factory installed over flexible assembly.
 - c. Assembly, including insulation and vapor barrier, shall meet Class I requirement of NFPA 90A and be UL 181 rated, with flame spread of 25 or less and smoke developed rating of 50 or under.
 - d. Approved Products:
 - 1) ANCO-FLEX 4625 by Anco Products.
 - 2) M-KC by Thermaflex by Flexible Technologies.
 - 3) Type 4m Insulated by Flexmaster.
2. Cinch Bands: Nylon, 3/8 inch removable and reusable type.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install duct in fully extended condition free of sags and kinks, using 36 inch maximum lengths.
- B. Make duct connections by coating exterior of duct collar for 3 inches with duct sealer and securing duct in place over sheet metal collar with specified cinch bands.

END OF SECTION 23 3346

SECTION 23 3401 - EXHAUST FANS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install roof mounted exhaust fans as described in Contract Documents.
 - 2. Furnish and install ceiling mounted exhaust fans as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 23 3001: 'Common Duct Requirements'.
 - 2. Division 26: Control device and electrical connection.

1.2 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Bear AMCA seal and UL label.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

- A. Centrifugal Roof Ventilators
 - 1. Acoustically insulated housings. Direct driven centrifugal fans consisting of housing, wheel, fan shaft, bearings, motor and integral disconnect switch, drive assembly, curb base, and accessories.
 - 2. Removable, spun-aluminum, dome top and outlet baffle; square, one-piece, aluminum base with venturi inlet cone
 - 3. Include motorized back-draft damper with no metal-to-metal contact.
 - 4. True centrifugal fan wheels. Aluminum hub and wheel with backward-inclined blades.
 - 5. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
 - 6. Direct drive as indicated. Resiliently mounted to housing, with Permanently lubricated, permanently sealed, self-aligning ball bearings. Drive pulleys shall be cast iron, adjustable pitch.
 - 7. Entire fan, motor, and wheel assembly shall be isolated from the exhaust airstream and shall be easily removable without disturbing housing.
 - 8. Suitably ground motors and mount on rubber-in shear vibration isolators.
 - 9. Accessories: Localized factory wired disconnect switch inside fan housing, factory wired through an internal aluminum conduit. Removable aluminum mesh bird screen. Counterbalanced, parallel-blade back-draft dampers mounted in curb base
 - 10. Roof Curbs: Galvanized steel; mitered and welded corners; 1-1/2-inch- thick, rigid, fiberglass insulation adhered to inside walls; and 1-1/2-inch wood nailer. Size as required to suit roof opening and fan base. Height: 24 inches
 - 11. Approved Products:
 - a. Acme
 - b. Broan
 - c. Carnes

- d. Loren Cook Company.
- e. Penn Ventilation

B. Ceiling Mounted Exhaust Fans:

1. Acoustically insulated housings. Sound level rating of 5.0 sones maximum for CFM and static pressure listed on Contract Drawings.
2. Include chatterproof integral back-draft damper with no metal-to-metal contact.
3. True centrifugal wheels.
4. Entire fan, motor, and wheel assembly shall be easily removable without disturbing housing.
5. Suitably ground motors and mount on rubber-in shear vibration isolators.
6. Provide wall or roof cap, as required.
7. Approved Products:
 - a. Acme: VQ.
 - b. Broan: LoSone.
 - c. Carnes: VCD.
 - d. Cook: Gemini.
 - e. Soler & Palau: FF.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Anchor roof mounted exhaust fan units securely to roof structure on 14 inch high roof curb.
- B. Install ceiling fans securely to ceiling and roof structure. Provide vibration isolation kits.
- C. Install motorized back-draft damper furnished by the ATC contractor as part of the overall Exhaust Fan assembly. Locate the damper near the roof penetration.
- D. Make required connections to exhaust ducts.
- E. Verify operation of the exhaust fan control through the building ATC control system and/or line voltage wall mounted timers.

END OF SECTION 23 3401

SECTION 23 3713 - DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install diffusers, registers, and grilles connected to ductwork as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 23 3001: General Duct Requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

- A. Return Grilles:
 - 1. Finish: Bright-white powder coat.
 - 2. 30 or 45 degree deflection.
 - 3. Approved Products. Price: 535 or equal by Carnes, Nailor or Titus
- B. Exhaust Grilles:
 - 1. Finish: Bright-white powder coat.
 - 2. 30 or 45 degree deflection.
 - 3. Approved Products. Price: 535 or equal by Carnes, Nailor or Titus
- C. Ceiling Plaque Diffusers:
 - 1. Type for surface mount ceilings or "T" bar lay in ceiling.
 - 2. Finish: Bright-white powder coat.
 - 3. Approved Products. Price SPD or equal by Carnes, Nailor or Titus
- D. Concentric Supply and Return Diffusers:
 - 1. Type for surface mount ceilings or "T" bar lay in ceiling.
 - 2. Combination supply/return square ceiling diffuser
 - 3. Finish: Bright-white powder coat.
 - 4. Furnished with insulated plenum box and duct adaptor
 - 5. Approved Products. Price CRSD or Titus CSR-P
- E. Floor Registers:
 - 1. Type for surface mounting in floor. 14" x 6" flanged frame.
 - 2. Rectangular configuration with two way vents
 - 3. Finish: Bright-white powder coat.
 - 4. Furnished with integral 3-blade volume damper. Foot adjusted.
 - 5. Approved Products. Hart and Cooley 411

F. Floor Return Grilles:

1. Type for surface mounting in floor. 14" x 6" flanged frame.
2. Rectangular configuration with one way vent.
3. Finish: Bright-white powder coat.
4. Approved Products. Price LBMH or equal by Titus, Hart & Cooley or Nailor.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Anchor grilles registers and diffusers securely into openings. Secure frames to ductwork by using four sheet metal screws, one per side.
- B. Verify and coordinate locations of diffusers, registers and grilles with architectural reflected ceiling and floor plans. Install ceiling diffusers and grilles flush with ceiling systems. Install floor grilles flush with floors and parallel to walls.
- C. Make all required duct connections between diffusers, registers and grilles.
- D. Mount duct mounted supply air registers to supply air duct using high efficiency take-off and duct boot with volume damper.
- E. Mount concentric supply/return diffusers in coordination with the new roof top unit and with the existing building roof structure.
- F. Cut ceiling systems as needed to install concentric supply/return diffusers. Where needed offset supply and return air ductwork from roof top unit to diffuser.
- G. Make duct mounted return air grilles to return air duct using duct boot with volume damper.

END OF SECTION 23 3713

SECTION 23 7413 - PACKAGED, ROOF TOP UNITS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install packaged gas fired, DX air conditioning units as described in Contract Documents.
 - 2. Roof Top units shall be capable of performing as part of the overall heating and cooling systems described in the contract documents.
 - 3. Make required connections between roof top units and concentric supply and return air diffusers.
- B. Related Requirements:
 - 1. Section 23 0501: 'Common HVAC Requirements'.
 - 2. High Efficiency. SEER/EER minimum values as designated on the drawings.

1.2 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Air-Cooled Condensing Unit Section shall be UL approved and rated according to ARI Standards.
 - 2. Air delivery of units certified in accordance with standard test code for centrifugal fans adopted by AMCA.
 - 3. Heating sections shall be AGA approved and shall be two stage as indicated on the contract documents..

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 - 1. Ship units with lifting angles and fully charged with refrigerant R-410A

1.4 WARRANTY

- A. Manufacturer Warranty:
 - 1. 5 year warranty on refrigeration compressors. 2-year warranty on microprocessor control board. 1 year warranty on all other parts and components.

PART 2 - PRODUCTS

2.1 PERFORMANCE

- A. Capacities:
 - 1. SEER rating, as defined by ARI, shall be not less than 15.0 for units 5 tons and smaller.
 - 2. EER rating, as defined by ARI, shall be not less than 12.0 for units 6 tons and larger.

2.2 MANUFACTURED UNITS

A. Roof Top Air Conditioning Units:

1. Units shall be completely factory assembled and tested. Units shall include following components and features:
 - a. Condenser coils.
 - b. Condenser fans and motors.
 - c. Evaporator fans with ECM motors.
 - d. Interconnected wiring.
 - e. Pre-wired control panel.
 - f. Filter section – MERV 8 (minimum).
 - g. Factory installed 100 percent modulating economizer cycle including gear driven motorized dampers and controls with dampened barometric exhaust for 3 tons thru 7.5 tons.
 - h. Corrosion-resistant all-weather powder coat painted cabinet.
 - i. Factory weather hoods for outside air intake and barometric relief.
 - j. Two Stage Heating Sections (3 tons – 7.5 tons)
 - k. Two Stage Cooling for units 6 tons and larger.
2. Air-Cooled Condensing Unit Section:
 - a. Strainer-dryer.
 - b. Time delay or cycle protection to prevent short cycling.
 - c. Condenser Coil: 1/2 inch outside diameter copper tube with aluminum fins. Include condenser coil louvered hail guard assembly.
 - d. Compressors:
 - 1) Equip with crankcase heater.
 - 2) Fully hermetic scroll type internally protected. Independent circuits for units 7-1/2 tons and larger.
 - 3) Mount on factory rubber-shock, internal spring vibration isolators.
 - 4) Two stage variable speed scroll compressors for units 6 tons and larger.
 - e. Condenser Fan: Axial flow type, low noise type propeller fan. Condenser fan shall be direct-driven propeller type and discharge upward. Condenser fan shall have blades riveted to corrosion-resistant steel spiders and be dynamically balanced. Condenser motor shall be totally enclosed.
 - f. Refrigerant Coils: Constructed of copper tubes with mechanically bonded aluminum plate fins.
 - g. Refrigerant lines shall have:
 - 1) Flexible connections.
 - 2) Suction and liquid line service valves.
 - 3) Charging valves.
 - 4) Receiver valve.
3. Heating Section:
 - a. Two stage heating including modulating gas burners and control valves.
 - b. Units 3 Tons and Larger:
 - 1) Tubular section type of 20 ga steel minimum with 1.2 mil nominal aluminum-silicone alloy coating.
 - 2) Factory-installed induced draft blower.
 - c. Gas shut-off valve.
 - d. High limit switches.
 - e. Fan switch safety pilot and control transformer.
 - f. Automatic electric ignition.

4. Fan Section:
 - a. Indoor Blower (evaporator fan):
 - 1) Dynamically balanced and tested, steel fan wheel, with corrosion-resistant finish. Bearings shall be sealed, permanently lubricated, ball bearing type.
 - 2) Belt driven, double inlet, forward curved centrifugal type with adjustable pitch motor pulley.
 - b. Constructed and tested in accordance with AMCA requirements.
 - c. Fan Motor: ECM type, capable of maintaining required CFM for both heating and cooling modes under varying downstream pressure changes.
 - d. Furnish with flexible fabric duct connections with weather protection on supply and return air take-offs.
 - e. Evaporator-fan cabinet interior shall be insulated with 1/2-inch-thick minimum fiber glass insulation coated on air side. Use Aluminum foil-faced insulation in heating compartment.
5. Controls:
 - a. Bacnet compatible with open protocol controllers for integration with CSI controls.
 - b. Low ambient and dual pressure.
 - c. Pre-wired.
 - d. Low voltage control circuit with fuse protection on 24 V transformer side.
 - e. Solid state compressor protection for following factory-supplied safeties:
 - 1) Compressor over-temperature, over-current.
 - 2) Loss of charge / low-pressure switch.
 - 3) Freeze protection thermostat, evaporator coil.
 - 4) High-pressure switch.
 - f. Following minimum protection for heating section:
 - 1) High temperature limit switch.
 - 2) Flame rollout switch.
 - 3) Flame proving controls on units 3 tons and larger.
6. Safety Controls:
 - a. Factory Supplied Duct Smoke Detectors mounted in Supply Air Section of Roof top Cabinet:
 - 1) Description:
 - a) Intelligent low-flow photoelectric duct smoke detector with flashscan. Photo electric smoke detector mounted in systems with airflow greater than 2000 CFM.
7. Cabinets:
 - a. 3 Ton and Larger Units: Galvanized steel sheet and post construction, weatherproof, with powder coated factory finish on externally exposed surfaces and primed interior panel surfaces.
 - b. Access Doors: Hinged, lockable and gasketed for evaporator fan, compressor, filter, and controls sections. Quarter turn handles, two minimum per door.
 - c. Cabinet interiors shall be fully insulated with 1/2-inch-thick minimum fiber glass insulation coated on air side. Use Aluminum foil-faced insulation in heating compartment.
8. Roof Curbs: Galvanized steel; mitered and welded corners; 2-inch- thick, rigid, fiberglass insulation adhered to inside walls; and 2-inch wood nailer. Size as required to suit roof opening and fan base. Height: 14 inches
9. Accessories: Localized factory wired disconnect switch. Single point power connection, internally powered GFI outlet with integral transformer. Louvered hail guards for condenser section. Weather hoods with integral bird screens for outside air intake and barometric relief openings.

10. Acceptable Manufacturers and Models:
- a. Quality Design Standard: **Carrier Inc - Series 48**
 - b. Other acceptable manufacturers and models include:
 - 1) Lennox Inc - Landmark Series
 - 2) Daiken Inc - DRG Series
 - 3) Trane Inc - Voyager Series
 - 4) York Inc – Series ZYG

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Coordinate location of the roof top units with the general contractor, architect, and structural engineer. Position roof top units as needed to facilitate the location of supply and return air openings in relation to the ductwork connections. Locate roof top units between existing structure and where indicated.
- B. Maintain manufacturer's required service and operational clearances for the roof top units. Do not install roof top unit outside air intakes closer than 10 feet from restroom exhaust fans, plumbing vents or adjacent roof top unit gas flue discharges.
- C. Roof Openings: Where required frame roof openings around supply and return air ducts. Supply air ducts shall run unimpeded from the roof top unit to the supply air ducts. Fabricate sheet metal transitions as needed to install supply and return air duct connections.
- D. Install units level on 14 inch high roof curbs that are securely anchored to roof deck. Provide 1/2-inch-thick x 1 inch wide, full perimeter, neoprene, self-adhering, vibration strip between roof curb and roof top unit. Ensure all openings between roof top unit and roof curb are properly weather proofed and sealed.
- E. Duct Connections: Connect supply and return air ducts to roof top units using factory fabricated neoprene flexible duct connectors equal to Ductmate Proflex. Ensure that supply and return air ducts are sound and vibration isolated and are not in direct contact with the roof top unit or roof structure.
- F. Install required dampers and ductwork as indicated on the drawings.
- G. Infill roof top unit roof curbs with sound absorbing, weather-proof poly-iso insulation boards as called for in the Contract Documents.
- H. Install lb/oz gas regulator and isolation ball valve with flexible gas connector at each roof top unit connection. Verify two-stage gas heating section operation. Coordinate operation with the ATC contractor.
- I. Install 3-inch-deep p-trap at each condensate drain connection for each roof top unit. Extend drain down to roof.

3.2 FIELD QUALITY CONTROL

- A. Manufacturer Services:
 - 1. Roof-Top Unit Equipment Manufacturer to provide factory start-up services. Coordinate start-up and commissioning of the roof-top units with the supplier and contractor. Provide factory trained technician start up to verify full and complete operation of the roof-top unit in both heating and cooling operation. This includes package roof top unit economizers with power or barometric exhaust.
 - 2. Verify operation of all two-stage heating and cooling systems.
 - 3. Work closely with the Test and Balance Contractor to verify required CFM, heating and cooling capacities are obtained.
 - 4. Remove and replace drive sheaves and pulleys as needed to obtain the CFM noted on the drawings.

5. Complete the factory Start-Up Checklist provided by the manufacturer: Include Start-Up Checklist as part of the O&M manuals.
6. Verify the following:
 - a. Correct Voltage requirements
 - b. Packaging materials removed.
 - c. Compressor and fan shipping hold down bolts removed.
 - d. Weather hoods and hail guards are attached.
 - e. Condensate P-trap in installed.
 - f. Flue hoods are installed.
 - g. Gas piping is connected. Check gas piping for leaks.
 - h. All electrical and control connections and terminals are tight and correct.
 - i. Fan wheels are trued and balanced and correct fan rotation is verified. Check sheave alignment and belt tension
 - j. Filters are clean and in place.
 - k. Verify scroll compressors are rotating and free from excessive vibration and noise.
 - l. Check refrigerant pipe connections. Verify no leaks.
 - m. Verify full and correct charge of required refrigerant.
 - n. Verify crankcase heater is energized and operational.
 - o. Verify that compressors are operating within required running load amperages.
 - p. Verify blower static pressure and return air static pressures. Record readings.
 - q. Verify that roof top units are noise and vibration free.
 - r. Complete and sign Start-Up report.

END OF SECTION 23 7413

SECTION 23 8126 - HEAT PUMPS AND AIR CONDITIONING UNITS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install heat pumps and air conditioning units as described in Contract Documents.
 - 2. Furnish and install roof top support curbs as described in Contract Documents.
- B. Related Sections:
 - 1. Section 23 0501: General Mechanical Requirements.
 - 2. Section 23 2300 Refrigerant Piping

1.2 SUBMITTALS

- A. Product data for each heat pump unit.
- B. Quality Assurance / Control: Equipment check-out sheets.

1.3 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies: Each unit shall be UL / ULC or ETL labeled.

1.4 WARRANTY

- A. Provide five-year warranty on compressors beginning from date of start-up. Record start-up date on warranty certificate for each unit.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

- A. Heat Pumps:
 - 1. Indoor Units:
 - a. Compact wall mounted units, multiple speed fan, integral condensate pump, wall bracket support, removable washable filter.
 - b. Isolate moving parts from cabinets to reduce noise.
 - c. Furnish with branch controller for distributing refrigerant up to four (4) separate indoor units. Mount controller above accessible ceiling.
 - 2. Outdoor Units:
 - a. Compressor shall be of rotary or scroll design.
 - b. Fans shall be direct driven and discharge horizontally.
 - c. Casing shall be fully weatherproof for outdoor installations.

- d. Microprocessor Controls shall be factory wired with field installed remote ATC controls as part of the Johnson Verasys system.
 - e. Refrigerant shall be R-410a.
 - f. Isolate moving parts from cabinets to reduce noise.
 - g. Use dry-charged tubing for connection of unit's refrigerant system.
 - 3. Approved Manufacturers.
 - a. Mitsubishi Electronics America Inc
 - b. LG HVAC Inc
- B. Air Conditioning Only:
- 1. Indoor Units:
 - a. Compact wall mounted units, multiple speed fan, integral condensate pump, wall bracket support, removable washable filter.
 - b. Isolate moving parts from cabinets to reduce noise.
 - 2. Outdoor Units:
 - a. Compressor shall be of rotary or scroll design.
 - b. Fans shall be direct driven and discharge horizontally.
 - c. Casing shall be fully weatherproof for outdoor installations.
 - d. Microprocessor Controls shall be factory wired with field installed remote ATC controls as part of the Johnson Verasys system.
 - e. Refrigerant shall be R-410a.
 - f. Isolate moving parts from cabinets to reduce noise.
 - g. Use dry-charged tubing for connection of unit's refrigerant system.
 - 3. Approved Manufacturers.
 - a. Mitsubishi Electronics America Inc
 - b. LG HVAC Inc

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Furnish and install split system heat pump and air conditioning units of capacity, size and orientation noted on the drawings. Secure interior unit tight and flush with wall.
- B. Make all required field refrigeration piping connections between interior indoor units and outdoor units for a complete and functional heating and cooling system. Run refrigeration piping concealed in wall behind unit.
- C. Verify operation of the heat pump or air conditioning unit.
- D. Mount outdoor air cooled heat pumps and air conditioning units on roof curbs of size indicated. Maintain manufacturers recommended service and operational clearances for all heat pumps.
- E. Seismically brace heat pumps and air conditioning condensers using approved seismic hold down clips.
- F. Install condensate drain line from integral evaporator unit pump and pipe to floor sink or service sink or nearest sink tail piece.

- G. Manufacturer's Field Service: Units shall be started up, checked out, and adjusted by Unit Manufacturer's authorized factory trained service mechanic. Use equipment check-out sheet provided by Manufacturer. Complete and sign all items on sheet.

END OF SECTION 23 8126



OCS – SPECIAL EDUCATION AND ANNEX BUILDING REMODELS

DIVISION 26: ELECTRICAL

26 0500	Basic Electrical Materials & Methods
26 0519	Wires & Cables
26 0537	Concrete Transformer Vaults
26 0925	Occupancy Sensed Lighting Control
26 2413	Switchboards 600 Volts & Below
26 2416	Panelboards
26 2726	Switches & Receptacles
26 4300	Surge Protective Devices
26 5100	Lighting
26 3100	Fire Alarm Systems

SECTION 26 0500 – BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. Provide all items, articles, materials, equipment, operations and/or methods listed, mentioned, shown and/or scheduled on the drawings and/or in these specifications, including all labor, services, permits, fees, utility charges, and incidentals necessary and required to perform and complete the electrical work described in this Division. Apply for all permits early in the project to avoid problems due to code revisions.
- B. See the contract conditions (general and supplementary) and Division 1 for requirements concerning this Division including, but not limited to, submittals, shop drawings, substitution requests, change orders, maintenance manuals, record drawings, coordination, permits, record documents and guarantees.
- C. Division 26 Contractor shall be responsible for all work indicated by divisions 26, 27, 28, and the electrical portions of 33 within the drawings and specifications. Any work indicated by Division 16 shall be provided and installed by the Division 26 Contractor.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

- A. Mechanical equipment motors to be furnished under another Division but connected under this Division. Starters to be mounted and connected by this Division but furnished by another Division unless otherwise noted on the electrical drawings. Motor control centers shall be furnished and installed under this Division of the work. Verify and coordinate all equipment locations and electrical characteristics with other trades involved in the work. Coordination shall be done prior to rough-in or ordering equipment.
- B. Control wiring for mechanical equipment beyond provisions shown on the Electrical Drawings shall be performed under another Division of the work.

1.3 QUALITY ASSURANCE:

- A. Do all work in accordance with regulations and requirements of serving electric utility, telephone utility, cable TV utility, National Electrical Code, state and local codes and amendments, National Fire Codes, and all other applicable codes. Coordinate with local utility services prior to work and product release. Where Owners Design Standards have been incorporated into the design, the contractor shall refer to these Standards for additional clarification.

1.4 PROJECT CONDITIONS:

- A. The Contractor shall inspect the job site prior to bidding and familiarize himself with existing conditions which will affect the work. Prior to start of work, obtain "As built", "Record", or other Drawings showing existing underground utilities.
- B. Electrical drawings are diagrammatic indicating approximate location of outlets, lighting fixtures, electrical equipment, etc. Consult the Architectural, Structural, and Mechanical Drawings to avoid conflicts with equipment, structural members, etc. When required make all deviations from Drawings to make the work conform to the building as constructed, and to related work of others. Minor relocations ordered prior to installation may be made without added cost to Owner.

- C. Call to the attention of the Architect any error, omission, conflict or discrepancy in Drawings and/or Specifications. Do not proceed with any questionable items of work until clarification of same has been made.
- D. Under no conditions are beams, girders, footings or columns to be cut for electrical items unless so shown on Drawings or written approval obtained from the Architect.
- E. Verify the physical dimensions of each item of electrical equipment to fit the available space and promptly notify the Architect prior to roughing-in if conflicts appear. Coordination of equipment to the available space and to the access routes through the construction shall be the Contractor's responsibility.

1.5 SHOP DRAWINGS:

- A. Prior to ordering equipment, and prior to Contractor's first application for payment, the Contractor shall, within 14 days after award of this work, submit complete shop drawings, electronic PDF copy with PDF index tabs, or six (6) hard copies neatly bound in 3-ring binder form, with indexed tabs, to the Architect, of materials and equipment he proposes to furnish. It is preferred that all sections be submitted at once, however, in the event that one or more sections need approvals quickly and others are not prepared yet, the Engineer will agree to review the individual section submittals needing immediate approval. However, each individual submittal section must be complete and remaining submittals that are not a rush shall be submitted all in one package as quickly as possible. Submitting individual sections over many weeks/months will not be tolerated.
- B. List shall bear Contractor's stamp, signature or other means to show that he has inspected same and certified that submitted material is correct in regard to quantity, size, dimension, quality and is coordinated with the Contract Documents.
- C. See individual sections within this Division for products requiring submittal.
- D. Each shop drawing submittal shall be prepared by the manufacturer, and shall clearly show manufacturer's name, catalog numbers, pictures, details, layout, type, size, rating, style, and all options identified in a permanent fashion. Specific items or options shall be permanently marked on sheets containing more than one option – do not rely on the Engineer to mark options. Yellow highlight will not be an acceptable means of marking.
- E. Large equipment drawings such as UPS systems, generators, transformers, switchboards, and similar large equipment shall include the size, weight, seismic rating, emissions data, elevation, and wiring diagrams in addition to the product data.
- F. Some sections of this Division may require shop drawings prepared on full size floor plans in AutoCAD or other CAD software. Where required, contact the Architect for the latest version of the electronic plans and match the size and scale of the construction drawings. Drawings delivered to the contractor from the Architect/Engineer may not include addenda changes. Contractor shall only use electronic plans for purposes of the construction on this job, and not for any other use or reuse. Add any required addenda items prior to finishing shop drawings and submittals.
- G. Provide complete materials (all materials) list at the beginning of each tabbed section showing "Submittal Number", "Specification Section", "Material Item", "Manufacturer's Name and Catalog Number", and all pertinent data.
- H. Provide samples where required in individual sections of this Division.
- I. Contractor agrees that Shop Drawing Submittals processed by the Architect are not Change Orders; that the purpose of Shop Drawing Submittals by the Contractor is to demonstrate to the Architect that the Contractor understands the design concept, that they demonstrate their understanding by indicating which equipment and material they intend to furnish and install and by detailing the fabrication and installation methods they intend to use.

- J. Contractor further agrees that if deviations, discrepancies or conflicts between Shop Drawings and Specifications are discovered either prior to or after Shop Drawing Submittals are processed by the Architect/Engineer, the design Drawings and Specifications shall control and shall be followed.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. All materials shall be new and bear manufacturer's name, model number, electrical characteristics and other identification. All equipment to be U.L. approved or listed by another testing agency approved by authorities having jurisdiction.
- B. Material and equipment shall be standard product of manufacturer regularly engaged in production of similar material for at least five years (unless specifically exempted) and shall be manufacturer's latest design.
- C. If the description of a product is in conflict with the product as specified in the catalog number, the description shall generally take precedence. Contact the Architect for clarification if this occurs.
- D. All equipment must be rated and certified for the appropriate seismic design category or seismic use group for the installed geographical location. For essential or life safety equipment, provide an additional seismic factor of 1.5.

2.2 DISCONNECTS:

- A. Safety and disconnect switches to be Heavy duty quick-make, quick-break, dual rated, lockable, and of such electrical characteristics as required for the load served. Switches to have defeatable cover interlock.
- B. Fuse clips shall accept Class R or Class L fuses if required. Motor rated toggle switches equal to Square D Class 2510, type F with thermal overloads may be used as motor disconnects in dry locations.
- C. Disconnect switches required by code shall be installed whether or not specifically shown on the Drawings.
- D. Disconnect switches for refrigeration equipment and multiple motor HVAC equipment shall be fusible type.

2.3 FUSES:

- A. Provide fuses as indicated on the drawings, sized per NEC, or as required by the equipment manufacturer, whichever provides maximum protection, for a fully operational system.
- B. All fuses shall be furnished of the same manufacturer.
- C. All fuses shall be installed by the electrical contractor at job-site and only when equipment is to be energized. Fuses shall not be installed during shipment.
- D. All fuses to be 200,000 AIC, Current-limiting, U.L., Time Delay, Dual-element Type as follows:
1. For feeders 601 Amps to 6000 Amps:
 - a. Class L, KRP-C, KLPC, & A4BQ

2. For feeders 600 Amps and less:
 - a. Class RKK-1 for 600 volt; LPS-RK, LLS-RK, & A6D-R
 - b. Class RK-1 for 250 volt; LPN-RK, LLN-RK, & A2D-R
 - c. Class J; JHC, JTD, & AJT
3. For motor circuits beyond the main and sub distribution boards, 600 volt and below:
 - a. Class RK-5 for 600 volt; FRS-R, FLS-R, & TRS-R
 - b. Class RK-5 for 250 volt; FRN-R, FLN-R, & TR-R
- E. Approved Manufacturers, with catalog numbers listed in order: Bussman, Littelfuse, Ferraz Shawmut.
- F. If the electrical contractor wishes to furnish materials other than those specified, a written request, along with a complete short circuit and selective coordination study, shall be submitted to the engineer for evaluation at least 8 days prior to the bid date. If the engineer's evaluation indicates acceptance, a written addendum will be issued listing the other acceptable manufacturer.

2.4 BOXES:

- A. Outlet and junction boxes shall be sized in accordance with code requirements or as noted on the drawings.
- B. Unless otherwise specified or shown on the drawings, all outlet boxes for new work shall be galvanized steel knockout, outlet boxes. Gangable boxes are not acceptable. Outlet boxes shall not be smaller than 4" square and 1-1/2 inches in depth, unless otherwise noted. All outlet box covers, rings, or other fittings shall be galvanized. Boxes which are exposed to the weather shall be cast metal. Outlet boxes for phone and data outlets shall be 2.5" deep boxes.
- C. Outlet boxes shall be designed for the intended use and shall be installed flush with finish surface lines or not more than 1/8 inch back and shall be level and plumb. Long screws with spacers or shims for mounting devices are not acceptable. No combustible materials shall be exposed to wiring at outlets.
- D. Outlet boxes on opposite sides of fire or sound isolating partitions shall have a minimum horizontal separation of 24". Back-to-back boxes are not permitted in any walls.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION METHODS:

- A. All items, articles, materials, and equipment specified under this Division shall be installed per the manufacturer's installation instructions. Where the manufacturer's instructions are in conflict with the directions provided elsewhere in this Contract, the Engineer shall be notified prior to beginning rough-in.
- B. Cutting or notching shall be kept to an absolute minimum and done when, and in a method approved by the Architect. Patch and correct finished surfaces damaged by electrical work.
- C. Relays, panels, cabinets and equipment shall be level and plumb and installed parallel with structural building lines. All equipment and enclosures shall fit neatly without gaps, openings, or distortions. Provide approved devices for closing all unused openings.
- D. Arrange circuit wiring as shown on the Drawings and do not alter or combine runs or homeruns without the specific approval of the Architect. Feeder runs shall not be recombined or altered.

- E. In general, the mounting heights shall be as noted on the Drawings, or as listed below, the Architectural Interior Elevations and drawing notes taking precedence. Where no heights are indicated, request clarification from the Architect. Consult the Architectural, Mechanical and Structural drawings to avoid conflicts prior to roughing-in and for exact locations. All dimensions are to the top of the back box or device whichever is higher. Lighting dimensions are to the bottom of suspended fixtures and center of wall mounted fixtures unless otherwise noted.
- | | |
|---------------------------------------|--|
| Light Switches | 48 inches to center |
| Convenience Receptacles | 18 inches to center |
| Data/Telephone Outlets | 18 inches to center |
| Receptacles and Outlets Over Counters | 10 inches above counter or 5 inches above Backsplash to top, whichever is greater. |
| Panelboard | 72 inches to top |
| Disconnects and Motor Controllers | 72 inches to top |
| FACP and NAC panels | 72 inches to top |
| Fire Alarm Signals | 96 inches to top (but at least 6" below ceiling) |
| Fire Call Stations | 48 inches center |
| Fire Alarm Annunciator | 66 inches to top |
- F. Where raceways penetrate floors, ceilings, ducts, chases, and fire walls, provide fire stopping to maintain integrity of the fire assembly. Firestopping method shall be approved by the Code Authority having jurisdiction.
- G. All materials and equipment installed under this work shall be properly and adequately supported from the building structure except where ceiling construction or other provisions are specifically designed to support them. Support systems shall provide a safety factor of four. This shall apply to chains, hangers, anchors, clamps, screws, structural iron, and all other hardware and appurtenances associated with the support system.
- H. Maintain the following minimum separations from voice and data cables. Power conduit - 12", transformers and motors - 40", fluorescent lighting - 12". Coordinate with the voice and data installer to assure these separations are met.

3.2 LOW VOLTAGE WIRING METHODS:

- A. Unless stated otherwise in these specifications, or on the drawings, raceways for low voltage wiring of Occupancy Sensors, Paging, Intercom, TV Cabling, Computer, and Telephone systems utilizing N.E.C. class II current limitation methods will be required only in walls, inaccessible ceilings, and areas where conductors might be exposed to physical damage. Security CCTV, Intrusion Detection Systems, and Card Access Systems shall be installed in conduit for entire length of homeruns.
- B. Where cables pass through air plenums, the cables shall be either in conduit, or be plenum rated. The ceiling spaces in this project generally serve as air plenums and will require either conduit or plenum rated cable.
- C. Conductors shall be concealed in all finished spaces and shall be run parallel to structural lines and supported at minimum 5' intervals from structure.
- D. All low voltage cable must be suitable for the conditions in which it will be used. Prior to purchasing or installing any cable, confirm with the Mechanical Contractor which areas, if any, require plenum rated cable.
- E. Furnish and install all necessary sleeves and raceways to permit the installation of signal cables (specific attention is called to non-contiguous ceiling spaces) to the appropriate equipment termination point. Provide sleeves through all fire-rated walls and partitions. No outlets of any type shall be left without a raceway system or accessible ceiling path to their termination point. Verify that raceway sizes and quantities are appropriate and will have at least 50% spare capacity after all cables are initially installed. Provide at least one empty spare conduit to each area, sized to handle future needs.

3.3 LABELING:

- A. Clearly and properly label the complete electrical system to indicate the loads served or the function of each item of equipment provided under this work.
- B. Permanent Engraved nameplates: shall be 1/16 inch thick, laminated three-ply plastic, center-ply white, outer-ply black (for normal power) or red (for emergency power) or orange (for UPS power) "Lamicoid" or equal. Letters shall be formed by engraving outer colored ply, exposing white center-ply, and shall be a minimum of 5/8 inch high. Nameplates shall be secured with screws or pop rivets.
- C. Provide permanent engraved nameplates for the equipment listed below as well as all other similar equipment; refer to each section for specific labeling requirements:
 - 1. Panelboards
 - 2. Safety Disconnects
 - 3. Fire Alarm Control Panels (FACP) and Fire Alarm Notification Appliance Circuit Panels (NAC)
 - 4. Other similar electrical devices and equipment
- D. Self-Adhesive Labels: shall have self-adhesive "P-Touch" or equivalent sticky backs, black lettering with a clear (see through) background.
- E. Provide self-adhesive labels for the devices and equipment listed below as well as all other similar equipment; each label shall list the applicable circuit number feeding the device and devices fed from Emergency or UPS power shall also list "EMERGENCY" or "UPS" as applicable next to the circuit number (for example, a receptacle fed from circuit 2 in panel 1P1 would read "1P1-2" on the label):
 - 1. Thermal Switches and Manual Starters
 - 2. Power outlet receptacles
 - 3. Light Switches, Wall Mount Occupancy Sensors, and Wall Mount timeswitches
 - 4. Dimming Switches and Wall Mount Dimming controllers
 - 5. Fire alarm initiation devices (smoke detectors, heat detectors, pull stations, etc.)
 - 6. Fire alarm notification devices (horn/strobes, etc.)
- F. Where existing service entrance components are modified, including where conductors are increased in size, or the service transformer or service disconnecting means is replaced or increased in size, provide a new permanent engraved label on each service switchboard, panelboard, and/or disconnecting means with required information as indicated by the National Electrical Code.
- G. Provide neat and clearly legible handwritten labeling using a permanent "Sharpie" or equivalent chisel tip black marker for all junction boxes containing power and fire alarm wiring. Label each junction box with the applicable circuit number(s) for the cables contained within each junction box in a location and large enough to be clearly visible from the floor.
- H. Where changes are made in existing panels, distribution boards, etc., provide new labeling and schedules to accurately reflect the changes.

3.4 SAFETY:

- A. The Engineer has not been retained or compensated to provide design and construction review services relating to the Contractor's safety precautions or to means, methods, techniques, sequences or procedures required for the contractor to perform the work.

3.5 DEMOLITION:

- A. It is the intent of these specifications to require the contractor to make all necessary adjustments to the electrical system, required to meet code, and accommodate installation of the new and remodeled work.
- B. Remove all existing fixtures, clocks, switches, receptacles, raceways, and other electrical equipment and devices and associated wiring from walls, ceilings, floors, and other surfaces scheduled for remodeling, relocation, or demolition unless specifically shown as retained or relocated on the drawings. If existing walls, ceiling, floors, etc. are moved, extend existing devices, fixtures, and circuiting to the new location.
- C. Disconnect all existing mechanical equipment scheduled for removal or relocation. See mechanical drawings for scope of work. Remove abandoned raceways and cables. Relabel panels and motor control centers to reflect changes.
- D. If existing junction boxes will be made inaccessible, or if abandoned outlets serve as feed through boxes for other existing electrical equipment which is being retained, new conduit and wire shall be provided to bypass the abandoned outlets. If existing conduits pass through or are mounted on partitions or ceilings which are being removed or remodeled, new conduit and wire shall be provided to route around the ceiling or wall and maintain service to the existing load.
- E. Extend circuiting and devices in all existing walls to be furred out.
- F. Locations of items shown on the drawings as existing are partially based on as-built and other drawings which may contain errors. The Contractor shall verify the correctness of the information shown prior to bidding and provide such labor and material as is necessary to accomplish the intent of the contract documents. The plans may show some demolition conditions but are not intended to show all of them.
- G. All materials accumulated during the demolition process are the Owners property and shall be removed from the job site and delivered to an Owner storage facility as directed by the Owner. If owner does not wish to salvage materials, contractor shall remove from jobsite and dispose, or recycle materials at contractor's discretion, in a lawful manner.
- H. Where changes are made in existing panels, distribution boards, etc., provide new labeling and schedules to accurately reflect the changes.
- I. Demolish and dispose of hazardous materials in a lawful manner, such as PCB containing transformers or ballasts, mercury containing lamps, or materials containing lead. All costs for proper disposal shall be paid by the contractor unless specified elsewhere in the general conditions.

3.6 GROUNDING:

- A. Ground all electric equipment, raceways and enclosures in accordance with code rules and established safety practices. Provide a single main grounding point where grounding conductors from the Grounding Electrode System ground rods, ground grids, water pipes, main switchgear, etc. may be terminated.
- B. Install grounding conductors in approved metallic raceways unless specifically shown or specified otherwise. Bond at each end and at all intervening boxes and enclosures between the service equipment and grounding electrode.

- C. No. 8 and smaller grounding conductors shall have green insulation. No. 6 and larger shall be marked with green colored tape at each end and at every box, panel, switchboard, or point where conductor is accessible.

3.7 EQUIPMENT CONNECTIONS:

- A. The location and method for connecting to each item of equipment shall be verified prior to roughing-in. The voltage and phase of each item of equipment shall be checked before connecting. Motor rotations shall be made in the proper direction. Pump motors are not to be test run until liquid is in the system and proper lubrication to all bearings in unit is checked.
- B. Conduit, wire and circuit breaker sizes for mechanical, elevator and similar equipment are based on the equipment ratings of one manufacturer. The equipment actually furnished may have entirely different electrical characteristics. Conduit, wire, circuit breakers, disconnects, etc. shall not be ordered or installed until exact electrical requirements are obtained. Responsibility for this coordination rests with the Contractor.

3.8 SEISMIC BRACING:

- A. Furnish and install all seismic bracing of equipment, feeders, lighting fixtures, and other electrical items in accordance with prevailing codes. Refer to ASCE 7-10, section 13.3 and 13.6 for calculation methods. Provide and submit the required designs, calculations, certifications, and stamped drawings to the authority having jurisdiction and obtain their approval prior to installation or fabrication.
- B. Where conduit, cable trays, or busducts are attached to structures where they cross a seismic isolation interface, the electrical components shall be designed to accommodate the seismic relative displacement.

3.9 PAINTING:

- A. All electrical equipment and conduit exposed in finished areas and on exterior walls are to be painted to match surrounding surfaces.
- B. Contractor shall coordinate the timing of painting requirements.
- C. Refer to Architectural specifications for methods and materials.

3.10 PROJECT RECORD DOCUMENTS:

- A. Maintenance of Documents:
 - 1. Maintain at Jobsite, One Record Copy of: Contract Drawings, Specifications, Addenda, Reviewed Shop Drawings, Change Orders, Other Modifications to Contract and Field Test Records.
 - 2. Keep apart from documents used for construction.
 - 3. Keep documents available at all times for inspection by Architect.
- B. Recording:
 - 1. Label each document "PROJECT RECORD."
 - 2. Keep record documents current. Do not permanently conceal any work until required information has been recorded.

3. Contract Drawings, legibly mark to record actual construction; including but not limited to the following:
 - a. Depths of various elements; locations of underground items, with dimensions to building walls and corners; changes of dimensions and details; changes made by Addendum, Field Orders or Change Order.
 - b. Specifications and Addenda; legibly mark each Section to record changes made by Addendum, Field Order or Change Order.
- C. As-Built Submittals:
 1. At completion of project, transfer changes, addenda items, variations from drawings, exact routes of all feeders and service conduits, and locations of stubbed conduits to clean new prints and specifications which will be supplied by the Architect and deliver to the Architect as "As-reported Record" drawings. Include dimensions to all buried or concealed conduits to permanent structures.
- D. Operation and Maintenance Manuals
 1. At completion of project, prepare Operation and Maintenance Manuals with operation and Maintenance Data, contractors warranties, and copies of approved electrical permits. Include corrected copies of original submittals and shop drawings.
 2. See Division 1 for additional requirements.

3.11 WARRANTIES:

- A. Provide a minimum 1 year warranty on all electrical equipment, devices, labor, and work by Division 26 whether specified or not.
- B. Provide warranties greater than 1 year as specified in other sections where stated. The warranty requirement most stringent shall be used where conflicts arise.
- C. The systems listed below require warranties exceeding the minimum warranty:
 1. Lighting; 5 years for ballasts refer to Section – 26 51 00
 2. Fire Alarm Systems; 2 years refer to Section – 28 31 00
- D. Provide copies of all warranties to the owner upon completion of the project.

3.12 COMPLETION:

- A. Complete each system as shown or specified herein and place in operation except where only roughing-in or partial systems are called for. Each system shall be tested and left in proper operation free of faults, shorts or unintentional grounds. Demonstrate system in the presence of the Architect, the Owner or their representative when requested.

3.13 FINAL OBSERVATION:

- A. Contractor shall submit written certification that:
 1. Contract Documents have been reviewed.
 2. Contractor has inspected Project for compliance with Contract Documents.
 3. Work has been completed in accordance with Contract Documents.

4. Equipment and Systems have been tested and are operational.
 5. Project is completed and ready for final inspection.
- B. Architect will make final inspection as soon as possible after receipt of Certification.
- C. Should Architect consider that work is finally complete in accordance with Contract Document requirements, Contractor shall make Contract Closeout submittals.
- D. Should Architect consider that work is not finally complete:
1. He will so notify Contractor, stating reasons.
 2. Contractor shall take immediate steps to remedy deficiencies, and send second written notice to Architect certifying that work is complete.
 3. Architect will re-inspect work.
- E. The Architect will make two final inspections. The first will determine deficiencies and errors in the work and the second will determine whether or not the noted deficiencies and errors have been satisfactorily corrected.
- F. If additional inspections are required because of the Contractor's failure to complete the deficiencies and errors prior to the second inspection, costs for the successive inspections will be back-charged to the Contractor by the Owner, who, in turn, will reimburse the Architect. Charges will be based as follows:
1. Architect time at current billing rates.
 2. Travel time, and all other expenses incurred in making inspections.
- G. Contractor to provide one (1) journeyman, tools, meters, instruments and other test equipment required by Architect. Contractor to remove and replace trims, covers, fixtures, etc., for Architect to review and test materials, systems, methods and workmanship. (Example: Removing switchboard and panel covers to take voltage/amp readings, review connections and wire size, etc.)

END OF SECTION 26 0500

SECTION 26 0519 – WIRES & CABLES (600V)

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. Provide all wires and cables as herein specified and shown on the associated drawings for service conductors, feeder conductors and branch circuit conductors.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

- A. Basic Material & Methods – Section 26 0500.
- B. Raceways – Section 26 0533.

1.3 QUALITY ASSURANCE:

- A. All wire and cable shall meet or exceed the following standards:
 - 1. ASTM-B series specifications
 - 2. ICEA S-61-402/NEMA WC 5 - Thermoplastic insulated cables 0-2000 volt
 - 3. UL Standard 62 and 83 – Thermoplastic insulated cable
 - 4. UL VW-1 Flame Test for sizes #12 through #1
 - 5. National Electric Code (NFPA 70) – Latest edition
- B. Manufacturers shall be engaged in the manufacturing of industry accepted quality wires and cables for a period of no less than 5 years for all types and sizes required.

1.4 SUBMITTALS:

- A. None required.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

- A. Provide products of Southwire, Houston Wire, Rome Cable, or similar manufacturer located within the continental North American market. Cables made in Europe, Asia, South America, Africa, or other overseas markets are not acceptable.
- B. Substitutions: Equivalent manufacturers are allowed at contractor's option; no submittals or prior approvals are necessary if cable meets specifications.

2.2 MATERIALS:

- A. Application: For use in general wiring applications for lighting and power in ducts, conduits, wireways and other approved raceways with a maximum conductor temperature of 90 degrees C in dry locations and 75 degrees C in wet locations.
- B. Provide wires and cables that are chemical, gasoline, and oil resistant. Provide wires and cables that are sunlight resistant.

- C. Minimum conductor size shall be No. 12 AWG unless otherwise noted.
- D. Where adverse conductor exposure exists, code approved insulation suitable for the conditions encountered shall be used unless shown otherwise on the Drawings.
- E. Wire and cable shall be new, shall have grade of insulation, voltage and manufacturer's name permanently marked on outer covering at regular intervals and shall be delivered in complete coils or reels with identifying size and insulation tags.

2.3 COPPER CONDUCTORS:

- A. For No. 10 AWG and smaller provide soft drawn stranded copper conductors with type THHN/THWN insulation.
- B. For No. 8 AWG and larger provide soft drawn stranded, Class B stranded copper conductors with type THHN/THWN insulation.

2.4 ALUMINUM AND/OR METAL CLAD (MC) CABLING OPTIONS:

- A. Aluminum Cabling is not acceptable – Provide copper only conductors.
- B. MC Cable is not acceptable.

2.5 COLOR CODE:

- A. All wires shall be fully colored in sizes 12 through 6 AWG, and color banded at each end with colored tape at all terminations, panels, equipment, junction boxes, and pull boxes for sizes 4 AWG and larger.
- C. Color Code throughout the project shall be:
 - 1. 208Y/120V System

Phase A	Black
Phase B	Red
Phase C	Blue
Neutral	White
Neutral A (dedicated)	White w/black stripe #12 & #10
Neutral B (dedicated)	White w/red stripe #12 & #10
Neutral C (dedicated)	White w/blue stripe #12 & #10
Equipment Ground	Green
- C. Provide a permanent, plastic engraved label on the inside of each branch-circuit panelboard throughout the project identifying the Color Code used throughout the project. Refer to NEC 200.6 (D).

2.6 SPLICES AND TERMINATIONS:

- A. Splices shall utilize Scotch "Hyflex" or "Ideal" wing nut connector installed properly. Crimp on splices designed to be used without wire stripping are not acceptable.
- B. Splices for No. 8 and larger wires shall be made with mechanically applied pressure type connectors.
- C. All taped joints shall be with "Scotch 33+" or equal, applied in half-lap layers without stretching to deform.
- D. Where splice box is subject to rain, weather, or moisture, provide "Rain Tight" termination device.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Inspect exposed cables for physical damage and remove as length allows.
- B. Utilize pulling compound on long pulls. Ensure that cable reels and pulling apparatus are firmly secured prior to pulling. Use pulling attachments and materials including approved swivel connections, pulling eyes, and/or friction tape as applicable. Carefully follow all applicable safety requirements when pulling cables.
- C. Do not exceed manufacturers recommendations for maximum allowable tension, or side wall pressure. In all cases, pulling tension applied to the conductors shall be limited to 0.008 lbs. per circular mil of conductor cross-section area.
- D. Do not exceed manufacturers recommendations for minimum allowable bending radius. For training of cables, minimum bend radius to inner surfaces of cable shall be 12 times cable diameter. Where cable is pulled under tension over sheaves, conduit bends, or other curved surfaces, make minimum bend radius 50% greater than specified above for training.
- E. Provide dedicated neutrals on all branch power receptacle circuits of 120/208 volt.

3.2 BRANCH CIRCUIT GROUNDED CONDUCTOR (NEUTRAL) WIRING METHODS:

- A. Dedicated (separate) neutral wiring methods
 - 1. Provide dedicated (separate) neutral for each branch circuit; shared/common neutral wiring is not allowed.
 - 2. For dedicated neutral branch wiring, there shall be no more than six (6) current carrying conductors allowed within a single raceway unless specifically allowed otherwise in the drawings. All neutral conductors shall be considered current carrying. Provide all required wire size increases to account for the applicable NEC wire ampacity deratings.
 - 3. Provide dedicated neutral cables with colored stripe as required in wire color coding section for identification.

3.3 PARALLELED CONDUCTORS:

- A. Under no condition shall conductors less than #1/0 AWG copper be run in parallel. Where paralleled runs are used, the contractor must cut to exact length on each phase leg. Where parallel conductors are run in parallel conduits, each conduit shall carry all phase legs as well as neutral, equipment ground, and/or isolated ground conductor as applicable.
- B. Size parallel ground conductors as per NEC 250.

3.4 SPLICES AND TERMINATIONS:

- A. Splices are to be made up complete promptly after wire installation.
- B. Single wire pigtails shall be provided for fixture and device connections. Wirenuts may be used for fixture wire connections to single wire circuit conductor pigtails.
- C. Install wing nut connector properly, according to manufacturers written instructions. Crimp on splices designed to be used without wire stripping are not acceptable.

- D. Torque bolted connections to manufacturers recommendations. Torque both ends of the cable, or parallel cables, to the same Torque level.
- E. Insulation shall be removed with a stripping tool designed specifically for that purpose. A pocket knife is not an acceptable tool. All conductors shall be left nick-free.
- F. Thermoplastic insulated wire and cable shall not be installed or handled in temperatures below +14 degrees F (-10 C). Cross-linked polyethylene insulated wire and cable may be installed to -40 degrees F (-40 C).

3.5 LABELING:

- A. Service Cables - Provide an engraved laminated 3-ply plastic "Lamicoid" or equal label which designated as "SERVICE CABLE(S)" attached with a nylon wire tie to the cables at each entry and exit from pullboxes, wireways and any other similar locations.
- B. Feeders - Provide an engraved laminated 3-ply plastic "Lamicoid" or equal label with feeder name attached with a nylon wire tie to the feeder at each entry and exit from pullboxes, wireways and any other similar locations.
- C. Branch Circuits - Clearly mark and identify the circuit number(s) at each junction box and similar location with a permanent black marker or equivalent that is clearly visible. For concealed junction boxes the marking shall be made on the outside coverplate; for exposed boxes or boxes with finished coverplates marking shall be made on the interior of the box where visible when removing the coverplate.

END OF SECTION 26 0519

SECTION 26 05 37 - CONCRETE TRANSFORMER VAULTS

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. Furnish and install all concrete transformer vault and accessories as herein specified and shown on the drawings.
- B. Submit detailed drawings showing applicable dimensions, imbedded struts, pulling irons, rings, cover, and drain grate.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

- A. Amcor Precast, Duracrete Inc., Eagle, Oldcastle, or approved equal
- B. Requests for substitution of other products will be considered if submitted in accordance the General Conditions, Division 1, and Section 26 05 00.

2.2 MATERIALS:

- A. Transformer Vault shall be approved and meet all requirements of the local power company, Rocky Mountain Power.
- B. Concrete transformer vaults shall be constructed of precast or poured in place concrete. Precast materials shall be shipped to the jobsite as a unit assembly. Lid assembly shall be sealed with suitable material.
- C. Provide vault interior dimensions and height as detailed on the drawings.
- D. Easily removed knockouts shall be provided to permit conduit entrance. Locate knockouts only where conduits will be installed in this contract. Do not install future knockouts.
- E. Vault floor shall be pitched for drainage and one or more drain holes shall be provided.
- F. Superstrut C300 series mounting channel, or equal of Unistrut, shall be cast into interior walls.
- G. Pulling-in irons shall be included inside each manhole as detailed.
- H. Embedded metal parts such as channels, pulling-in inserts and cable supports, and bell ends on conduit shall have grounding connection.
- I. Frame and cover for manholes shall be standard manhle entries, troffer pattern, non-ventilated, cast iron with clear opening size as detailed on drawings; cast-in inscriptions "ELECTRIC".

- J. Provide one ground rod for each manhole; copperweld 3/4" diameter, 10'-0" long driven just inside the finished wall with top 4" above the finished floor. Ground all metal items within the manhole with No. 6 bare stranded soft drawn copper wire.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Location of transformer vault shall be coordinated with the power company prior to excavation and setting regardless of where the drawings indicate to locate it. The Power company will be reviewing location as it relates to their required clearances, easements, clearance to flammable gas, and accessibility of trucks. Relocate vault up to 10 feet at no extra cost to the owner. For requests exceeding a 10 foot relocation, consult with Architect.
- B. Do not install the transformer vault above existing buried utilities.
- C. Seal surfaces between sections on multi-section vaults and lid must be clean and all gaskets must be in place. Excavation hole must not contain water when setting vault. Excavation must provide a minimum of 18 inches clearance around the side walls of each vault for ease of installation and for compaction of backfill.
- D. Backfill around all vaults with engineered fill, pea gravel or sand. No voids should remain between the vault walls and native soil. Backfill must be progressively compacted from the bottom to the top surface. Provide 12 inches of compacted gravel, graded level, under each vault for drainage.
- E. Seal all joints between vault sections, lid, risers, covers, etc. with appropriate gasket or sealant. Apply in a manner to insure filling of all voids in the joint being sealed.

END OF SECTION 26 0537

SECTION 26 0925 – OCCUPANCY SENSED LIGHTING CONTROL

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. The Contractor shall provide all labor, materials, tools, appliances, control hardware, sensor, wire, junction boxes and equipment necessary for and incidental to the delivery, installation and furnishing of a completely operational occupancy sensor lighting control system, as described herein.
- B. The Contractor shall examine all general specification provisions and drawings for related electrical work required as work under Division 26.

1.2 SUBMITTALS:

- A. Submit complete and descriptive shop drawings including floor plans, layouts, catalog cuts and other descriptive data indicating compliance with the specifications herein. Submit data sheets on sensors, control units and all junction boxes and mounting accessories, including all wiring diagrams. Submit in accordance with Division 01.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

- A. Acceptable Manufacturers:
 - 1. Acuity Brands
 - 2. LC&D
 - 3. Douglas Lighting Controls
 - 4. Cooper Lighting Control
 - 5. Watt Stopper Lighting Control Solutions
 - 6. Lutron / Hubbell Control
- B. Requests for substitution of other products will be considered if submitted in accordance with the general conditions and Division 1.

2.3 CEILING MOUNT DUAL-TECHNOLOGY TYPE (For Rooms up to 1200 SF)

Low Profile, ceiling mount, 360 degree coverage:	Watt Stopper Model DT-300
Adjustable arm, wall mount, 180 degree coverage:	WattStopper Model DT-200

- A. The Occupancy Sensors shall be capable of detecting presence in the floor area to be controlled, by detecting Doppler shifts in transmitted ultrasound and passive infrared heat changes (dual technology). Sensors that utilize microphonics are not approved.
- B. Upon entering a space, motion from both technologies must be sensed before lighting will be turned on. After this has occurred, detection in either technology will hold lighting on for the set time period. Sensors will have a retrigger time delay where only one motion is necessary to turn on the lights within 5 seconds after turning off.
- C. Ultrasonic sensors will be volumetric in coverage. Up to 10 different passive infrared patterns will be available by lens selection. Detection shall be maintained when a person of average size and weight moves only within or a maximum distance of twelve inches either in a horizontal or vertical manner at the approximate speed of 12

inches per second. The sum of this distance, volume and speed represent the average condition an Occupancy Sensor must meet in order that the lights will not go off when a person is reading or writing while seated at a desk.

- D. Sensors will cover a minimum of 1500 square feet when mounted at 12 feet.
- E. The sensors are designed to be ceiling mounted and not protrude more than 2 inches and should blend in aesthetically with the space.
- F. Each sensing technology shall have independent sensitivity adjustments and LED display.
- G. Time Delay range shall be adjustable from 15 seconds to 15 minutes.
- H. Sensors shall operate on 24 volts, 25 milliamps DC.
- I. Sensor shall have an additional single pole, double throw isolated relay with Normally Open, Normally Closed and Common outputs rated at 1 amp for 24 VDC. The isolated relay is for use with HVAC control, Data Logging, and other control options.
- J. Ultrasonic circuit shall be solid state, crystal controlled with signal processing filtering.
- K. Ultrasonic receivers shall be temperature and humidity resistant with less than a 6dB shift in the humidity range of 10% to 90% and less than a 6dB shift in the temperature range of -20o to 60o C.
- L. The ultrasonic frequency shall be 40 kHz + .006%.
- M. Ceiling mount sensors shall provide a minor motion coverage range of 250 to 1300 square feet with an overall 1/2 step coverage range from 500 to 2000 square feet.
- N. All sensors shall be capable of operating normally with electronic ballast and PL lamp systems.
- O. All sensors shall be self-contained, crystal controlled ultrasonic or infrared occupancy sensors located to provide coverage of 90 to 100% of the controlled area.
- P. Coverage of sensors shall remain constant after sensitivity control has been set. No automatic reduction shall occur in coverage due to the cycling of air conditioner or heating fans.
- Q. All sensors shall have readily accessible, user adjustable controls for time delay and sensitivity. Controls shall be recessed in the sensor to limit tampering.
- R. In the event of failure, a bypass manual "override on" shall be provided on each sensor. When bypass is utilized, lighting shall remain on constantly or control shall divert to a wall switch until sensor is replaced. This control shall be recessed in the sensor to prevent tampering.
- S. Ultrasonic operating frequency shall be crystal controlled to within plus or minus 0.005% tolerance to assure reliable performance.
- T. Ultrasonic microphone receiver frequency shall be 25 KHz or greater and shall be temperature and humidity resistant.
 - 1. All sensors shall provide a red LED indication light to verify that motion is being detected and that the unit is working.

- U. All ultrasonic sensors shall comply with the State of California Safety and Health Requirements. Decibel levels for ultrasonic sensors shall comply with the following California Energy Commission criteria:

Midfrequency of Sound Pressure Third Octave	Minimum dB level within Third Octave Band (in dB Band (KHz) reference 20 micropascals)
Less than 20	80
20 or more to less than 25	105
25 or more to less than 31.5	110
31.5 or more	115

The Contractor shall certify in writing that installed sensors comply with the specified California Energy Commission criteria for ultrasonic sound.

- V. All sensors shall have no leakage current in OFF mode and shall have voltage drop protection.
- W. Sensors shall be suitable for N.E.C. 725 Class 2 wiring and use plenum cable where approved. Where plenum cable is not approved, provide conduit to within 6 inches of sensor location.

2.4 POWER PACKS:

- A. Power Packs shall be mounted on external J boxes and be an integrated self-contained unit consisting of a load switching relay and a transformer.
- B. Relay Contacts shall have ratings of:
 - 10A - 120 VAC Tungsten
 - 20A - 120 VAC Ballast
 - 15A - 277 VAC Ballast
- C. Relay contacts shall be isolated.
- D. Power Packs: Wattstopper BZ-50, BZ-150
- E. Between sensors and controls units shall be three (3) conductors, 18 AWG, stranded U.L. Classified, PVC insulated or TEFLON jacketed cable approved for use in plenums. One sensor shall be capable of driving four Power Packs.
- F. Enclosures for Power Packs shall be NEMA I construction with mounting and barriers to provide separation between line and low voltage wiring or a standard four (4") inch junction box with control unit mounting to cover plate with ½ inch knockout. Boxes not located above accessible ceilings shall be painted to match finish color of mounting surface.
- G. Occupancy sensors shall have calibration at the occupancy sensor head, not at the power pack above the ceiling.

PART 3 - EXECUTION

3.1 PERFORMANCE:

- A. The objective of this section is to ensure the proper design and installation of the occupancy sensor based fluorescent lighting control system in rooms designated on the drawings so that lighting is turned off

automatically after reasonable time delay when a room or area is vacated by the last person to occupy said room or area.

- B. The occupancy sensor based lighting control shall accommodate all conditions of space utilization and all irregular work hours and habits.

3.2 INSTALLATION:

- A. It shall be the contractor's responsibility to contact the Manufacturers Representative and, with their assistance, aim and locate sensors correctly as required for complete and proper volumetric coverage within the range of coverage(s) of controlled areas. Rooms shall have ninety (90) to one hundred (100) percent coverage to adequately cover the controlled area to accommodate all occupancy habits of single or multiple occupants at any location within the rooms(s). The sensor symbols shown on the drawings are diagrammatic and indicate only rooms which are to be provided with sensors. The contractor shall provide sensors as 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. Sensors in small offices should be located to avoid false operation caused by persons walking by the door and outside the office.
- B. Mount occupancy sensors a minimum of 8 feet away from HVAC diffusers. Ultrasonic sensors shall be mounted on vibration free, stable surfaces and shall not be used in areas of heavy air flow, moving objects, or on ceilings over 14 feet high.
- C. Where "override-OFF" switch is required, switch is to be connected on the load side of the Power Pack Relay.
- D. Contractor shall be responsible to make all required adjustments to the occupancy sensor system for a period of 3 months after Owner occupancy at no additional charge to the Owner to ensure the system is working properly after occupancy.

3.3 LABELING:

- A. Provide self-adhesive labeling for all wall mounted occupancy sensors in compliance with Part 3.3 of Section 26 05 00.
- B. Provide hand written permanent marker circuit number labeling on the power pack junction box in compliance with Part 3.3 of Section 26 05 00.

3.4 WARRANTY:

- A. Contractor shall warrant the system including all equipment furnished in accordance to this specification to be undamaged, free of defects in materials and workmanship, and in conformance with the specifications. The suppliers obligation shall include repair or replacement, and testing without charge to the owner, all or any parts of equipment which are found to be damaged, defective or non-conforming and returned to the supplier. Warranty on sensors and controls units will be for a period of five (5) years. The warranty shall commence upon the owner's acceptance of the project. Warranty on labor shall be for a minimum period of one (1) year.

3.5 OWNER TRAINING:

- A. Upon completion of the system fine tuning and required adjustments, the factory authorized technician shall provide the necessary training at the Owner's facility to familiarize the owner's personnel with the operation, use, adjustment, maintenance, and trouble shooting diagnosis of the occupancy sensing devices and system.

END OF SECTION 26 0925

SECTION 26 24 13 – SWITCHBOARDS 600 VOLTS & BELOW

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. Furnish and install the service entrance switchboard and distribution switchboards as herein specified and shown on the associated electrical drawings.

1.2 SUBMITTALS:

- A. Submit complete descriptive shop drawings indicating bus arrangement, overcurrent devices, labeling, dimensions, ratings and other pertinent data.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

- A. Square D, General Electric, Siemens, Cutler-Hammer/Westinghouse
- B. Requests for substitution of other products will be considered if submitted in accordance with the General Conditions, Division 1, and Section 26 05 00.

2.2 EQUIPMENT:

- A. Each distribution board section shall be free standing and have an open bottom. Top and bottom conduit area is to be clearly shown and dimensioned on the shop drawings. All front plates used for mounting meters, selector switches or other front mounted devices shall be hinged with all wiring installed and laced with flexibility at the hinged side. All closure plates shall be screw removable and small enough for easy handling by one man. The paint finish shall be gray enamel over a rust-inhibiting phosphate primer.
- B. Overcurrent devices shall be of size and type as indicated on the drawings. Series rated equipment will not be permitted as a substitute for the interrupting capacities stated on the one line diagram.
- C. Main lugs shall be tool applied compression type if aluminum wire is used. The bus bars shall be rigidly braced for 100,000 amps and sized as indicated on the drawings.
- D. The bus bars shall be Copper only.
- E. The end section is to have bus bar provisions for future addition of a switchboard section. The provisions shall include the bus bars installed to the extreme side of the switchboard and prepunched to facilitate future bolted splice plates.
- F. Where fusible switches are indicated, they shall have Class R or L fuse clips. Fusible switches shall be of the positive, quick-make, quick-break type and external operating handle shall be suitable for padlocking in the "OFF" position. All units shall be dead front.

- G. Operating handles shall be mounted on the unit doors and interlocked with the overcurrent device to prevent opening of the door when the switch is "ON". A concealed "defeater" shall be provided so that authorized personnel may open door without interrupting power.
- H. All extra space in distribution boards shall be bussed for future use.
- I. Prior to bidding, confirm that equipment will fit within the physical space allocated on the drawings for switchgear. Do not attempt to use equipment which does not fit within the space allotted. Do not use space identified for future use.
- J. Provide ground-fault protection integral with each circuit breaker rated 1000 amps or more and operating above 150 volts phase-to-ground but below 600 volts phase-to-phase regardless of what is shown on the drawings.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Distribution boards shall be free from surface and finish defects, and cleaned of dust and construction debris.
- B. All nameplates, labels, screws, bolts, or other hardware shall be in place prior to acceptance.
- C. Prior to installation of switchgear and transformers, layout the electrical rooms and obtain approval of the layout from the code authority having jurisdiction.
- D. Switchboards shall not be installed under piping or ductwork. Meet all requirements of NEC article 110 for Dedicated Electrical Space and Working space about equipment.

3.2 LABELING:

- A. Where changes are made in existing switchboards, distribution boards, etc., provide new labeling and schedules to accurately reflect the changes; hand written revisions will not be acceptable.
- B. Provide an engraved permanent master nameplate at the main distribution to identify the project, the Engineer and the date.
- C. Provide engraved nameplate for all switchboards permanently mounted on the outside face of switchboard; include the following minimum information:
 - 1. Text stating "Main Building Disconnect" (if applicable)
 - 2. Switchboard name
 - 3. Source feeding switchboard
 - 4. Voltage, Size (amps), number of phases, number of wires, and AIC rating
- D. Provide engraved nameplates to clearly label each switchboard breaker to identify each load served, each spare breaker, and each space (size in amps and phase).
- E. Engraved nameplates shall have a black back ply, an inner white ply with outer colored ply as follows: Black for normal power, Red for Emergency (Legally Required or Optional Standby) power, Orange for UPS power.

- F. Provide a permanent engraved label indicating the conductor insulation color for: (1) all ungrounded conductors (2) grounded conductor (3) equipment grounding conductor. This shall be documented at each switchboard in a readily visible location; refer to Wires and Cables Section 26 05 19 for conductor color coding.

3.3 PERFORMANCE TESTING:

- A. Provide ground-fault protection system testing prior to Owner's acceptance and provide written record of testing and proper operation to the A/E team, Owner and Authority Having Jurisdiction (AHJ). Ground-fault protection system testing shall be done in accordance with the manufacturer's instructions.

END OF SECTION 26 2413

SECTION 26 2416 - PANELBOARDS

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. Provide all branch circuit panelboards as herein specified and shown on the drawings.

1.2 SUBMITTALS:

- A. Submit complete and descriptive shop drawings indicating dimensions and compliance with the specifications herein. Submit in accordance with the General Conditions, Division 01, and Section 26 05 00.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

- A. Breaker Panels: Square D, Siemens, General Electric, Cutler-Hammer/Westinghouse,
- B. Requests for substitution of other products will be considered if submitted in accordance with the General Conditions, Division 01, and Section 26 05 00.

2.2 EQUIPMENT:

- A. Panels shall be factory pre-assembled using bolt-on circuit breakers, equivalent to Square D NQOD series. Separate feeder lugs shall be provided for each feeder conductor.
- B. Breakers in branch panelboards shall be not less than 3/4 inch on centers. Each breaker shall be securely fastened to prevent movement and trims shall fit neatly and tightly to the breaker assembly. Two and three pole breakers shall be single breaker assembly rather than two or three single pole breakers with the handles tied together externally.
- C. Panel finish shall be a flat, light gray finish suitable for painting over or being left with factory finish. Flush mounted panels in finished walls shall be painted to match wall, paint and paint preparation to be as specified by Architect. Panel covers to be painted off wall, then installed over painted wall surface. Trims to be separately packed and protected from scratching and marring. Refer to labeling requirements in 26 05 00 Basic Materials and Methods.
- D. Panelboard trims to have concealed trim screws and door hinges, and a flush stainless steel cylinder lock with catch and coil spring loaded door pull equivalent to Square D "Mono-Flat". All panels shall be keyed alike.
- E. Where grounding conductors are shown or specified, provide each panel and distribution center with grounding bus to which the grounding conductors shall be connected, each having its own terminal or lug.
- F. Panelboards rated 400 amps or less shall not exceed 6" depth.
- G. Provide Fully rated equipment greater than or equal to the interrupting capacities indicated on the drawings.

- H. Provide all copper bus bars, 100% rated neutral bus, ground bus and isolated ground bus where indicated. Lugs shall be rated for copper only, CU-AL rated lugs shall not be allowed.
- I. Provide breaker tie handles in 2 pole and 3 pole configurations for all grouped multiwire branch circuits to allow grouped disconnecting means. Verify quantity with contractor.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Breaker handle guards shall be provided on each circuit supplying obviously constant loads to prevent accidental shutting off. Such loads are refrigeration, contactor controlled circuits, freeze protection, etc.
- B. Furnish and install three spare one inch conduits from the top of each recessed panel, to an accessible point above the ceiling.
- C. Care shall be taken to terminate ground conductors from isolated ground receptacles only on the isolated ground bus in a panel. Do not terminate bonding conductors on an isolated ground bus.
- D. Each multiwire branch circuit shall be provided with breaker tie handles such that all ungrounded conductors will be simultaneously disconnected as per NEC 210.4 (B). Provide 2 pole and 3 pole breaker tie handles in sufficient quantity for all grouped circuits.
- E. Group the ungrounded and grounded conductors for multiwire branch circuits in at least one location inside the panelboard with wire ties or similar means per NEC 210.4 (D).

3.2 LABELING:

- A. No brand labels or other marking shall be on the outside of the panels. Where changes are made in existing panels, distribution boards, etc., provide new labeling and schedules to accurately reflect the changes; hand written revisions will not be acceptable.
- B. Provide engraved nameplate for all panelboards permanently mounted inside door for flush panels and on the outside face of the door for surface panels; include the following minimum information:
 - 1. Text stating "Main Building Disconnect" (if applicable)
 - 2. Panelboard name
 - 3. Source feeding panel
 - 4. Voltage, Size (amps), number of phases, number of wires, and AIC rating
- C. Engraved nameplates shall be have a black back ply, an inner white ply with outer colored ply as follows: Black for normal power, Red for Emergency (Legally Required or Optional Standby) power, Orange for UPS power.
- D. Provide typewritten branch panel schedules with protective clear, transparent covers accounting for every breaker installed. Use actual room designations assigned by name or number near completion of the work, and not the designations shown on drawings.

- E. Provide a permanent engraved label or include with the panel schedule information indicating the conductor insulation color for: (1) all ungrounded conductors (2) grounded conductor (3) equipment grounding conductor. This shall be documented at each panelboard in a readily visible location; refer to Wires and Cables Section 26 05 19 for conductor color coding.

END OF SECTION 26 2416

SECTION 26 2726 – SWITCHES & RECEPTACLES

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. Provide all switches, receptacles, and other devices as herein specified and shown on the associated drawings.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

- A. Bryant, Arrow-Hart, Eagle, LeGrand, General Electric, Leviton, Hubbell are acceptable.

2.2 MATERIALS:

- A. The following list of wiring devices covers the most commonly specified items and establishes the grade of device. Should the Drawings indicate a device other than those listed herein without reference to catalog number, such device shall be of the same grade and manufacturer as like devices.

Single Pole Switches	Hubbell #1221
Duplex Receptacles - 20 amp	Hubbell #5362
Where required by Code and/or indicated on drawings	
Hospital-grade Duplex Receptacle	Hubbell #8300
Safety Duplex Receptacle	Hubbell #HBLSG 63H
Duplex Receptacles-Isolated Ground	Hubbell #5362-IG, Orange
Switch with Pilot	LeGrand #20AC1
Dimmer	Lightolier, Sunrise Series Electronic 0-10V Part# SR1200ZTUNV (provide relay pack for 277 volt)

- B. All wiring devices and plates to be specification grade. Receptacles shall be mounted vertically with the ground pin down unless otherwise noted.
- C. Color of devices and plates to be selected by Architect. Provide nylon plates in finish areas. Wood paneled walls shall have brown devices and plates. Restrooms, and food preparation areas to have 302 stainless steel plates.
- D. Flush floor receptacles to be duplex and to have brass, hinged flap lids. Provide carpet flanges in carpeted floors. (See 26 0500, 2.4, E.)
- E. Wet location and/or weatherproof receptacles shall be in a weatherproof enclosure, the integrity of which is not affected when the receptacle is in use (attachment plug cap inserted), UL labeled and listed "Suitable For Wet Locations While In Use". Provide enclosure with stainless steel screws, gasket between enclosure and mounting surface and between cover and base, clear impact resistant UV stabilized polycarbonate as manufactured by TayMac Corporation or accepted equivalent.
- F. Receptacles installed outdoors in a wet/damp location shall be listed weather-resistant type.

PART 3 - EXECUTION

3.1 GENERAL:

- A. Provide a separate GFI type receptacle for each receptacle noted on plans as GFI. Standard receptacles fed from an up-stream GFI type receptacle are not acceptable.
- B. Install outlets and switches in a neat manner.
- C. Extend mudrings to flush out with surrounding wood panels and walls.
- D. Faceplates, devices, and boxes shall be square with floor, and door lines.
- E. Devices to be installed flush with faceplate.

3.2 LABELING:

- A. Provide self-adhesive labels for all switches and receptacles in compliance with Part 3.3 of Section 26 05 00.
- B. Where switches control remote lighting or power outlets, or where switches in the same outlet (two or more) serve different purposes, such as light, power, intercom, etc. or different areas, such as corridor and outside, provide self-adhesive labels clearly indicating the function of each switch or outlet.

END OF SECTION 26 2726

SECTION 26 43 00 – SURGE PROTECTIVE DEVICES

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. Furnish all labor, materials, equipment and services necessary for and incidental to the installation of the surge protective device (referred to as SPD herein and/or TVSS on the drawings) components at locations shown on the plans.

1.2 QUALITY ASSURANCE:

- A. The SPD shall be UL Listed as a surge protective device, category C, UL 1449 latest Edition. All UL 1449 test data shall be provided with submittal.
- B. The SPD shall bear suppressed voltage rating issued by UL, and the units shall be tested in accordance with ANSI/IEEE C62.41 latest edition, Category C, 20kV/10kA, 8x20 uS and 1.2x50 uS Combination Waveform and .5uS - 100kHz Ring Wave with a minimum of 10 sequential impulses delivered directly into the SPD at a maximum of sixty second intervals for each waveform.
- C. Manufacturers Qualifications: Only firms regularly engaged in the manufacture of SPD products for category C (ANSI/IEEE C62.41), and whose products have been providing satisfactory service for not less than five years, shall be considered. Manufacturer qualifications shall be provided as part of the submittal.
- D. The SPD must be capable of surviving 1000 sequential surges without failure, using IEEE test procedures established in C62.45.
- E. The SPD device must have MOV surge devices, installed with full rating indicated between Phase to Neutral, Phase to Ground, and Neutral to Ground, and be capable of handling a minimum surge current as follows:

Panel/Switchboard Size Equal to or greater than (A):	3000	2000	1200	800	225	100
Mode:	kA/Mode					
Line to Neutral	250	200	150	100	80	50
Line to Ground	250	200	150	100	80	50
Neutral to Ground	250	200	150	100	80	50

1.3 SUBMITTALS:

- A. Submit complete and descriptive shop drawings in accordance with the General Conditions, Division 1, and Section 26 05 00.
- B. Submit all related SPD Specifications and drawing information requested in this document and U.L. 1449 latest edition surge suppression ratings for the SPD. In order for a SPD system to be considered, all responses to

information requested in this specification must be provided in writing. If a manufacturer cannot comply with any portion of this specification, this must be stated in the reply and the reason for non-compliance shall be provided.

- C. Submit operation and maintenance data in accordance with the General Conditions, Division 1, and Section 26 05 00.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

- A. Provide products of one of the following manufacturers:
 - 1. Liebert
 - 2. Mersen
 - 3. Current Technologies
 - 4. United Power
 - 5. EFI
- B. Requests for substitution of other products meeting all specification requirements herein will be considered if submitted in accordance with the General Conditions, Division 1 and section 26 05 00.

2.2 SPD EQUIPMENT:

- A. The SPD shall be suitable for application in category C environments as described in ANSI/IEEE C62.41. The SPD shall be of parallel design and provide protection from Line to Ground, Line to Line, Line to Neutral, and Neutral to Ground.
- B. The SPD shall be compatible with the electrical system voltage, current, configuration and intended application.
- C. The SPD maximum continuous operation voltage (MCOV) shall be capable of sustaining 100% of the nominal RMS voltage continuously without degradation.
- D. The SPD shall only use solid state clamping components connected in parallel with the supply to limit the surge voltages. Clamping components shall be installed in 7 modes. Four mode SPD devices are not acceptable.
- E. For Monitoring of SPD's Provide:
 - 1. Visual and audible indication with disable switch for properly performing protection.
 - 2. Provide a surge counter.
- F. SPD shall be repetitive in nature such that failure of a single component within the SPD (i.e. MOV, fuse, etc) does not leave the electrical system unprotected.
- G. All SPD's installed in front of the main service disconnect(s) as indicated on the drawings shall be provided with an integral disconnect and the SPD shall be located next to the main service disconnect(s).

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Ship with complete installation instructions, which are to be followed in detail. The manufacturer's representative is to be contacted and is to supervise the installation.
- B. Supplemental installation information is as follows:
 - 1. Use the breaker space closest to the neutral bus. Nipple the suppressor to the panel where the suppressor can be installed so as to keep both the hot leads and the neutral lead as short and straight as possible from the suppressor to the breakers and the neutral bus.
 - 2. The best performance is achieved with the shortest leads and neutral. All efforts within the code should be used to minimize the lead lengths. Ideally the leads should be less than eight inches long. Each inch of lead above six inches will add approximately 20 volts to the quoted let-through voltage. Cut the leads down to the shortest size that will allow installation.
 - 3. If the neutral bus is out of reach of the leads, then a #4 AWG conductor is to be run from the remote neutral bus to a lug near the suppressor, and the lead from the suppressor should be cut as short as possible.
 - 4. The ground is to be connected to the case of the panel (equipment ground only). Do not connect the suppressor ground wire to an isolated ground (IG) bus.
- C. Installation shall comply with all applicable State and National Electrical Codes, including NEC Articles 240, 250, 310 and 285. Utilize the panelboard/switchboard circuit breaker to provide overcurrent protection and a means to disconnect power from unit. Fuses shall not be utilized for the SPD overcurrent protection unless specifically indicated on the drawings and if utilized shall be of the Time Delay type rated for the available fault current at the location of installation.
- D. Phase, neutral and ground leads of installed SPD must be grouped and twisted together up to the point of connection at the bus or overcurrent device. Lead lengths must be as short as possible, avoiding bends where possible. Lead lengths greater than sixteen inches or sharp bends in leads shall not be permitted, where lead lengths greater than sixteen inches cannot be avoided high performance low impedance cable equivalent to Current Technology "High Performance Interconnect (HPI) SPD connection system" shall be used while maintaining the shortest lead lengths possible, wire size shall be as indicated on the drawings. Lead length is measured from switchboard bus or breaker to point of connection to SPD device.
- E. Mount so that suppressor indicator lights will be clearly visible after installation.
- F. Circuit breaker shall be exclusively utilized for the SPD device.
- G. Raceway from SPD to switchboard shall consist of rigid steel conduit with double locknuts and grounding bushings connected to switchboard ground.
- H. Overcurrent protection sizing shall be as per manufacturer's instructions. Conductor sizing shall be based on NEC requirements.

3.2 LABELING:

- A. Where changes are made in existing SPD's (TVSS's) provide new labeling to accurately reflect the changes; hand written revisions will not be acceptable.

B. Provide engraved nameplate for all SPD's permanently mounted on the outside face of the SPD; include the following minimum information:

1. TVSS name
2. KA/mode ratings for line to neutral, line to ground, and ground to neutral

3.3 WARRANTY:

A. Warranty shall be for full replacement without pro-rating value, for a minimum period of 10 years.

END OF SECTION 26 4300

SECTION 26 5100 - LIGHTING

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. Provide light fixtures with lamps and accessories as herein specified and shown on the drawings.

1.2 QUALITY ASSURANCE:

- A. If the catalog number of a specified fixture should conflict with the fixture description or the general lighting specifications, such conflicts shall be brought to the attention of the Architect prior to bidding.
- B. The dimensions shown on the luminaire schedule are for general reference only. Refer to the manufacturer's shop drawings for exact dimensions prior to rough in.

1.3 SUBMITTALS:

- A. Submit product data and shop drawings for fixtures, ballasts, and lamps in accordance with the General Conditions, Division 1, and Section 26 05 00.
- B. Verify that fixture description matches that which is indicated by the specified catalog number.
- C. All features mentioned in the fixture list shall be marked on the submitted items.
- D. Submit written confirmation that dimming ballasts and dimming controls are compatible.
- E. Submit Operation and Maintenance data in accordance with the General Conditions, Division 1, and Section 26 05 00.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

- A. See Luminaire Schedule for acceptable manufacturers.
- B. Requests for substitution of other products will be considered if submitted in accordance with the General Conditions, Division 1, and Section 26 05 00.
- C. Substitution requests for fixtures equal to those specified shall include complete construction and photometric data including, if applicable, candlepower distribution curve, spacing to mounting height ratio, table of coefficients of utilization, isofootcandle curve, ANSI beam spread classification, efficiency, etc.
- D. Submittals and substitution requests for fluorescent fixtures shall include the sheet metal gauge of the housing and the lens thickness, material, and pattern.

2.2 MATERIALS:

- A. Polystyrene lenses and lenses less than 0.125 inches nominal thickness shall not be permitted unless otherwise noted.
- B. Provide luminaires with Area Coverage, damp, or wet label if required for the application indicated.

- C. All recessed luminaires shall be free of light leaks.

2.3 BALLASTS/DRIVERS:

- A. All ballasts/drivers shall be capable of providing reliable operation of the lamps at the lowest temperature normally encountered. The contractor shall confirm that the ballasts are appropriate for the ambient conditions.
- B. The contractor shall verify the voltage prior to submittal.
- C. DIMMING DRIVER LED: Provide integral 0-10 volt dimming driver capable of continuous dimming that works with any standard 0-10V dimmer, unless noted otherwise on Luminaire Schedule:
 - UL listed and CSA certified.
 - Comply with IESNA LM-79 and LM-80 standards.
 - Recognized Testing Laboratory listed, thermally protected, resetting, Class P, For use in insulated ceilings.
 - Power factor equal to or greater than 90%.
 - Meet all current Federal, State and Power Co. efficiency and efficacy standards, and rebate program requirements.
 - Meet all current ANSI, IEEE, and FCC regulations for EMI/RFI, harmonic distortion, and transient protection.
 - Compatible with occupancy sensor switching.

Coordinate dimming with dimming controls specified in separate section.

Provide low voltage cable for 0-10 volt dimming per manufacturer instructions.

- D. Provide emergency battery/inverter packs at fixtures indicated on plans.
 - 1. Emergency battery/inverter pack shall be capable of operating at a minimum of 1100 lumens, or at the lumen rating listed on the Light Fixture Schedule (whichever is greater), for a minimum of 90 minutes.
 - 2. Emergency battery/inverter packs shall be UL listed and warranted for a minimum of 5 years.
 - 3. Approved Manufacturers: Bodine, Iota, Lithonia or as listed on the fixture schedule.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Luminaires installed under this work shall be properly and adequately supported from the building structure except where ceiling construction or other provisions are specifically designed to support the fixture units. Fixture support systems shall provide a safety factor of four. This shall apply to chains, hangers, anchors, clamps, screws, and all other hardware and appurtenances associated with the support system.
- B. Fixture supports shall provide proper alignment and leveling of fixtures, and shall be arranged to maintain the alignment at all times. The final decision as to adequacy of alignment shall be given by the Architect.
- C. All light outlets shall be supplied with a fixture. Outlet symbols on the drawings without a type designation shall have a fixture the same as those used in similar or like locations.
- D. Fixture stem or chain lengths for industrial reflector or bare lamp strip fixtures shall be appropriate for the space and for coordination with other work such as ducts and piping. Provide swivel hangers for stem-hung fixtures.
- E. Fixtures shall be left clean at the time of acceptance of the work and every lamp shall be in operation. The responsibility for cleaning or protecting fixtures from dirt, dust, paint, debris, etc. shall rest with the Contractor performing this division of work.

- F. Prior to the purchase of any luminaire, the finish shall be verified with the Architect and the voltage shall be verified based on the panelboard voltage.
- G. Fixtures of a given description may be used in more than one type of ceiling. Consult the Architectural Reflected Ceiling plan to obtain this information. Some ceiling types may have changed immediately prior to bidding or by addenda or change order and the changes may not be reflected in the fixture list or fixture designations as shown on the plans. The contractor shall compare the electrical plans with the reflected ceiling plan and confirm that the specified fixtures are compatible with the ceiling system prior to ordering.
- H. Provide seismic support wires for all recessed fixtures where ceiling framing is not designed for fixture support.
- I. Provide all recessed lay-in fixtures a flexible power whip of at least 48 inches but not exceeding 72 inches. Where using modular wiring systems, wiring shall be supported from structure, not laying on ceiling tiles.
- J. Where fixtures are mounted under cabinets, in soffits, coves, or other physically restricting spaces, the contractor shall verify that the fixtures will fit the space prior to ordering.
- K. Undercabinet and similar fixtures are to be hard wired. Flexible cords similar to SO cord are not acceptable.
- L. Air supply fixtures shall be supplied with pattern control vanes.
- M. See Architectural plans for fire rated ceilings and coordinate fixture installation with general contractor to assure continuity of fire rating.

3.3 WARRANTY:

- A. Provide a 5 year complete parts and replacement labor by manufacturer.

END OF SECTION 26 5100

SECTION 28 3100 – FIRE ALARM SYSTEMS

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. The Contractor shall furnish and install a complete automatic and manual electronic addressable fire alarm system, as specified herein and indicated on the drawings.
- B. The system shall include a central control panel, power supply, signal initiating devices, audible and visual alarm devices, door holders, a wiring system and all accessory devices required to provide a complete operating system. Equipment wiring shown on the drawings is diagrammatic and shows only the intended function.
- C. The system shall comply with the applicable provisions of the National Fire Alarm Code (NFPA 72), Americans with Disabilities Act, and meet all requirements of the local authorities having jurisdiction. All equipment and devices shall be listed by the Underwriters' Laboratories, Inc., or approved by the Factory Mutual Laboratories.
- D. NFPA 72 requires audible devices to be heard above the ambient noise levels in all areas of the building. Audible devices shown on the drawings represent a generic layout. Different devices have varying dB output levels and may not provide the performance required by NFPA 72 based on the device layout shown on the drawings. The Contractor shall review the layout with his fire alarm supplier prior to bidding, and if necessary, add additional audible devices to meet the alerting requirements of NFPA 72. This is a performance specification. Any additional devices required shall be shown on a plan and submitted with the shop drawings. Shop drawing checking by the Architect will be only for aesthetic coordination and not for performance as a warning system.

1.2 SUBMITTALS:

- A. Submit complete and descriptive shop drawings in accordance with Division 1 and Section 26 05 00.
- B. Submit plans and specifications to the governing Building Official. Obtain his written acceptance of, and procure and pay for all permits for the system prior to beginning work and ordering equipment.

1.3 ELECTRONIC MEDIA:

- A. The Architect will furnish electronic media for the Contractors use if requested. Title blocks will be removed and small addenda drawings will be removed as well. Addenda and change orders will usually not have been incorporated into the files and it is the Contractors responsibility to add that information. The Contractor or Vendor that will ultimately use the files will be required to sign a hold harmless agreement.
- B. Conversion to formats other than the current version of Autocad will be billed based on time expended in making the conversion.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

- A. Silent Knight

2.2 EQUIPMENT:

- A. The fire alarm control panel shall detect the operation of any signal initiating device, display on the control panel the English language description of the alarm and the area of the alarm condition, print on the printer the alarm type, location, time, and date, close all fire and smoke doors, operate all alarm and auxiliary devices and in addition, shall function as follows:
1. A trouble lamp and trouble buzzer, operating together shall signal any trouble condition. Failure of the building service supply, derangement of system wiring, or alarm condition shall cause the trouble lamps to come on and the trouble buzzer to sound.
 2. A self-restoring silencing switch shall be provided to silence the trouble buzzer which shall be so arranged that the trouble lamp will remain on until the system is restored to normal.
 3. All alarm signals shall be automatically locked in at the control panel until the operated device is returned to its normal condition, and the panel is manually reset.
 4. A switch shall be provided on the control panel for silencing the alarm devices. The manual switch and the alarm silencing switch shall be self-restoring type which cannot be left in an abnormal position.
 5. Each circuit shall be supervised and shall be so arranged that a fault condition in any circuit, or group of circuits, will not affect the proper operation of any other circuit. Supervision shall be the NFPA style appropriate for the occupancy type.
 6. Circuit fuses shall be provided in the control panel for each signal initiating circuit and each alarm circuit. A blown fuse shall cause the audible and visual trouble signals to operate.
 7. All control panel components shall be contained in a 16 gauge steel cabinet with hinged door and key lock finished in red baked enamel.
 8. Provide a digital transmitter with terminals and other necessary facilities in the control panel to permit transmission of trouble and alarm signals over leased or privately owned telephone cable to a remote station receiving panel. Provide two RJ31X telephone jacks at the fire alarm panel and extend two telephone cables to the main telephone board for this purpose.
 9. Provide a key operated "Drill" switch to simulate operation of an initiating device. The "Drill" switch shall not trip the device which transmits a signal to the fire department, operate the elevator return system, or roll down guillotine type fire doors.
 10. The contractor shall determine and furnish the appropriate number of transponders (data gathering panels) needed for proper operation. All transponders shall have at least 20 percent spare points.
 11. The panel shall be approved as a limited energy system.

2.3 SOFTWARE:

- A. The Field Configuration Program shall provide all of the programmable operating instructions for the system. The resident program shall be stored on non-volatile EPROM.
- B. Programming shall be performed at the location of the fire alarm control using a lap-top computer. It shall be possible to program the system without shutting the system down. Programming shall be done off line. Installing the program into the system shall be done by one man from in front of the control panel using a data transfer command. A hard copy of the system programming software shall be made available to the facility manager for his/her use at his/her option. Software will allow the user to reprogram system points, add system points, add or change point descriptions and update the data file.
- C. Programmed control point activation shall include selective control of HVAC, door holder release, elevator recall, fire pump control, stairwell pressurization fans, etc.

2.4 POWER SUPPLY:

- A. The fire alarm system main power supply shall operate on 120 volt AC. Separate overcurrent protection shall be provided, marked "FIRE ALARM". The entire system shall operate on 24 volts DC or less.
- B. Lead calcium or gel cell batteries shall be provided which provide automatic charging and change over to batteries to operate the system in the event of a power failure.
- C. The charger circuits shall be automatic to restore the batteries to their full/charge after an extended power failure automatically. The system shall restore itself automatically to normal power input when AC power is restored to the power input terminals. Charger operation and battery condition shall be electrically supervised.

2.5 INITIATING & WARNING DEVICES:

- A. Call stations shall visually indicate if they have been tripped and shall not have glass or breakable element in them. A special key must be used to reset them.
- B. Audible devices shall be as indicated on the drawings. Horns shall be semi-flush mounted. Chimes shall be electronic type with adjustable volume. Strobe lights shall be behind a white translucent cover with the word "FIRE" on it in red letters. No single audible device shall have a sound level over 100db.
- C. Smoke detectors shall have twist-lock plug-in head. Each detector shall have a red lamp to indicate the initiation of the alarm and it shall be possible to connect a remote lamp. Each detector shall have a unique address. Detectors shall extend no more than 2-1/2" below the ceiling. Detector heads shall be the "smart" type which automatically adjust their sensitivity to ambient conditions.

- D. Detectors mounted above a ceiling shall not be hidden behind ductwork or other obstructions and shall be easily accessible for servicing. Provide an engraved phenolic label on the ceiling tile below each detector which reads "Smoke Detector <software label>". The "Software Label" is the detector identification address used to access that detector. The label shall be white with black lettering.
- E. Furnish and connect all air duct ionization detectors. Each detector shall have a unique address and shall have a zone addressable relay for fan control installed near the appropriate fan starter. The detectors will be physically mounted by the division 25 contractor.
- F. Each duct detector in a concealed location 10 feet above the finished floor or located such that the detectors alarm or supervisory indicator is not readily visible shall have a remote supervisory indication device with indicating light in a visible location acceptable to the local authority having jurisdiction.
- G. Flow switches and O.S. & Y. valve tamper switches shall be furnished and installed by the mechanical contractor and wired by the electrical contractor. Provide an addressable monitoring device at each switch.
- H. Annunciators shall be a display module indicating alarm/trouble conditions in English language with the description and location of the event.
- I. Every initiating device shall have a unique address.
- J. Provide addressable monitoring devices for all auxillary fire alarm devices such as kitchen hood fire systems, halon systems, flow switches, etc.
- K. In each elevator machine room, provide the addressable relays as described in the listing below. Relays shall be located in the appropriate elevator machine rooms and be equipped with one set of SPDT contacts for each elevator controller.
 - 1. One relay for each floor served by the elevators. Relay to be activated by the smoke detectors in the respective elevator lobby.
 - 2. One relay activated by detectors in the elevator machine room and hoistway. These detectors shall be wired to operate the shunt trip breaker feeding each elevator. Provide the necessary wiring to accomplish this function.
 - 3. One relay to indicate that the fire alarm system is in alarm.
- L. Provide an addressable relay at one of the energy management system DDCU panels to indicate that the fire alarm system is in alarm.
- M. Provide an addressable relay at each elevator fire/smoke door. The relay shall release the doors upon initiation of the detector nearest the door.
- N. Coiling doors shall be operated only by their associated detectors.

PART 3 - EXECUTION

3.1 WIRING:

- A. Furnish and install all required wiring in accordance with local and National codes.
- B. Unless otherwise specified, minimum wire size shall be 16 gauge for audible alarm circuits, and 18 gauge for signal initiating circuits. Strobes shall be wired separately from audible devices, including combination horn/strobe units.
- C. All point monitors and relays for control of auxiliary devices such as fans, dampers, solenoids, elevators, etc. are to be located within three feet of the device they control.
- D. Mount all detectors in accordance with the requirements of NFPA 72E.

3.2 LABELING:

- A. Where changes are made in existing panels, provide new labeling to accurately reflect the changes; hand written revisions will not be acceptable.
- B. Provide permanent engraved labels for all fire alarm control panels, notification appliance circuit (NAC) power supply panels, transponder panels, and speaker system panels in compliance with Part 3.3 of Section 26 05 00. Include the following information:
 - 1. Panel name, date of installation (month/year)
 - 2. Circuit number feeding the panel
- C. Provide self-adhesive labels for the following devices in compliance with Part 3.3 of Section 26 05 00:
 - 1. All initiating devices (smoke detectors, heat detectors, duct detectors, beam detectors, pull stations, monitor modules, control modules, etc.); for addressable devices provide unique address, for zone devices provide zone address.
 - 2. All notification appliances (horn/strobes, strobes, horns, etc.); provide NAC panel supplying device along with circuit number.
- D. Label all fire alarm system junction boxes with a permanent black marker indicating circuits.
- E. Fire alarm system conduit shall be labeled by one of the following means unless raceway is run exposed within finished spaces:
 - 1. Red painted conduit or MC cable (if MC cable is allowed)
 - 2. With 2" wide red painted or red taped bands on the conduit at no less than 8 feet on center increments and at every end or termination of the conduit.
- F. Fire alarm system junction boxes shall be provided with red coverplates unless they are installed exposed within finished spaces.
- G. Identify the circuit disconnecting means for the fire alarm equipment as "FIRE ALARM CIRCUIT" with red identification.

3.3 DEVICE LOCATION

- A. Install smoke and heat detectors a minimum of 3 feet away from air supply and return diffusers. Install smoke or heat detectors in sloped ceilings to within 3 feet of the top of the sloped structure.
- B. Install smoke and heat detectors in locations as approved by the NFPA 72. Adjust locations as required to coordinate with solid beam construction, peaked or sloped ceilings, and high ceiling areas.
- C. Smoke detectors installed in corridors shall be no more than 30 feet on center, and 15 feet from the end of the hallway. Pullstations shall be located not more than 15 feet from end of the hallway. Strobes and speaker/strobes shall not be located more than 15 feet from the end of a hallway or change in corridor direction.
- D. Consult Engineer for minor relocations of devices that may be required to avoid obstructions, or for ease of installation or concealment. Mark all such relocations on record drawings. Contractor shall relocate devices up to 15 feet without any additional charge to the contract.

3.4 FIELD QUALITY CONTROL:

- A. A factory trained representative of the manufacturer shall supervise the prefinal testing of the system. Pretest all installed devices to ensure compliance prior to the final test.
- B. The final test shall be subject to the approval and acceptance of the responsible Architect/Engineer, and the Fire Marshal. Provide all appropriate equipment to complete the testing.
- C. On completion of the acceptance tests, the Owner or his representative shall be instructed in the operation and testing of the system.

3.5 CERTIFICATION/CLOSEOUT:

- A. Submit a statement to the Architect/Engineer that indicates the system has been designed, tested, and installed in accordance with all applicable codes and regulations.
- B. Submit diskette or CD, with all appropriate programming updates to the owner.
- C. Submit testing report to the Architect/Engineer and Fire Marshal showing results of tests.

3.6 WARRANTY

- A. Submit letter of warranty, guaranteeing the new portion of the fire alarm system parts and labor for 2 years. Provide a 24 hour response upon failure of any component of the fire alarm system. The vendor and the contractor are required to participate as necessary for any warranty work during the warranty period.

END OF SECTION 28 3100



OCS – SPECIAL EDUCATION AND ANNEX BUILDING REMODELS

DIVISION 28: ELECTRONIC SAFETY AND SECURITY

28 3100 Fire Alarm Addressable

SECTION 28 3100 – FIRE ALARM SYSTEMS

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. The Contractor shall furnish and install a complete automatic and manual electronic addressable fire alarm system, as specified herein and indicated on the drawings.
- B. The system shall include a central control panel, power supply, signal initiating devices, audible and visual alarm devices, door holders, a wiring system and all accessory devices required to provide a complete operating system. Equipment wiring shown on the drawings is diagrammatic and shows only the intended function.
- C. The system shall comply with the applicable provisions of the National Fire Alarm Code (NFPA 72), Americans with Disabilities Act, and meet all requirements of the local authorities having jurisdiction. All equipment and devices shall be listed by the Underwriters' Laboratories, Inc., or approved by the Factory Mutual Laboratories.
- D. NFPA 72 requires audible devices to be heard above the ambient noise levels in all areas of the building. Audible devices shown on the drawings represent a generic layout. Different devices have varying dB output levels and may not provide the performance required by NFPA 72 based on the device layout shown on the drawings. The Contractor shall review the layout with his fire alarm supplier prior to bidding, and if necessary, add additional audible devices to meet the alerting requirements of NFPA 72. This is a performance specification. Any additional devices required shall be shown on a plan and submitted with the shop drawings. Shop drawing checking by the Architect will be only for aesthetic coordination and not for performance as a warning system.

1.2 SUBMITTALS:

- A. Submit complete and descriptive shop drawings in accordance with Division 1 and Section 26 0500.
- B. Submit plans and specifications to the governing Building Official. Obtain his written acceptance of and procure and pay for all permits for the system prior to beginning work and ordering equipment.

1.3 ELECTRONIC MEDIA:

- A. The Architect will furnish electronic media for the Contractors use if requested. Title blocks will be removed, and small addenda drawings will be removed as well. Addenda and change orders will usually not have been incorporated into the files and it is the Contractors responsibility to add that information. The Contractor or Vendor that will ultimately use the files will be required to sign a hold harmless agreement.
- B. Conversion to formats other than the current version of Autocad will be billed based on time expended in making the conversion.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

- A. Silent Knight

2.2 EQUIPMENT:

- A. The fire alarm control panel shall detect the operation of any signal initiating device, display on the control panel the English language description of the alarm and the area of the alarm condition, print on the printer the alarm type, location, time, and date, close all fire and smoke doors, operate all alarm and auxiliary devices and in addition, shall function as follows:
1. A trouble lamp and trouble buzzer, operating together shall signal any trouble condition. Failure of the building service supply, derangement of system wiring, or alarm condition shall cause the trouble lamps to come on and the trouble buzzer to sound.
 2. A self-restoring silencing switch shall be provided to silence the trouble buzzer which shall be so arranged that the trouble lamp will remain on until the system is restored to normal.
 3. All alarm signals shall be automatically locked in at the control panel until the operated device is returned to its normal condition, and the panel is manually reset.
 4. A switch shall be provided on the control panel for silencing the alarm devices. The manual switch and the alarm silencing switch shall be self-restoring type which cannot be left in an abnormal position.
 5. Each circuit shall be supervised and shall be so arranged that a fault condition in any circuit, or group of circuits, will not affect the proper operation of any other circuit. Supervision shall be the NFPA style appropriate for the occupancy type.
 6. Circuit fuses shall be provided in the control panel for each signal initiating circuit and each alarm circuit. A blown fuse shall cause the audible and visual trouble signals to operate.
 7. All control panel components shall be contained in a 16-gauge steel cabinet with hinged door and key lock finished in red baked enamel.
 8. Provide a digital transmitter with terminals and other necessary facilities in the control panel to permit transmission of trouble and alarm signals over leased or privately owned telephone cable to a remote station receiving panel. Provide two RJ31X telephone jacks at the fire alarm panel and extend two telephone cables to the main telephone board for this purpose.
 9. Provide a key operated "Drill" switch to simulate operation of an initiating device. The "Drill" switch shall not trip the device which transmits a signal to the fire department, operate the elevator return system, or roll down guillotine type fire doors.
 10. The contractor shall determine and furnish the appropriate number of transponders (data gathering panels) needed for proper operation. All transponders shall have at least 20 percent spare points.
 11. The panel shall be approved as a limited energy system.

2.3 SOFTWARE:

- A. The Field Configuration Program shall provide all of the programmable operating instructions for the system. The resident program shall be stored on non-volatile EPROM.
- B. Programming shall be performed at the location of the fire alarm control using a lap-top computer. It shall be possible to program the system without shutting the system down. Programming shall be done offline. Installing the program into the system shall be done by one man from in front of the control panel using a data transfer command. A hard copy of the system programming software shall be made available to the facility manager for his/her use at his/her option. Software will allow the user to reprogram system points, add system points, add or change point descriptions and update the data file.
- C. Programmed control point activation shall include selective control of HVAC, door holder release, elevator recall, fire pump control, stairwell pressurization fans, etc.

2.4 POWER SUPPLY:

- A. The fire alarm system main power supply shall operate on 120 volt AC. Separate overcurrent protection shall be provided, marked "FIRE ALARM". The entire system shall operate on 24 volts DC or less.

- B. Lead calcium or gel cell batteries shall be provided which provide automatic charging and change over to batteries to operate the system in the event of a power failure.
- C. The charger circuits shall be automatic to restore the batteries to their full/charge after an extended power failure automatically. The system shall restore itself automatically to normal power input when AC power is restored to the power input terminals. Charger operation and battery condition shall be electrically supervised.

2.5 INITIATING & WARNING DEVICES:

- A. Call stations shall visually indicate if they have been tripped and shall not have glass or breakable element in them. A special key must be used to reset them.
- B. Audible devices shall be as indicated on the drawings. Horns shall be semi-flush mounted. Chimes shall be electronic type with adjustable volume. Strobe lights shall be behind a white translucent cover with the word "FIRE" on it in red letters. No single audible device shall have a sound level over 100db.
- C. Smoke detectors shall have twist-lock plug-in head. Each detector shall have a red lamp to indicate the initiation of the alarm and it shall be possible to connect a remote lamp. Each detector shall have a unique address. Detectors shall extend no more than 2-1/2" below the ceiling. Detector heads shall be the "smart" type which automatically adjust their sensitivity to ambient conditions.
- D. Detectors mounted above a ceiling shall not be hidden behind ductwork or other obstructions and shall be easily accessible for servicing. Provide an engraved phenolic label on the ceiling tile below each detector which reads "Smoke Detector <software label>". The "Software Label" is the detector identification address used to access that detector. The label shall be white with black lettering.
- E. Furnish and connect all air duct ionization detectors. Each detector shall have a unique address and shall have a zone addressable relay for fan control installed near the appropriate fan starter. The detectors will be physically mounted by the division 25 contractor.
- F. Each duct detector in a concealed location 10 feet above the finished floor or located such that the detectors alarm or supervisory indicator is not readily visible shall have a remote supervisory indication device with indicating light in a visible location acceptable to the local authority having jurisdiction.
- G. Flow switches and O.S. & Y. valve tamper switches shall be furnished and installed by the mechanical contractor and wired by the electrical contractor. Provide an addressable monitoring device at each switch.
- H. Annunciators shall be a display module indicating alarm/trouble conditions in English language with the description and location of the event.
- I. Every initiating device shall have a unique address.
- J. Provide addressable monitoring devices for all auxiliary fire alarm devices such as kitchen hood fire systems, halon systems, flow switches, etc.
- K. In each elevator machine room, provide the addressable relays as described in the listing below. Relays shall be located in the appropriate elevator machine rooms and be equipped with one set of SPDT contacts for each elevator controller.
 - 1. One relay for each floor served by the elevators. Relay to be activated by the smoke detectors in the respective elevator lobby.
 - 2. One relay activated by detectors in the elevator machine room and hoistway. These detectors shall be wired to operate the shunt trip breaker feeding each elevator. Provide the necessary wiring to accomplish this function.
 - 3. One relay to indicate that the fire alarm system is in alarm.

- L. Provide an addressable relay at one of the energy management system DDCU panels to indicate that the fire alarm system is in alarm.
- M. Provide an addressable relay at each elevator fire/smoke door. The relay shall release the doors upon initiation of the detector nearest the door.
- N. Coiling doors shall be operated only by their associated detectors.

PART 3 - EXECUTION

3.1 WIRING:

- A. Furnish and install all required wiring in accordance with local and National codes.
- B. Unless otherwise specified, minimum wire size shall be 16 gauge for audible alarm circuits, and 18 gauge for signal initiating circuits. Strobes shall be wired separately from audible devices, including combination horn/strobe units.
- C. All point monitors and relays for control of auxiliary devices such as fans, dampers, solenoids, elevators, etc. are to be located within three feet of the device they control.
- D. Mount all detectors in accordance with the requirements of NFPA 72E.

3.2 LABELING:

- A. Where changes are made in existing panels, provide new labeling to accurately reflect the changes; handwritten revisions will not be acceptable.
- B. Provide permanent engraved labels for all fire alarm control panels, notification appliance circuit (NAC) power supply panels, transponder panels, and speaker system panels in compliance with Part 3.3 of Section 26 05 00. Include the following information:
 - 1. Panel name, date of installation (month/year)
 - 2. Circuit number feeding the panel
- C. Provide self-adhesive labels for the following devices in compliance with Part 3.3 of Section 26 0500:
 - 1. All initiating devices (smoke detectors, heat detectors, duct detectors, beam detectors, pull stations, monitor modules, control modules, etc.); for addressable devices provide unique address, for zone devices provide zone address.
 - 2. All notification appliances (horn/strobes, strobes, horns, etc.); provide NAC panel supplying device along with circuit number.
- D. Label all fire alarm system junction boxes with a permanent black marker indicating circuits.
- E. Fire alarm system conduit shall be labeled by one of the following means unless raceway is run exposed within finished spaces:
 - 1. Red painted conduit or MC cable (if MC cable is allowed)
 - 2. With 2" wide red painted or red taped bands on the conduit at no less than 8 feet on center increments and at every end or termination of the conduit.
- F. Fire alarm system junction boxes shall be provided with red coverplates unless they are installed exposed within finished spaces.

- G. Identify the circuit disconnecting means for the fire alarm equipment as "FIRE ALARM CIRCUIT" with red identification.

3.3 DEVICE LOCATION

- A. Install smoke and heat detectors a minimum of 3 feet away from air supply and return diffusers. Install smoke or heat detectors in sloped ceilings to within 3 feet of the top of the sloped structure.
- B. Install smoke and heat detectors in locations as approved by the NFPA 72. Adjust locations as required to coordinate with solid beam construction, peaked or sloped ceilings, and high ceiling areas.
- C. Smoke detectors installed in corridors shall be no more than 30 feet on center, and 15 feet from the end of the hallway. Pullstations shall be located not more than 15 feet from end of the hallway. Strobes and speaker/strobes shall not be located more than 15 feet from the end of a hallway or change in corridor direction.
- D. Consult Engineer for minor relocations of devices that may be required to avoid obstructions, or for ease of installation or concealment. Mark all such relocations on record drawings. Contractor shall relocate devices up to 15 feet without any additional charge to the contract.

3.4 FIELD QUALITY CONTROL:

- A. A factory trained representative of the manufacturer shall supervise the prefinal testing of the system. Pretest all installed devices to ensure compliance prior to the final test.
- B. The final test shall be subject to the approval and acceptance of the responsible Architect/Engineer, and the Fire Marshal. Provide all appropriate equipment to complete the testing.
- C. On completion of the acceptance tests, the Owner or his representative shall be instructed in the operation and testing of the system.

3.5 CERTIFICATION/CLOSEOUT:

- A. Submit a statement to the Architect/Engineer that indicates the system has been designed, tested, and installed in accordance with all applicable codes and regulations.
- B. Submit diskette or CD, with all appropriate programming updates to the owner.
- C. Submit testing report to the Architect/Engineer and Fire Marshal showing results of tests.

3.6 WARRANTY

- A. Submit letter of warranty, guaranteeing the new portion of the fire alarm system parts and labor for 2 years. Provide a 24 hour response upon failure of any component of the fire alarm system. The vendor and the contractor are required to participate as necessary for any warranty work during the warranty period.

END OF SECTION 28 3100

