

UNION STATION

Restroom Renovations

Hartford, Connecticut

Contract Document Specifications

TSKP Studio
Architect
One Hartford Square West
146 Wyllys St., 1-203
Hartford CT 06106
(860) 547-1970

The drawings and specifications are divided into section to meet the needs of the Architect, Engineers, and other Design Consultants. These sections are not prepared as instructions to the Contractor for how to buy out or subcontract the Work.

The Contractor is responsible for all the Work described in the Contract Documents, regardless of where it is indicated, he acknowledges that he has reviewed ALL the Contract Documents and understands the entire scope of the project in its entirety.



LIST OF CONSULTANTS

ARCHITECT

TSKP STUDIO, LLC
146 Wyllys Street, Suite 1-203
Hartford, CT 06106

MEP/FP Engineers

Bemis Associates LLC
185 Main Street
Farmington, CT 06032

UNION STATION RESTROOM RENOVATIONS

COVER

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UNION STATION RESTROOM RENOVATIONS

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**NOTICE
GREATER HARTFORD TRANSIT DISTRICT
INVITATION FOR BIDS
UNION STATION TRANSPORTATION CENTER
PUBLIC RESTROOM EXPANSION AND RENOVATION
GHTD IFB #11-020**

The Greater Hartford Transit District (GHTD), Hartford, Connecticut, a municipal corporation formed under Chapter 103a of the Connecticut General Statutes, Revision of 1958, as amended, is seeking a general contractor to perform construction for the expansion and renovation of the public restrooms at Hartford's Union Station Building, within the area of work as indicated in the Bid Documents.

Bid documents including drawings and specifications will be available on or after **Friday, June 5, 2020**. Printed versions of contract drawings and specifications may be purchased at a fee per set from the Reprstore, located at 37 Airport Road, Hartford, CT 06114. Reprstore customer service can be reached by telephone at (860) 296-0374 or via email at plots@reprstore.com. Purchases are non-refundable. Bidders can also access bid documents (including drawings and specifications) electronically for \$30.00 through the Reprstore digital plan room on the website by visiting the following link:

<https://www.reprstoreplanroom.com/>

Bids shall be submitted to LaShaunda Drake, Greater Hartford Transit District, One Union Place, First Floor North, Hartford, CT. 06103, on or before **3:00 PM local time on Thursday, July 16, 2020**. There will be a public bid opening at 3:10 p.m. local time held via GoToMeeting. **A Pre-Bid Conference will be held by the District on Wednesday, June 17, 2020 at 1:00 PM local time**, to provide an opportunity to outline the requirements the District will expect of the Bidder, as well as to provide the opportunity for questions and explanations. Such Conference will be held via GoToMeeting. Attendance at the Pre-Bid Conference is not mandatory, and is not a condition for final award.

Questions concerning the bidding process should be submitted in writing to LaShaunda Drake at ldrake@ghtd.org.

Bids received after the deadline will not be considered and will be returned to the bidder unopened. Any changes, or any requests for changes in the specifications, will not be recognized after sealed bids are submitted to the District.

Any contract resulting from this invitation for bids is subject to a financial assistance contract between the District and the Federal Transit Administration and the District and the State of Connecticut. All bidders will be required to certify that they are not on the

Comptroller General's list of ineligible contractors. Further, the contractor will be required to comply with all applicable equal employment opportunity laws and regulations.

The GHTD hereby notifies all bidders that in regard to any contract entered into pursuant to this Invitation for Bids, advertisement or solicitation, disadvantaged business enterprises will be afforded full opportunity to submit proposals in response, and will not be subjected to discrimination on the basis of race, color, sex or national origin in consideration for an award.

The GHTD reserves the right to reject any and all bids as submitted by this Invitation for Bids, and to waive informalities and irregularities, as it deems in its best interest.



**INVITATION FOR BIDS
GHTD IFB #11-020**

**PUBLIC RESTROOM EXPANSION AND RENOVATION
UNION STATION TRANSPORTATION CENTER
HARTFORD, CT**

**GREATER HARTFORD TRANSIT DISTRICT
ONE UNION PLACE, HARTFORD, CT 06103
(860) 247-5329**

JUNE 5, 2020

SECTION I – GENERAL INFORMATION FOR BIDDERS

1. INTRODUCTION

The Greater Hartford Transit District (the “District”) is a quasi-municipal corporation operating under the authority of Chapter 103a of the Connecticut General Statutes. The District, a demand-response transit provider, is responsible for the provision of Americans with Disabilities (ADA) compliant door to door transportation services for disabled residents within the service area of CT Transit’s Hartford and, New Britain/Bristol Divisions.

The District has broad powers to acquire, operate, finance, plan, develop, maintain and otherwise provide all forms of land transportation and related services including the development or renewal of transportation centers and parking facilities.

The District is also the owner and operator of Hartford’s Historic Union Station Transportation Center Complex, an intermodal hub of transportation that currently serves Amtrak rail, CTrail, intercity and intra city bus service, taxi services, and public parking. The Complex includes the Spruce Street Parking Lot. The Union Station Transportation Center is a mixed-use facility that includes: ticketing booths for bus and rail travel, office space on three levels, and food/beverage vendors.

The District, as the owner and operator of the Union Station Transportation Center (the "Center") issues this formal Invitation for Bids (IFB) from qualified firms for a general contractor to provide Demolition and Interior Renovations of existing Public Restrooms and support spaces (to include the Amtrak restroom and both Amtrak locker rooms) located on the First floor of the Hartford Union Station. The scope of work includes, but is not limited to, architectural, mechanical, electrical, plumbing (MEP) work and minor Site Work related to Logistic Plan. Project includes the furnishing and installation of the temporary Portable Restrooms Trailers as indicated on Drawings. TSKP Studio is the designer/engineer of record for this project.

The specifics of the services, and other documents relevant to this IFB, are set forth in the Scope of Services and in the Exhibits attached hereto and made a part hereof.

2. SUBMISSION OF BIDS

In order to respond, the Candidate must supply the required information on and along with the response forms. An officer or explicit agent of your organization must sign the response form and any supplementary proposal document.

a) Date and Location for Submittal

Bids must be submitted to the District on or before **Thursday, July 16, 2020 3:00 p.m.** local time. Each bid shall be securely sealed in a suitable envelope and marked “GHTD IFB #11-020 PUBLIC RESTROOM EXPANSION AND RENOVATION” in capital letters on the envelope. Bids should be delivered to:

LaShaunda Drake
Procurement and Contract Coordinator

Greater Hartford Transit District
One Union Place
Hartford, Connecticut 06103-1409
(860) 380-2012

Late submissions will not be accepted. It is the responsibility of a Bidder to ensure that its Bid is delivered to the District by the date and time referred to hereinabove. Delivery by facsimile or other electronic means will not be accepted. Bids received before the opening date will be kept unopened until the time fixed for the bid opening. The person whose duty it is to open the bids will determine when the time stated for opening has arrived. All bids will be opened in public at the bid opening. Any person present shall have the right to have any part of the bids read aloud. The District reserves the right to postpone the bid opening if it is determined that to do so is in the best interest of the District.

b) Form of Bid

One copy of the bid form shall be completed, signed and submitted. No other form of bid or proposal will be acceptable.

Every designated space on the bid form shall be filled in or otherwise marked to show the bidder's intention clearly. Interlineations, alterations, erasures or any other change must be clearly initialed by the bidder. All amounts shall be stated in figures. The bid form is to be submitted along with the Certifications and other documents required by this IFB. Any conditional or qualified bid will be rejected.

3. BID INQUIRIES

Communication by any bidder with any agent or employee of the District on the subject of this IFB, or the pending process may result in the bidder being deemed ineligible with regard to this IFB. All questions and requests for clarification regarding this IFB or this process must be submitted in writing to LaShaunda Drake at ldrake@ghtd.org on or before **12:00 p.m. local time on June 24, 2020**. Responses shall be in writing and posted in the form of an addendum and will be distributed to all known recipients of the IFB document.

The bids submitted for the work must be based upon the text of this document including the General Information, Special Instructions, Specifications, all Addenda, and any referenced plans, and no oral or informal statement or representation by any representative or employee of the District or the designer shall be considered an amendment to or waiver of any statements in or requirement of such bidding or proposed contract documents and no claim or right of action shall accrue in favor of any respondent as a result of or founded on such oral or informal statements or representations. The District or its agents shall not be responsible for any oral instructions or interpretations given to a Bidder.

4. PRE-PROPOSAL CONFERENCE

A Pre-Bid Conference will be held by the District via **GoToMeeting on Wednesday, June 17th, 2020 at 1:00 p.m. local time**, for the purpose of outlining the requirements and service standards that the District will expect of the Contractor, as well as to provide the opportunity for questions and explanations. The Bidder may submit any written requests for clarification as well as any questions regarding this solicitation package prior to the pre-bid conference. Attendance at the Pre-Bid Conference is not mandatory, and is not a condition for final award.

To join the GoToMeeting, visit: <https://global.gotomeeting.com/join/130332941>
You can also dial in using your phone: 1 (571) 317-3122
Access Code: 130-332-941

The District reserves the right to issue addenda to this IFB as a result of inquiries received, or to make adjustments to its project schedule if it is deemed in the District's best interest to do so. The District further reserves the right to reject any and all Proposals resulting from this RFP if the District deems that it is in the best interest of the District to do so.

5. SITE INSPECTION

Information contained in these documents is provided in good faith only that all Proposers may have access to the same information utilized by the District, and is not intended as a substitute for personal investigations, interpretations and judgment of the Proposer. As information may be approximated or incomplete, Proposers should conduct a thorough inspection, review of existing conditions of the site and compare it to the specifications and drawings. Any discrepancies or needs for clarifications must be raised as indicated in Paragraph 3, above.

Submission of a bid shall be evidence that the Proposer has examined the site, compared it with the drawings and specifications and satisfied itself of the conditions existing at the site, the storage and handling of materials, and all other matters incidental to the work under this contract. No additional compensation will be allowed for difficulties which the Proposer could have discovered or reasonably anticipated prior to bidding.

6. COMMENCEMENT OF SERVICES

It is the intent of the District to execute an agreement with the successful bidder, to commence in the Fall of 2020.

7. FUNDING

Any contract resulting from this Invitation for Bids is subject to a financial assistance contract between the District and the Federal Transit Administration and between the District and the State of Connecticut Department of Transportation. All firms will be required to certify that they are not on the U.S. Department of Transportation's list of ineligible contractors. Further, the contractor will be required to comply with all applicable equal employment opportunity laws and regulations.

No bids will be accepted from, or a Contract awarded to any person, firm, or corporation that is in arrears or is in default to the State of Connecticut upon any debt or contract or that is in default as a surety or in any other manner is in default of any obligation to the State. Additionally, no Contract shall be awarded to any person, firm, or corporation that has failed to perform on any prior or previous contract, agreement, or license with the State. Nor will any Contract be awarded to any firm that is not registered with the Secretary of State's Office to conduct business in the State of Connecticut.

8. FEDERAL GRANT REQUIREMENTS

Exhibit A attached hereto and made a part hereof sets forth federal requirements placed upon vendors who are participating in a project funded in whole or in part with Federal grants. Its provisions are hereby included herein as an integral part of this IFB.

9. STATE GRANT REQUIREMENTS

Contractor must comply with State Grant Requirements (Exhibit B).

10. PROCUREMENT AND APPEALS PROCESS

The District's procurement procedures and appeals process are contained in Exhibit C attached hereto and made a part hereof.

11. DISADVANTAGED BUSINESS ENTERPRISE

It is the policy of the District that disadvantaged business enterprises ("DBE's") be afforded the maximum opportunity to participate in the performance of all contracts let by the District. This participation may be in the form of prime contracts, and/or sub-contracts, and/or direct or general overhead items procured from DBEs allocated to the Services. The term "disadvantaged business enterprise" means a business enterprise that is at least 51% owned and controlled by one or more socially disadvantaged persons. Such disadvantage may arise from cultural, racial, chronic economic circumstances or background, or other similar cause. Such persons would include but not be limited to citizens of the United States who are: African Americans (not of Hispanic origin); Hispanic Americans; Native Americans; Asian-Pacific Americans; and, women regardless of race and ethnicity. Proposers will submit a statement indicating its own DBE status and what subcontracts and/or overhead purchases with amounts thereof under this project it will let to comply with the District's DBE goal of **5%**.

If the Contractor is unable to achieve the specified contract goals, the Contractor must submit written documentation to the District indicating his/her good faith efforts to satisfy goal requirements.

The District is a part of the State of Connecticut Department of Transportation Unified Certification Program ("UCP") and any contractor and/or sub-contractor and/or vendor utilized to meet the DBE Participation requirements must be certified through that UCP. A list of Conn DOT Certified DBE vendors can be found at: http://www.biznet.ct.gov/dot_dbe/dbesearch.aspx. Upon request, the District will provide information related to the state certification process.

12. VALIDITY OF PROPOSALS

Bidders agree that their proposals remain valid for a period of one hundred and eighty (180) days after the above cited due date for submission of bids and may be extended beyond that time by mutual agreement.

By responding to this IFB, the bidder implicitly states that the bid is not made in connection with any competing firm submitting a separate response to this IFB, and is in all respects fair and without collusion or fraud. It is further implied that the bidder did not participate in the District's IFB development process, had no knowledge of the specific contents of this IFB prior to its issuance, and that no employee of the District participated directly or indirectly in the firm's bid preparation.

Please note that the costs associated with the preparation of a Bid are the sole responsibility of the applicable Bidder. Bidder shall not include any such expenses as part of the price proposed in response to the IFB.

13. INFORMATION TO BIDDERS

(a) Discrepancy in Bid Documents

If a bidder becomes aware of any discrepancy, ambiguity, error or omission in this solicitation package, he or she shall report it to District's representative, LaShaunda Drake, ldrake@ghtd.org, Greater Hartford Transit District, One Union Place, Hartford, CT 06103. The District will determine the necessity for clarification and may issue addenda as a result.

Any interpretation, change, clarification or correction in the bid documents will be made only by written instrument(s) issued by the District. Copies of such instrument(s) will be emailed or delivered to each person, firm or corporation which has received this IFB document.

(b) Brand Names

If present, brand, manufacturer or product names are indicated in the specifications only for the purpose of establishing identification and a general description of the item(s) sought. Items of equal quality, not bearing such names, may be submitted in the bid, provided however that prior approval for the item is obtained from the District.

(c) Requests for Clarification/Approved Equal Status

Requests for clarification of specifications and any protest of specifications must be received by the District, in writing, to LaShaunda Drake at ldrake@ghtd.org on or before **12:00 p.m. local time on June 24, 2020**. Responses shall be in writing and posted in the form of an addendum and will be distributed to all known recipients of the IFB document.

Approved Equal Status

In all cases, materials must be furnished as specified. Where brand names or specific items are used in the specifications, consider the term "or approved equal" to follow. Any unapproved deviations, exceptions, substitutions, alternates or conditional qualifications contained in a proposal may be cause for its rejection. If potential contractors believe that their product is an equal to the product specified, they must submit a written request to District in triplicate and this request will be approved or rejected by the District at least fifteen (15) calendar days prior to the scheduled opening of the bids. Requests for approved equals must be received by the District in writing by **July 1, 2020**.

Any request for an approved equal must be fully supported with catalog information, specifications and illustrations or other pertinent information as evidence that the substitute offered is equal to or better than the specification. Where an approved equal is requested, the contractor must clearly demonstrate the equality of this product to the District to determine whether the proposer's product is or is not equal to that specified. An Approved Equal Form is included in Exhibit E. Further changes in the specifications will be made by addendum.

(d) Obligations of the Proposer

At the time of the opening of proposals, each Proposer will be presumed to be thoroughly familiar with the IFB requirements, and the objectives for each element of the project, item, or service. A plea of mistake in the accepted response shall not be

available to the Proposer for the recovery of the bid surety or as a defense to any action based upon an accepted response.

(e) Omission of Details

No advantage shall be taken by the Proposer in the omission of any part or detail which is required to make the project complete and ready for service, even though such part of detail is not mentioned explicitly in the specifications. All units or parts not herein specified shall be manufacturer's standard units and shall conform to the highest standard in the industry.

(f) Qualification of Bidders

Contractor shall submit documentation of Qualifications to perform the work of this contract. Qualifications at a minimum will include CT license, list of projects of similar scope (subject and cost) for last five (5) years, references from past Owners for this kind of work, and any other materials that will provide assurance that Contractor has qualifications for the work. The District may make such investigations as deemed necessary to determine the ability of the Candidate to perform the work and the degree to which any Candidate meets the criteria for award listed herein. A Statement of Bidders Qualification is included in Exhibit E.

(f) Determination of Successful Bidder

In determining the successful bidder, consideration will be given to price, financial responsibility of the bidder, responsiveness to the specifications, warranty, suitability of the product offered for use, past experience, financial ability to meet the contract, facilities and equipment, availability of labor, delivery promise, terms of payment, and other objective and accountable factors which are reasonable.

Award of any contract from this Invitation for Bids shall be made to the bidder quoting the lowest total computed base bid, including delivery charges, and payment terms, but excluding alternate bid items, as described in the Bid (where applicable), provided the bid is responsive in all respects to the procurement requirements.

All materials, parts and equipment furnished by the contractor shall be new, high grade and free from defects. Materials and workmanship not conforming to the requirements of the specifications shall be considered defective and will be subject to rejection.

If the contractor fails to replace any defective or damaged work or materials after reasonable notice, the District may cause such work or materials to be replaced. The replacement expenses shall be deducted from the amount to be paid to the contractor.

The District may inspect all material and workmanship at any time during the progress of the work and shall have the right to reject all materials and workmanship which does not conform to the specifications or which is not considered to be of adequate quality.

(g) Disqualification of Bidders

Proposers may be disqualified and bids may be rejected for any of, but not limited to, the following causes:

- Failure to use Bid Proposal Form furnished by the District
- Lack of signature by an authorized representative on the Bid Proposal Form

- Failure to properly complete the Bid Proposal form
- Evidence of collusion among bidders
- Unauthorized alteration of Bid Proposal Form
- Failure to submit signed required certifications

The District reserves the right to waive any minor informality or irregularity.

14. QUANTITIES AND/OR USAGES

Quantities and/or usages are estimates only and in no way represent a commitment and/or intent to purchase the estimated amount. Actual quantities and delivery locations may vary. The District reserves the right to order all quantities that may be needed, at the contract price, during the contract term regardless of the estimates provided in this IFB.

15. SAMPLES

Samples are furnished free of charge and may be held for comparison with deliveries. Proposers must arrange for their return if desired. Samples are assumed to meet, at a minimum, District specifications for quality. All deliveries shall have at least the same quality as the accepted proposal sample. Latent deficiencies will be remedied by the contractor at no additional cost, or loss of service, to the District.

16. PAYMENT OF PREVAILING WAGES/DAVIS BACON WAGE RATES

The Proposer agrees that the contractor's laborers and mechanics and any subcontractor's, of any tier, laborers and mechanics who work on this project and who fall within any job classification established and published by the Connecticut Department of Labor shall be paid, at a minimum, the prevailing wage rates as certified by said Department. Each contractor and subcontractor of any tier performing work on this project shall post on the project the applicable prevailing wage rates and hourly basic rates of pay for the County or area within which the project is being performed, including the effective date of any changes thereof, in at least one conspicuous place for the information of the employees working on the project. The information so posted shall include a breakdown of contributions for health and welfare benefits, vacation benefits, pension benefits and any other economic benefit required to be paid. See Exhibit A: Federal Requirements for more details. See Exhibit G for Prevailing Wage Rates.

17. BONDING REQUIREMENTS

Each bid must be accompanied by Bid Security made payable to the District in an amount of five percent (5%) of Bidder's maximum Bid Price and in the form of cash, a certified or cashier's check, or a Bid Bond, issued by a surety. The Bid Security shall be sealed in a separate envelope containing the Bid.

In addition, a performance bond from a licensed bonding agent in the State of Connecticut shall be required for the Contract amount (100%) for the faithful performance of the work. A payment bond equal to forty percent (40%) of the Contract amount is also required from a licensed bonding agent in the State of Connecticut.

18. SINGLE BIDDER/SOLE SOURCE PROCUREMENT

In the event that a single bid is received, the District will conduct a price and/or cost analysis and review and audit all business records and related documents of the Bidder and any affiliated or parent company to determine the fairness and reasonableness of the bid. A price analysis is the process of examining the bid and evaluating a prospective price without evaluating separate cost elements. It should be recognized that a price analysis through comparison to other similar procurements must be based on an established or competitive price of the elements used in the comparisons. The comparison must be made to a purchase of similar quantity and involving similar specifications. Where a difference exists, a detailed analysis must be made of this difference and costs attached thereto.

Where it is impossible to obtain a valid price analysis, it may be necessary for the District to conduct a cost analysis of the bid price. The price and/or cost analysis shall be made by competent and experienced auditors or price analysis; an engineer's estimate or comparison of the prices is insufficient.

The Federal Transit Administration (FTA) may be asked to lend support in obtaining the services of the Defense Contract Audit Agency, if necessary. The District will submit to FTA all data and analysis of determination prior to award of a sole source contract.

19. WITHDRAWAL OF BIDS

Bids may be withdrawn only by written request. For bids already submitted, written request to withdraw must be delivered to the District prior to bid opening. All bids opened will be considered to be valid offers and may not be withdrawn for a period of one hundred and eighty (180) business days following the opening of the bids, unless the bidder is given written notice that its bid is not responsive to the specifications of this IFB.

20. SUBCONTRACTING

If subcontractors are necessary to complete any functions of this requirement, the Proposer must list the names and business locations of any proposed subcontractors, using the Subcontractor Form. The District reserves the right to review and approve any subcontractors proposed by the Respondent. Any approval of the subcontractor shall not be construed as making the District party of such contract, giving the subcontractor privities of contract with the District, or subjecting the District to liability of any kind to any subcontractor.

21. CONTRACTING

The District reserves the right to require the successful candidate to execute a contract in a format supplied by the District. The terms and conditions of the contract to be signed upon the award of the IFB will supersede any inconsistent provisions of the IFB documents.

The award of any contract is subject to the following conditions and contingencies:

1. The approval of such governmental agencies as may be required by law.
2. The appropriation of adequate funds by the proper agencies.
3. Compliance with all applicable laws, regulations, ordinances and codes of the United States and, the state of Connecticut.

4. The selected Proposer must be current in all tax or any other monetary obligation owed to the State of Connecticut.
5. The selected Candidate must have a current EEO certification on file with the State.

Contract Documents

The Contract Documents consist of the AIA Contract, this Invitation for Bids (IFB) and its reference documents, drawings, any Addenda issued, the Contractor's response to the IFB, the federal Requirements (Exhibit A), other documents listed in the Contract, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by the parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a Minor change in the Work issued by the Design Professional on behalf of the District.

22. RETAINAGE

When progress payments are being made for items being built, the District will withhold 5% of the total project cost, or as otherwise specified in the contract for this project.

23. ASSIGNMENT

The contractor shall not assign, transfer, convey or otherwise dispose of the agreement or his/her or its interest in the same, or any part thereof, without prior written approval of the District.

24. REQUIRED CERTIFICATIONS

The required certifications must be submitted with the bid form for the proposal to be considered responsive to the bid specifications. All certification forms are contained in Attachment E. Those bids which do not contain the required standard certifications, complete and signed as appropriate, will be determined ineligible.

25. INSURANCE REQUIREMENTS

Contractor shall obtain and maintain throughout the term of this Contract (or such longer period as may be specified below, if any) the following insurance:

A. Commercial General Liability

The Contractor shall carry Commercial General Liability Insurance, including a broad form comprehensive general liability endorsement and coverage against claims for personal injury, bodily injury, death or property damage, to be on the so-called "occurrence" form with a combined limit of not less than Two Million Dollars (\$2,000,000) in the aggregate and One Million Dollars (\$1,000,000) per occurrence, and to cover at least the following hazards: (1) premises and operations; (2) products and completed operations on an "if any" basis; (3) independent contractors; (4) blanket contractual liability for all insured contracts; and (5) contractual liability covering the indemnities in this Contract.

B. Workers' Compensation Insurance

With respect to all services the Contractor performs and all those performed for the Contractor by its subcontractors, the Contractor and its subcontractor(s) shall carry Workers' Compensation Insurance and, as applicable, insurance required in accordance with the U.S. Longshore and Harbor Workers' Compensation Act, in accordance with the

requirements of the laws of the State of Connecticut, and of the laws of the United States, respectively.

C. Business Automobile Insurance

Business Automobile Liability Insurance, to cover the use of all owned, hired, and non-owned vehicles, providing for the following minimum liability limits: One Million Dollars (\$1,000,000) for all damages arising out of bodily injuries to or death of all persons in any one accident or occurrence, and for all damages arising out of injury to or destruction of property in any one accident or occurrence. In cases where the insurance policy shows an aggregate limit as part of the automobile liability coverage, the aggregate limit must be at least Two Million Dollars (\$2,000,000).

D. Professional Liability Insurance.

If the Contractor or any of its subcontractors are providing design, architectural or engineering services with respect to this Contract, the Contractor and such subcontractors shall carry Professional Liability Insurance Policy in an annual aggregate amount not less than Two Million Dollars (\$2,000,000), which coverage shall be maintained in force for a period of not less than three (3) years after the completion of the work under this Contract.

E. Certificate of Insurance

All insurance provided for above shall be obtained under valid and enforceable policies, and issued by financially sound and responsible insurance companies authorized to do business in the State of Connecticut and having a general policy rating of A- or better and a financial class of VIII or better, each as determined by AM Best Company, Inc. Prior to commencing any work under this Contract and at least ten (10) days prior to the expiration dates of any insurance required hereunder, Contractor shall deliver to the District certificates of insurance evidencing such coverage and any renewal or successor policies. If the Contractor engages any subcontractor to perform any of its obligations under this Contract, the Contractor shall also deliver to the District certificates of insurance from such subcontractor evidencing such coverage and any renewal or successor policies. All policies of insurance required hereunder shall name the District (and such other persons or entities designated by the District) as an additional insured (except the workers' compensation and Professional Liability insurance). For the Workers' Compensation Insurance and, as applicable, U.S. Longshore and Harbor Workers' Compensation Act coverage, the policy number(s) and term of the policy (ies) shall be indicated on the certificate. With the exception of Professional Liability Insurance, each insurance policy shall state that the insurance company agrees to investigate and defend the insured against all claims for damages, even if groundless. All insurance policies provided for above shall contain clauses or endorsements to the effect that: (i) no act or negligence of the Contractor, or anyone acting for the Contractor, or failure to comply with the provisions of any policy, which might otherwise result in a forfeiture of the insurance or any part thereof, shall in any way affect the validity or enforceability of the insurance insofar as the District is concerned; (ii) no such policies shall be canceled without at least thirty (30) days' notice to the District (10 days for non-payment of premium); (iii) shall contain a waiver of subrogation in favor of the District, and (iv) shall provide that such coverage is primary and non-contributory.

Such insurance shall protect the District against all claims, liabilities, suits, actions, damages, or costs resulting from or arising out of the ownership, lease, operation,

maintenance, repairs, or use in any way of any project equipment for the purposes of the program covered by this Contract and for any other purpose. No project equipment shall be delivered to the Contractor, or operated by the Contractor until the Contractor has delivered the certificate(s) of insurance required hereunder. Prior to the annual renewal of a motor vehicle registration, the Contractor shall submit to the District a certificate of insurance for the project equipment. This Section shall not prevent the District from contracting for such required insurance coverage at any time, and in such event the Contractor shall pay the District for all costs of such insurance.

F. Indemnification

To the fullest extent permitted by law, the Contractor shall indemnify, defend and hold harmless the District and its officers, directors, employees and agents (collectively "Indemnified Parties") from and against all claims, damages, demands, losses, expenses, fines, penalties, causes of action, suits or other liabilities (including all costs of reasonable attorneys' fees) arising out of, related to, in connection with or resulting from, or alleged to arise out of or arise from the negligent acts or omissions, breach or failure to perform under the Contract or the violation of any applicable law or regulation, by Contractor, Contractor's subcontractors or anyone directly or indirectly employed by Contractor or by Contractor's subcontractors or anyone for whose acts any of them may be responsible or liable and whether such claim, damage, demand, loss, expense, fine, penalty, cause of action, suit or other liability is attributable to bodily injury, personal injury, sickness, disease or death, or to injury to or destruction of tangible property, including the loss of use resulting therefrom. This indemnity shall be effective regardless of whether or not such claim, damage, loss or expense is caused in part by any of the Indemnified Parties (but the indemnity shall not cover liability to the extent resulting from gross negligence or willful misconduct of the Indemnified Parties). Such indemnity obligation shall not be in derogation or limitation of any other obligation or liability of the Contractor or the rights of the District contained in this Contract or otherwise. This indemnification shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor under any workers' compensation acts, disability benefit acts or other employee benefits acts and includes any loss or injury suffered by an employee of Contractor. This indemnification shall survive the completion of the Work or the termination of the Contract.

To the extent the foregoing Indemnity applies to any violation of federal, state or local laws, ordinances or regulations, Contractor shall do and perform all work necessary to correct such violation.

26. NOTICE OF AWARD

The selected proposer will be provided with a written Notice of Award which shall be contingent upon the submission by the respondent of all documents required including, but not limited to, proper insurance certificates, performance and payment bonds, verification of DBE percentage contribution to the work and execution of contract within 10 days of the notice of award.

27. ATTACHED EXHIBITS

The following attachments are included in this package:

EXHIBIT A

- Federally Required Contract Clauses

EXHIBIT B

- State of Connecticut Grant Requirements

EXHIBIT C

- Procurement Procedures and Appeals Process

EXHIBIT D

- Bid Proposal Form

EXHIBIT E

- Required Certifications
 - Affidavit
 - Certificate of Eligibility
 - Certificate of Non-Collusion.
 - Certificate of Restrictions on Lobbying
 - Contractor's Statement on Sub-Contractors
 - Certificate for Disadvantaged Business Enterprise
 - DBE Good Faith Efforts Documentation Form
 - DBE Letter of Intent
 - Buy America Certification
 - Approved Equal Form
 - Statement of Bidder's Qualifications

EXHIBIT F

- State of Connecticut Contract Requirements

EXHIBIT G

- Connecticut Department of Labor Prevailing Wage Bid Package

EXHIBIT A
FEDERALLY REQUIRED CONTRACT CLAUSES

FEDERALLY REQUIRED CONTRACT CLAUSES

No Government Obligation to Third Parties –

(1) The recipient and contractor acknowledge and agree that, notwithstanding any concurrence by the US Government in or approval of the solicitation or award of the underlying contract, absent the express written consent by the US Government, the US Government is not a party to this contract and shall not be subject to any obligations or liabilities to the recipient, the contractor, or any other party (whether or not a party to that contract) pertaining to any matter resulting from the underlying contract.

(2) Contractor agrees to include the above clause in each subcontract financed in whole or in part with FTA assistance. It is further agreed that the clause shall not be modified, except to identify the subcontractor who will be subject to its provisions.

Program Fraud and False or Fraudulent Statements or Related Acts –

(1) Contractor acknowledges that the provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 USC 3801 et seq. and USDOT regulations, "Program Fraud Civil Remedies," 49 CFR 31, apply to its actions pertaining to this project. Upon execution of the underlying contract, contractor certifies or affirms the truthfulness and accuracy of any statement it has made, it makes, it may make, or causes to be made, pertaining to the underlying contract or FTA assisted project for which this contract work is being performed. In addition to other penalties that may be applicable, contractor further acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submittal, or certification, the US Government reserves the right to impose the penalties of the Program Fraud Civil Remedies Act (1986) on contractor to the extent the US Government deems appropriate.

(2) If contractor makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submittal, or certification to the US Government under a contract connected with a project that is financed in whole or in part with FTA assistance under the authority of 49 USC 5307, the Government reserves the right to impose the penalties of 18 USC 1001 and 49 USC 5307(n)(1) on contractor, to the extent the US Government deems appropriate.

(3) Contractor shall include the above two clauses in each subcontract financed in whole or in part with FTA assistance. The clauses shall not be modified, except to identify the subcontractor who will be subject to the provisions.

Access to Records –

The following access to records requirements apply to this Contract:

1. Where the purchaser is not a State but a local government and is an FTA recipient or a subgrantee of FTA recipient in accordance with 49 CFR 18.36(i), contractor shall provide the purchaser, the FTA, the US Comptroller General or their authorized representatives access to any books, documents, papers and contractor records which are pertinent to this contract for the purposes of making audits, examinations, excerpts and transcriptions. Contractor shall also, pursuant to 49 CFR 633.17, provide authorized FTA representatives, including any PMO contractor, access to contractor's records and construction sites pertaining to a capital project, defined at 49 USC 5302(a)1, which is receiving FTA assistance through the programs described at 49 USC 5307, 5309 or 5311.

2. Where the purchaser is a State and is an FTA recipient or a subgrantee of FTA recipient in accordance with 49 CFR 633.17, contractor shall provide the purchaser, authorized FTA representatives, including any PMO Contractor, access to contractor's records and construction sites pertaining to a capital project, defined at 49 USC

5302(a)1, which receives FTA assistance through the programs described at 49 USC 5307, 5309 or 5311. By definition, a capital project excludes contracts of less than the simplified acquisition threshold currently set at \$250,000.

3. Where the purchaser enters into a negotiated contract for other than a small purchase or under the simplified acquisition threshold and is an institution of higher education, a hospital or other non-profit organization and is an FTA recipient or a subgrantee of FTA recipient in accordance with 49 CFR 19.48, contractor shall provide the purchaser, the FTA, the US Comptroller General or their authorized representatives, access to any books, documents, papers and record of the contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts and transcriptions.

4. Where a purchaser which is an FTA recipient or a subgrantee of FTA recipient in accordance with 49 USC 5325(a) enters into a contract for a capital project or improvement (defined at 49 USC 5302(a)1) through other than competitive bidding, contractor shall make available records related to the contract to the purchaser, the Secretary of USDOT and the US Comptroller General or any authorized officer or employee of any of them for the purposes of conducting an audit and September 2019 inspection.

5. Contractor shall permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

6. Contractor shall maintain all books, records, accounts and reports required under this contract for a period of not less than three (3) years after the date of termination or expiration of this contract, except in the event of litigation or settlement of claims arising from the performance of this contract, in which case contractor agrees to maintain same until the recipient, FTA Administrator, US Comptroller General, or any of their authorized representatives, have disposed of all such litigation, appeals, claims or exceptions related thereto. Re: 49 CFR 18.39(i)(11).

FTA does not require the inclusion of these requirements in subcontracts.

Federal Changes -

Contractor shall comply with all applicable FTA regulations, policies, procedures and directives, including without limitation those listed directly or by reference in the Master Agreement between the recipient and FTA, as they may be amended or promulgated from time to time during the term of the contract. Contractor's failure to comply shall constitute a material breach of the contract.

Civil Rights –The following requirements apply to the underlying contract:

The Recipient understands and agrees that it must comply with applicable Federal civil rights laws and regulations, and follow applicable Federal guidance, except as the Federal Government determines otherwise in writing. Therefore, unless a Recipient or Program, including an Indian Tribe or the Tribal Transit Program, is specifically exempted from a civil rights statute, FTA requires compliance with that civil rights statute, including compliance with equity in service:

a. Nondiscrimination in Federal Public Transportation Programs. The Recipient agrees to, and assures that each Third Party Participant will, comply with Federal transit law, 49 U.S.C. § 5332 (FTA's "Nondiscrimination" statute): (1) FTA's "Nondiscrimination" statute prohibits discrimination on the basis of: (a) Race, (b) Color, (c) Religion, (d) National origin, (e) Sex, (f) Disability, (g) Age, or (h) Gender identity and (2) The FTA "Nondiscrimination" statute's prohibition against discrimination includes: (a) Exclusion from participation, (b) Denial of program benefits, or (c) Discrimination, including

discrimination in employment or business opportunity, (3) Except as FTA determines otherwise in writing: (a) General. Follow: 1 The most recent edition of FTA Circular 4702.1, "Title VI Requirements and Guidelines for Federal Transit Administration Recipients," to the extent consistent with applicable Federal laws, regulations, and guidance, and 2 Other applicable Federal guidance that may be issued, but (b) Exception for the Tribal Transit Program. FTA does not require an Indian Tribe to comply with FTA program-specific guidelines for Title VI when administering its projects funded under the Tribal Transit Program,

b. Nondiscrimination – Title VI of the Civil Rights Act. The Recipient agrees to, and assures that each Third Party Participant will: (1) Prohibit discrimination based on: (a) Race, (b) Color, or (c) National origin, (2) Comply with: (a) Title VI of the Civil Rights Act of 1964, as amended, 42 U.S.C. § 2000d et seq., (b) U.S. DOT regulations, "Nondiscrimination in Federally-Assisted Programs of the Department of Transportation – Effectuation of Title VI of the Civil Rights Act of 1964," 49 C.F.R. part 21, and (c) Federal transit law, specifically 49 U.S.C. § 5332, as stated in the preceding section a, and (3) Except as FTA determines otherwise in writing, follow: (a) The most recent edition of FTA Circular 4702.1, "Title VI and Title VI-Dependent Guidelines for Federal Transit Administration Recipients," to the extent consistent with applicable Federal laws, regulations, and guidance. (b) U.S. DOJ, "Guidelines for the enforcement of Title VI, Civil Rights Act of 1964," 28 C.F.R. § 50.3, and (c) Other applicable Federal guidance that may be issued,

c. Equal Employment Opportunity. (1) Federal Requirements and Guidance. The Recipient agrees to, and assures that each Third Party Participant will, prohibit discrimination on the basis of race, color, religion, sex, or national origin, and: (a) Comply with Title VII of the Civil Rights Act of 1964, as amended, 42 U.S.C. § 2000e et seq., (b) Facilitate compliance with Executive Order No. 11246, "Equal Employment Opportunity," as amended by Executive Order No. 11375, "Amending Executive Order No. 11246, Relating to Equal Employment Opportunity," 42 U.S.C. § 2000e note, (c) Comply with Federal transit law, specifically 49 U.S.C. § 5332, as stated in section a, and (d) Comply with FTA Circular 4704.1 other applicable EEO laws and regulations, as provided in Federal guidance, including laws and regulations prohibiting discrimination on the basis of disability, except as the Federal Government determines otherwise in writing, (2) General. The Recipient agrees to: (a) Ensure that applicants for employment are employed and employees are treated during employment without discrimination on the basis of their: 1 Race, 2 Color, 3 Religion, 4 Sex, 5 Disability, 6 Age, or 7 National origin, (b) Take affirmative action that includes, but is not limited to: 1 Recruitment advertising, 2 Recruitment, 3 Employment, 4 Rates of pay, 5

Other forms of compensation, 6 Selection for training, including apprenticeship, 7 Upgrading, 8 Transfers, 9 Demotions, 10 Layoffs, and 11 Terminations, but (b) Indian Tribe. Title VII of the Civil Rights Act of 1964, as amended, exempts Indian Tribes under the definition of "Employer". (3) Equal Employment Opportunity Requirements for Construction Activities. In addition to the foregoing, when undertaking "construction" as recognized by the U.S. Department of Labor (U.S. DOL), the Recipient agrees to comply, and assures the compliance of each Third Party Participant, with: (a) U.S. DOL regulations, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor," 41 C.F.R. chapter 60, and

(b) Executive Order No. 11246, "Equal Employment Opportunity," as amended by Executive Order No. 11375, "Amending Executive Order No. 11246, Relating to Equal Employment Opportunity," 42 U.S.C. § 2000e note,

d. Disadvantaged Business Enterprise. To the extent authorized by applicable Federal law, the Recipient agrees to facilitate, and assures that each Third Party Participant will facilitate, participation by small business concerns owned and controlled by socially and economically disadvantaged individuals, also referred to as "Disadvantaged Business Enterprises" (DBEs), in the Project as follows: 1) Requirements. The Recipient agrees to comply with: (a) Section 1101(b) of Map-21, 23 U.S.C. § 101 note, (b) U.S. DOT regulations, "Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs," 49 C.F.R. part 26, and (c) Federal transit law, specifically 49 U.S.C. § 5332, as stated in section a, (2) Assurance. As required by 49 C.F.R. § 26.13(a), (b) DBE Program Requirements. Recipients receiving planning, capital and/or operating assistance that will award prime third party contracts exceeding \$250,000 in a Federal fiscal year must: 1 Have a DBE program meeting the requirements of 49 C.F.R. part 26, 2 Implement a DBE program approved by FTA, and 3 Establish an annual DBE participation goal, (c) Special Requirements for a Transit Vehicle Manufacturer. The Recipient understands and agrees that each transit vehicle manufacturer, as a condition of being authorized to bid or propose on FTA-assisted transit vehicle procurements, must certify that it has complied with the requirements of 49 C.F.R. part 26,

(d) the Recipient provides assurance that: The Recipient shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of any DOT-assisted contract or in the administration of its DBE program or the requirements of 49 C.F.R. part 26. The Recipient shall take all necessary and reasonable steps under 49 C.F.R. part 26 to ensure nondiscrimination in the award and administration of DOT-assisted contracts. The Recipient's DBE program, as required by 49 C.F.R. part 26 and as approved by DOT, is incorporated by reference in this agreement. Implementation of this program is a legal obligation and failure to carry out its terms shall be treated as a violation of this agreement. Upon notification to the Recipient of its failure to carry out its approved program, the Department may impose sanctions as provided for under 49 C.F.R. part 26 and may, in appropriate cases, refer the matter for enforcement under 18 U.S.C. § 1001 and/or the Program Fraud Civil Remedies Act of 1986, 31 U.S.C. § 3801 et seq., (2) Exception for the Tribal Transit Program. FTA exempts Indian tribes from the Disadvantaged Business Enterprise regulations at 49 C.F.R. part 26 under Map-21 and previous legislation,

e. Nondiscrimination on the Basis of Sex. The Recipient agrees to comply with Federal prohibitions against discrimination on the basis of sex, including: (1) Title IX of the Education Amendments of 1972, as amended, 20 U.S.C. § 1681 et seq., (2) U.S. DOT regulations, "Nondiscrimination on the Basis of Sex in Education Programs or Activities Receiving Federal Financial Assistance," 49 C.F.R. part 25, and (3) Federal transit law, specifically 49 U.S.C. § 5332, as stated in section a,

f. Nondiscrimination on the Basis of Age. The Recipient agrees to comply with Federal prohibitions against discrimination on the basis of age, including: (1) The Age Discrimination in Employment Act (ADEA), 29 U.S.C. §§ 621 – 634, which prohibits discrimination on the basis of age, (2) U.S. Equal Employment Opportunity Commission (U.S. EEOC) regulations, "Age Discrimination in Employment Act," 29 C.F.R. part 1625, which implements the ADEA, (3) The Age Discrimination Act of 1975,

as amended, 42 U.S.C. § 6101 et seq., which prohibits discrimination against individuals on the basis of age in the administration of programs or activities receiving Federal funds, (4) U.S. Health and Human Services regulations, "Nondiscrimination on the Basis of Age in Programs or Activities Receiving Federal Financial Assistance," 45 C.F.R. part 90, which implements the Age Discrimination Act of 1975, and (5) Federal transit law, specifically 49 U.S.C. § 5332, as stated in section a,

g. Nondiscrimination on the Basis of Disability. The Recipient agrees to comply with the following Federal prohibitions pertaining to discrimination against seniors or individuals with disabilities: (1) Federal laws, including: (a) Section 504 of the Rehabilitation Act of 1973, as amended, 29 U.S.C. § 794, which prohibits discrimination on the basis of disability in the administration of federally funded programs or activities, (b) The Americans with Disabilities Act of 1990 (ADA), as amended, 42 U.S.C. § 12101 et seq., which requires that accessible facilities and services be made available to individuals with disabilities, 1 General. Titles I, II, and III of the ADA apply to FTA Recipients, but 2 Indian Tribes. While Titles II and III of the ADA apply to Indian Tribes, Title I of the ADA exempts Indian Tribes from the definition of "employer," (c) The Architectural Barriers Act of 1968, as amended, 42 U.S.C. § 4151 et seq., which requires that buildings and public accommodations be accessible to individuals with disabilities, (d) Federal transit law, specifically 49 U.S.C. § 5332, which now includes disability as a prohibited basis for discrimination, and (e) Other applicable laws and amendments pertaining to access for elderly individuals or individuals with disabilities, (2) Federal regulations, including: (a) U.S. DOT regulations, "Transportation Services for Individuals with Disabilities (ADA)," 49 C.F.R. part 37, (b) U.S. DOT regulations, "Nondiscrimination on the Basis of Disability in Programs and Activities Receiving or Benefiting from Federal Financial Assistance," 49 C.F.R. part 27, (c) U.S. DOT regulations, "Transportation for Individuals with Disabilities: Passenger Vessels," 49 C.F.R. part 39, (d) Joint U.S. Architectural and Transportation Barriers Compliance Board (U.S. ATBCB) and U.S. DOT regulations, "Americans With Disabilities (ADA) Accessibility Specifications for Transportation Vehicles," 36 C.F.R. part 1192 and 49 C.F.R. part 38, (e) U.S. DOJ regulations, "Nondiscrimination on the Basis of Disability in State and Local Government Services," 28 C.F.R. part 35, (f) U.S. DOJ regulations, "Nondiscrimination on the Basis of Disability by Public Accommodations and in Commercial Facilities," 28 C.F.R. part 36, (g) U.S. EEOC, "Regulations to Implement the Equal Employment Provisions of the Americans with Disabilities Act," 29 C.F.R. part 1630, (h) U.S. Federal Communications Commission regulations, "Telecommunications Relay Services and Related Customer Premises Equipment for Persons with Disabilities," 47 C.F.R. part 64, Subpart F, (i) U.S. ATBCB regulations, "Electronic and Information Technology Accessibility Standards," 36 C.F.R. part 1194, and (j) FTA regulations, "Transportation for Elderly and Handicapped Persons," 49 C.F.R. part 609, and (3) Other applicable Federal civil rights and nondiscrimination guidance,

h. Drug or Alcohol Abuse - Confidentiality and Other Civil Rights Protections. The Recipient agrees to comply with the confidentiality and civil rights protections of: (1) The Drug Abuse Office and Treatment Act of 1972, as amended, 21 U.S.C. § 1101 et seq., (2) The Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970, as amended, 42 U.S.C. § 4541 et seq., and (3) The Public Health Service Act, as amended, 42 U.S.C. §§ 290dd – 290dd-2,

i. Access to Services for People with Limited English Proficiency. Except as the Federal Government determines otherwise in writing, the Recipient agrees to promote accessibility of public transportation services to people whose understanding of English is limited by following: 1) Executive Order No. 13166, "Improving Access to Services for Persons with Limited English Proficiency," August 11, 2000, 42 U.S.C. § 2000d-1 note, and (2) U.S. DOT Notice, "DOT Policy Guidance Concerning Recipients' Responsibilities to Limited English Proficiency (LEP) Persons," 70 Fed. Reg. 74087, December 14, 2005,

j. Other Nondiscrimination Laws. Except as the Federal Government determines otherwise in writing, the Recipient agrees to: (1) Comply with other applicable Federal nondiscrimination laws and regulations, and (2) Follow Federal guidance prohibiting discrimination.

k. Remedies. Remedies for failure to comply with applicable Federal Civil Rights laws and Federal regulations may be enforced as provided in those Federal laws or Federal regulations.

Energy Conservation –Contractor shall comply with mandatory standards and policies relating to energy efficiency, stated in the state energy conservation plan issued in compliance with the Energy Policy & Conservation Act.

Termination –

a. Termination for Convenience. (General Provision) the recipient may terminate this contract, in whole or in part, at any time by written notice to contractor when it is in the recipient's best interest. Contractor shall be paid its costs, including contract close-out costs, and profit on work performed up to the time of termination. Contractor shall promptly submit its termination claim to the recipient. If contractor is in possession of any of the recipient's property, contractor shall account for same, and dispose of it as the recipient directs.

b. Termination for Default. [Breach or Cause] (General Provision) If contractor does not deliver items in accordance with the contract delivery schedule, or, if the contract is for services, and contractor fails to perform in the manner called for in the contract, or if contractor fails to comply with any other provisions of the contract, the recipient may terminate this contract for default. Termination shall be effected by serving a notice of termination to contractor setting forth the manner in which contractor is in default. Contractor shall only be paid the contract price for supplies delivered and accepted, or for services performed in accordance with the manner of performance set forth in the contract. If it is later determined by the recipient that contractor had an excusable reason for not performing, such as a strike, fire, or flood, events which are not the fault of or are beyond the control of contractor, the recipient, after setting up a new delivery or performance schedule, may allow contractor to continue work, or treat the termination as a termination for convenience.

c. Opportunity to Cure. (General Provision) the recipient in its sole discretion may, in the case of a termination for breach or default, allow contractor an appropriately short period of time in which to cure the defect. In such case, the notice of termination shall state the time period in which cure is permitted and other appropriate conditions. If contractor fails to remedy to the recipient's satisfaction the breach or default or any of the terms, covenants, or conditions of this Contract within ten (10) days after receipt by contractor or written notice from the recipient setting forth the nature of said breach or default, the recipient shall have the right to terminate the Contract without any further

obligation to contractor. Any such termination for default shall not in any way operate to preclude the recipient from also pursuing all available remedies against contractor and its sureties for said breach or default.

d. Waiver of Remedies for any Breach in the event that the recipient elects to waive its remedies for any breach by contractor of any covenant, term or condition of this Contract, such waiver by the recipient shall not limit its remedies for any succeeding breach of that or of any other term, covenant, or condition of this Contract.

e. Termination for Convenience (Professional or Transit Service Contracts) the recipient, by written notice, may terminate this contract, in whole or in part, when it is in the recipient's interest. If the contract is terminated, the recipient shall be liable only for payment under the payment provisions of this contract for services rendered before the effective date of termination.

f. Termination for Default (Supplies and Service) If contractor fails to deliver supplies or to perform the services within the time specified in this contract or any extension or if the contractor fails to comply with any other provisions of this contract, the recipient may terminate this contract for default. The recipient shall terminate by delivering to contractor a notice of termination specifying the nature of default. Contractor shall only be paid the contract price for supplies delivered and accepted, or services performed in accordance with the manner or performance set forth in this contract. If, after termination for failure to fulfill contract obligations, it is determined that contractor was not in default, the rights and obligations of the parties shall be the same as if termination had been issued for the recipient's convenience.

g. Termination for Default (Transportation Services) If contractor fails to pick up the commodities or to perform the services, including delivery services, within the time specified in this contract or any extension or if contractor fails to comply with any other provisions of this contract, the recipient may terminate this contract for default. The recipient shall terminate by delivering to contractor a notice of termination specifying the nature of default. Contractor shall only be paid the contract price for services performed in accordance with the manner of performance set forth in this contract. If this contract is terminated while contractor has possession of the recipient goods, contractor shall, as directed by the recipient, protect and preserve the goods until surrendered to the recipient or its agent. Contractor and the recipient shall agree on payment for the preservation and protection of goods. Failure to agree on an amount shall be resolved under the Dispute clause. If, after termination for failure to fulfill contract obligations, it is determined that contractor was not in default, the rights and obligations of the parties shall be the same as if termination had been issued for the recipient's convenience.

h. Termination for Default (Construction) If contractor refuses or fails to prosecute the work or any separable part, with the diligence that will insure its completion within the time specified, or any extension, or fails to complete the work within this time, or if contractor fails to comply with any other provisions of this contract, the recipient may terminate this contract for default. the recipient shall terminate by delivering to contractor a notice of termination specifying the nature of default. In this event, the recipient may take over the work and complete it by contract or otherwise, and may take possession of and use any materials, appliances, and plant on the work site necessary for completing the work. Contractor and its sureties shall be liable for any damage to the recipient

resulting from contractor's refusal or failure to complete the work within specified time, whether or not contractor's right to proceed with the work is terminated. This liability includes any increased costs incurred by the recipient in completing the work. Contractor's right to proceed shall not be terminated nor shall contractor be charged with damages under this clause if:

1. Delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of contractor. Examples of such causes include: acts of God, acts of the recipient, acts of another contractor in the performance of a contract with the recipient, epidemics, quarantine restrictions, strikes, freight embargoes; and
2. Contractor, within 10 days from the beginning of any delay, notifies the recipient in writing of the causes of delay. If in the recipient's judgment, delay is excusable, the time for completing the work shall be extended. The recipient's judgment shall be final and conclusive on the parties, but subject to appeal under the Disputes clauses.

If, after termination of contractor's right to proceed, it is determined that contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if termination had been issued for the recipient's convenience.

i. Termination for Convenience or Default (Architect & Engineering) the recipient may terminate this contract in whole or in part, for the recipient's convenience or because of contractor's failure to fulfill contract obligations. The recipient shall terminate by delivering to contractor a notice of termination specifying the nature, extent, and effective date of termination. Upon receipt of the notice, contractor shall (1) immediately discontinue all services affected (unless the notice directs otherwise), and (2) deliver to the recipient all data, drawings, specifications, reports, estimates, summaries, and other information and materials accumulated in performing this contract, whether completed or in process. If termination is for the recipient's convenience, it shall make an equitable adjustment in the contract price but shall allow no anticipated profit on unperformed services. If termination is for contractor's failure to fulfill contract obligations, the recipient may complete the work by contract or otherwise and contractor shall be liable for any additional cost incurred by the recipient. If, after termination for failure to fulfill contract obligations, it is determined that contractor was not in default, the rights and obligations of the parties shall be the same as if termination had been issued for the recipient's convenience.

j. Termination for Convenience or Default (Cost-Type Contracts) the recipient may terminate this contract, or any portion of it, by serving a notice of termination on contractor. The notice shall state whether termination is for convenience of the recipient or for default of contractor. If termination is for default, the notice shall state the manner in which contractor has failed to perform the requirements of the contract. Contractor shall account for any property in its possession paid for from funds received from the recipient, or property supplied to contractor by the recipient. If termination is for default, the recipient may fix the fee, if the contract provides for a fee, to be paid to contractor in proportion to the value, if any, of work performed up to the time of termination. Contractor shall promptly submit its termination claim to the recipient and the parties shall negotiate the termination settlement to be paid to contractor. If termination is for the recipient's convenience, contractor shall be paid its contract close-out costs, and a fee, if the contract provided for payment of a fee, in proportion to the work performed up to the time of termination. If, after serving a notice of termination for default, the recipient determines that contractor has an excusable reason for not performing, such as strike, fire, flood, events which are not the fault of and are beyond the control of contractor, the

recipient, after setting up a new work schedule, may allow contractor to continue work, or treat the termination as a termination for convenience.

Government-Wide Debarment and Suspension (Nonprocurement) –The Recipient agrees to the following:(1) It will comply with the requirements of 2 C.F.R. part 180, subpart C, as adopted and supplemented by U.S. DOT regulations at 2 C.F.R. part 1200, which include the following: (a) It will not enter into any arrangement to participate in the development or implementation of the Project with any Third Party Participant that is debarred or suspended except as authorized by: 1 U.S. DOT regulations, “Nonprocurement Suspension and Debarment,” 2 C.F.R. part 1200, 2 U.S. OMB, “Guidelines to Agencies on Governmentwide Debarment and Suspension (Nonprocurement),” 2 C.F.R. part 180, including any amendments thereto, and 3 Executive Orders Nos. 12549 and 12689, “Debarment and Suspension,” 31 U.S.C. § 6101 note, (b) It will review the U.S. GSA “System for Award Management,” <https://www.sam.gov>, if required by U.S. DOT regulations, 2 C.F.R. part 1200, and (c) It will include, and require each of its Third Party Participants to include, a similar provision in each lower tier covered transaction, ensuring that each lower tier Third Party Participant: 1 Will comply with Federal debarment and suspension requirements, and 2 Reviews the “System for Award Management” at <https://www.sam.gov>, if necessary to comply with U.S. DOT regulations, 2 C.F.R. part 1200, and (2) If the Recipient suspends, debars, or takes any similar action against a Third Party Participant or individual, the Recipient will provide immediate written notice to the: (a) FTA Regional Counsel for the Region in which the Recipient is located or implements the Project, (b) FTA Project Manager if the Project is administered by an FTA Headquarters Office, or (c) FTA Chief Counsel.

Buy America – Contractor shall comply with 49 USC 5323(j) and 49 CFR 661, stating that Federal funds may not be obligated unless steel, iron, and manufactured products used in FTA-funded projects are produced in the United States, unless a waiver has been granted by FTA or the product is subject to a general waiver. General waivers are listed in 49 CFR 661.7, and include software, microcomputer equipment and small purchases (currently less than \$150,000) made with capital, operating, or planning funds. Separate requirements for rolling stock are stated at 5323(j)(2)(C) and 49 CFR 661.11. Rolling stock must be manufactured in the US and have a minimum 60% domestic content for FY2016 and FY2017, a minimum 65% domestic content for FY2018 and FY2019 and a minimum 70% domestic content for FY2020 and beyond. A bidder or offeror shall submit appropriate Buy America certification to the recipient with all bids on FTA-funded contracts, except those subject to a general waiver. Proposals not accompanied by a completed Buy America certification shall be rejected as nonresponsive. This requirement does not apply to lower tier subcontractors.

Breaches and Dispute Resolution –Disputes arising in the performance of this contract which are not resolved by agreement of the parties shall be decided in writing by the recipient’s authorized representative. This decision shall be final and conclusive unless within ten days from the date of receipt of its copy, contractor mails or otherwise furnishes a written appeal to the recipient’s CEO. In connection with such appeal, contractor shall be afforded an opportunity to be heard and to offer evidence in support of its position. The decision of the recipient’s CEO shall be binding upon contractor and contractor shall abide by the decision. FTA has a vested interest in the settlement of any violation of Federal law including the False Claims Act, 31 U.S.C. § 3729.

Performance During Dispute - Unless otherwise directed by the recipient, contractor shall continue performance under this contract while matters in dispute are being resolved. Claims for Damages - Should either party to the contract suffer injury or damage to person or property because of any act or omission of the party or of any of his employees, agents or others for whose acts he is legally liable, a claim for damages therefore shall be made in writing to such other party within ten days after the first observance of such injury or damage.

Remedies - Unless this contract provides otherwise, all claims, counterclaims, disputes and other matters in question between the recipient and contractor arising out of or relating to this agreement or its breach will be decided by arbitration if the parties mutually agree, or in a court of competent jurisdiction within the residing State.

Rights and Remedies - Duties and obligations imposed by the contract documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law. No action or failure to act by the recipient or contractor shall constitute a waiver of any right or duty afforded any of them under the contract, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

Lobbying –Byrd Anti-Lobbying Amendment, 31 U.S.C. 1352, as amended by the Lobbying Disclosure Act of 1995, P.L. 104-65 [to be codified at 2 U.S.C. § 1601, et seq.] - Contractors who apply or bid for an award of \$100,000 or more shall file the certification required by 49 CFR part 20, "New Restrictions on Lobbying." Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier shall also disclose the name of any registrant under the Lobbying Disclosure Act of 1995 who has made lobbying contacts on its behalf with non-Federal funds with respect to that Federal contract, grant or award covered by 31 U.S.C. 1352. Such disclosures are forwarded from tier to tier up to the recipient.

Clean Air – 1) Contractor shall comply with all applicable standards, orders or regulations pursuant to the Clean Air Act, 42 USC 7401 et seq. Contractor shall report each violation to the recipient and understands and agrees that the recipient will, in turn, report each violation as required to FTA and the appropriate EPA Regional Office. 2) Contractor shall include these requirements in each subcontract exceeding \$150,000 financed in whole or in part with FTA assistance.

Clean Water – Contractor shall comply with all applicable standards, orders or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 USC 1251 et seq. Contractor shall report each violation to the recipient and understands and agrees that the recipient shall, in turn, report each violation as required to FTA and the appropriate EPA Regional Office. Contractor shall include these requirements in each subcontract exceeding \$150,000 financed in whole or in part with FTA assistance.

Cargo Preference - Contractor shall: a. use privately owned US-Flag commercial vessels to ship at least 50% of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to the underlying contract to the extent such vessels are available at fair and reasonable rates for US flag commercial vessels; b. furnish within 20 working days following the loading date of shipments originating within the US or within 30 working days following the loading date of shipments originating outside the US, a legible copy of a rated, "on-board" commercial bill-of-lading in English for each shipment of cargo described herein to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590 and to the recipient (through contractor in the case of a subcontractor's bill-of-lading.) c. include these requirements in all subcontracts issued pursuant to this contract when the subcontract involves the transport of equipment, material, or commodities by ocean vessel.

Fly America Requirements – Contractor shall comply with 49 USC 40118 (the “Fly America” Act) in accordance with General Services Administration regulations 41 CFR 301-10, stating that recipients and subrecipients of Federal funds and their contractors are required to use US Flag air carriers for US Government financed international air travel and transportation of their personal effects or property, to the extent such service is available, unless travel by foreign air carrier is a matter of necessity, as defined by the Fly America Act. Contractor shall submit, if a foreign air carrier was used, an appropriate certification or memorandum adequately explaining why service by a US flag air carrier was not available or why it was necessary to use a foreign air carrier and shall, in any event, provide a certificate of compliance with the Fly America requirements. Contractor shall include the requirements of this section in all subcontracts that may involve international air transportation.

Davis-Bacon and Copeland Anti-Kickback Acts

– (1) Minimum wages - (i) All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR Part 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is

performed. The wage determination (including any additional classifications and wage rates conformed under paragraph (1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers. (ii)(A) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met: (1) Except with respect to helpers as defined as 29 CFR 5.2(n)(4), the work to be performed by the classification requested is not performed by a classification in the wage determination; and (2) The classification is utilized in the area by the construction industry; and (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and (4) With respect to helpers as defined in 29 CFR 5.2(n)(4), such a classification prevails in the area in which the work is performed. (B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary. (C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary. (D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii) (B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification. (iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof. (iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (v)(A) The contracting officer shall require that any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met: (1) The work to be

performed by the classification requested is not performed by a classification in the wage determination; and (2) The classification is utilized in the area by the construction industry; and (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary. (C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination with 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary. (D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(v) (B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(2) **Withholding** - The recipient shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the contract, the grantee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) **Payrolls and basic records** - (i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of

Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the recipient for transmission to the Federal Transit Administration. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under section 5.5(a)(3)(i) of Regulations, 29 CFR part 5. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, DC 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. (B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following: (1) That the payroll for the payroll period contains the information required to be maintained under section 5.5(a)(3)(i) of Regulations, 29 CFR part 5 and that such information is correct and complete; (2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3; (3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract. (C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code. (iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the Federal Transit Administration or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) **Apprentices and trainees** - (i) Apprentices - Apprentices will be permitted to work at

less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator of the Wage and Hour Division of the U.S. Department of Labor determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.(ii) Trainees - Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In

addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) **Equal employment opportunity** - The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

(5) **Compliance with Copeland Act requirements** - The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

(6) **Subcontracts** - The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the Federal Transit Administration may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

(7) **Contract termination: debarment** - A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

(8) **Compliance with Davis-Bacon and Related Act requirements** - All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

(9) **Disputes concerning labor standards** - Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

(10) **Certification of Eligibility** - (i) By entering into this contract, contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1). (ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1). (iii) The penalty for making false statements is prescribed in 18 USC 1001.

Contract Work Hours & Safety Standards Act –

(1) **Overtime requirements** - No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages - In the event of any violation of the clause set forth in para. (1) of this section, contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in para. (1) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in para. (1) of this section.

(3) Withholding for unpaid wages and liquidated damages - the recipient shall upon its own action or upon written request of USDOL withhold or cause to be withheld, from any moneys payable on account of work performed by contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours & Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in para. (2) of this section.

(4) Subcontracts - Contractor or subcontractor shall insert in any subcontracts the clauses set forth in this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. Prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in this section.

Bonding Requirements – FTA may accept the bonding policy and requirements of the recipient, provided that they meet the minimum requirements for construction contracts as follows:

a. A bid guarantee from each bidder equivalent to five (5) percent of the bid price. The "bid guarantees" shall consist of a firm commitment such as a bid bond, certified check, or other negotiable instrument accompanying a bid as assurance that the bidder will, upon acceptance of his bid, execute such contractual documents as may be required within the time specified.

b. A performance bond on the part to the Contractor for 100 percent of the contract price. A "performance bond" is one executed in connection with a contract to secure fulfillment of all the contractor's obligations under such contract.

c. A payment bond on the part of the contractor for 100 percent of the contract price. A "payment bond" is one executed in connection with a contract to assure payment, as required by law, of all persons supplying labor and material in the execution of the work provided for in the contract. Payment bond amounts required from Contractors are as follows:

(1) 50% of the contract price if the contract price is not more than \$1 million;

(2) 40% of the contract price if the contract price is more than \$1 million but not more than \$5 million; or

(3) \$2.5 million if the contract price is more than \$5 million.

d. A cash deposit, certified check or other negotiable instrument may be accepted by a grantee in lieu of performance and payment bonds, provided the grantee has established a procedure to assure that the interest of FTA is adequately protected. An irrevocable letter of credit would also satisfy the requirement for a bond.

Bid Bond Requirements (Construction)

(a) Bid Security - A Bid Bond must be issued by a fully qualified surety company acceptable to (Recipient) and listed as a company currently authorized under 31 CFR, Part 223 as possessing a Certificate of Authority as described thereunder.

(b) Rights Reserved - In submitting this Bid, it is understood and agreed by bidder that the right is reserved by (Recipient) to reject any and all bids, or part of any bid, and it is agreed that the Bid may not be withdrawn for a period of [ninety (90)] days subsequent to the opening of bids, without the written consent of (Recipient).

It is also understood and agreed that if the undersigned bidder should withdraw any part or all of his bid within [ninety (90)] days after the bid opening without the written consent of (Recipient), shall refuse or be unable to enter into this Contract, as provided above, or refuse or be unable to furnish adequate and acceptable Performance Bonds and Labor and Material Payments Bonds, as provided above, or refuse or be unable to furnish adequate and acceptable insurance, as provided above, he shall forfeit his bid security to the extent of (Recipient's) damages occasioned by such withdrawal, or refusal, or inability to enter into an agreement, or provide adequate security therefor.

It is further understood and agreed that to the extent the defaulting bidder's Bid Bond, Certified Check, Cashier's Check, Treasurer's Check, and/or Official Bank Check (excluding any income generated thereby which has been retained by (Recipient) as provided in [Item x "Bid Security" of the Instructions to Bidders]) shall prove inadequate to fully recompense (Recipient) for the damages occasioned by default, then the undersigned bidder agrees to indemnify (Recipient) and pay over to (Recipient) the difference between the bid security and (Recipient's) total damages, so as to make (Recipient) whole.

The undersigned understands that any material alteration of any of the above or any of the material contained on this form, other than that requested, will render the bid unresponsive.

Performance and Payment Bonding Requirements (Construction)

The Contractor shall be required to obtain performance and payment bonds as follows:

(a) Performance bonds

1. The penal amount of performance bonds shall be 100 percent of the original contract price, unless the (Recipient) determines that a lesser amount would be adequate for the protection of the (Recipient).

2. The (Recipient) may require additional performance bond protection when a contract price is increased. The increase in protection shall generally equal 100 percent of the increase in contract price. The (Recipient) may secure additional protection by directing the Contractor to increase the penal amount of the existing bond or to obtain an additional bond.

(b) Payment bonds

1. The penal amount of the payment bonds shall equal:

(i) Fifty percent of the contract price if the contract price is not more than \$1 million.

(ii) Forty percent of the contract price if the contract price is more than \$1 million but not more than \$5 million; or

(iii) Two and one half million if the contract price is more than \$5 million.

2. If the original contract price is \$5 million or less, the (Recipient) may require additional protection as required by subparagraph 1 if the contract price is increased.

Performance and Payment Bonding Requirements (Non-Construction)

(a) The following situations may warrant a performance bond:

1. (Recipient) property or funds are to be provided to the contractor for use in performing the contract or as partial compensation (as in retention of salvaged material).
2. A contractor sells assets to or merges with another concern, and the (Recipient), after recognizing the latter concern as the successor in interest, desires assurance that it is financially capable.
3. Substantial progress payments are made before delivery of end items starts.
4. Contracts are for dismantling, demolition, or removal of improvements.

(b) When it is determined that a performance bond is required, the Contractor shall be required to obtain performance bonds as follows:

1. The penal amount of performance bonds shall be 100 percent of the original contract price, unless the (Recipient) determines that a lesser amount would be adequate for the protection of the (Recipient).
2. The (Recipient) may require additional performance bond protection when a contract price is increased. The increase in protection shall generally equal 100 percent of the increase in contract price.

The (Recipient) may secure additional protection by directing the Contractor to increase the penal amount of the existing bond or to obtain an additional bond.

(c) A payment bond is required only when a performance bond is required, and if the use of payment bond is in the (Recipient's) interest.

(d) When it is determined that a payment bond is required, the Contractor shall be required to obtain payment bonds as follows:

1. The penal amount of payment bonds shall equal:
 - (i) Fifty percent of the contract price if the contract price is not more than \$1 million;
 - (ii) Forty percent of the contract price if the contract price is more than \$1 million but not more than \$5 million; or
 - (iii) Two and one half million if the contract price is increased.

Advance Payment Bonding Requirements

The Contractor may be required to obtain an advance payment bond if the contract contains an advance payment provision and a performance bond is not furnished. The (recipient) shall determine the amount of the advance payment bond necessary to protect the (Recipient).

Patent Infringement Bonding Requirements (Patent Indemnity)

The Contractor may be required to obtain a patent indemnity bond if a performance bond is not furnished and the financial responsibility of the Contractor is unknown or doubtful.

The (recipient) shall determine the amount of the patent indemnity to protect the (Recipient).

Warranty of the Work and Maintenance Bonds

1. The Contractor warrants to (Recipient), the Architect and/or Engineer that all materials and equipment furnished under this Contract will be of highest quality and new unless otherwise specified by (Recipient), free from faults and defects and in conformance with the Contract Documents. All work not so conforming to these standards shall be considered defective. If required by the [Project Manager], the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

2. The Work furnished must be of first quality and the workmanship must be the best obtainable in the various trades. The Work must be of safe, substantial and durable construction in all respects. The Contractor hereby guarantees the Work against defective materials or faulty workmanship for a minimum period of one (1) year after Final Payment by (Recipient) and shall replace or repair any defective materials or equipment or faulty workmanship during the period of the guarantee at no cost to (Recipient). As additional security for these guarantees, the Contractor shall, prior to the release of Final Payment [as provided in Item X below], furnish separate Maintenance (or Guarantee) Bonds in form acceptable to (Recipient) written by the same corporate surety that provides the Performance Bond and Labor and Material Payment Bond for this Contract. These bonds shall secure the Contractor's obligation to replace or repair defective materials and faulty workmanship for a minimum period of one (1) year after Final Payment and shall be written in an amount equal to ONE HUNDRED PERCENT (100%) of the CONTRACT SUM, as adjusted (if at all).

Seismic Safety—Contractor agrees that any new building or addition to an existing building shall be designed and constructed in accordance with the standards required in USDOT Seismic Safety Regulations 49 CFR 41 and shall certify compliance to the extent required by the regulation. Contractor shall also ensure that all work performed under this contract, including work performed by subcontractors, complies with the standards required by 49 CFR 41 and the certification of compliance issued on the project.

Disadvantaged Business Enterprises --

a. This contract is subject to the requirements of Title 49, Code of Federal Regulations, Part 26, Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs. The national goal for participation of Disadvantaged Business Enterprises (DBE) is 10%. The recipient's overall goal for DBE participation is 5%. A 5% contract goal for DBE participation has been established for this procurement.

b.) The contractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of this contract. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the municipal corporation deems appropriate. Each subcontract the contractor signs with a subcontractor must include the assurance in this paragraph (see 49 CFR 26.13(b)).

c.) If a separate contract goal has been established, Bidders/offerors are required to document sufficient DBE participation to meet these goals or, alternatively, document adequate good faith efforts to do so, as provided for in 49 CFR 26.53.

d.) If no separate contract goal has been established, the successful bidder/offeror will be required to report its DBE participation obtained through race-neutral means throughout the period of performance.

e.) The contractor is required to pay its subcontractors performing work related to this contract for satisfactory performance of that work no later than 30 days after the contractor's receipt of payment for that work from the recipient. In addition, the contractor may not hold retainage from its subcontractors or must return any retainage payments to those subcontractors within 30 days after the subcontractor's work related to this contract is satisfactorily completed or must return any retainage payments to those subcontractors within 30 days after incremental acceptance of the subcontractor's work by the recipient and contractor's receipt of the partial retainage payment related to the subcontractor's work.

f.) The contractor must promptly notify the recipient whenever a DBE subcontractor performing work related to this contract is terminated or fails to complete its work, and must make good faith efforts to engage another DBE subcontractor to perform at least the same amount of work. The contractor may not terminate any DBE subcontractor and perform that work through its own forces or those of an affiliate without prior written consent of the recipient.

Prompt Payment –

The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than 30 days from the receipt of each payment the prime contract receives from the Recipient. The prime contractor agrees further to return retainage payments to each subcontractor within 30 days after the subcontractors work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of the Recipient. This clause applies to both DBE and non-DBE subcontracts.

Recycled Products –The contractor agrees to comply with all the requirements of Section 6002 of the Resource Conservation and Recovery Act (RCRA), as amended (42 U.S.C. 6962), including but not limited to the regulatory provisions of 40 CFR Part 247, and Executive Order 12873, as they apply to the procurement of the items designated in Subpart B of 40 CFR Part 247.

Incorporation of Federal Transit Administration (FTA) Terms –

The preceding provisions include, in part, certain Standard Terms & Conditions required by USDOT, whether or not expressly stated in the preceding contract provisions. All USDOT-required contractual provisions, as stated in FTA Circular 4220.1F, are hereby incorporated by reference. Anything to the contrary herein notwithstanding, all FTA mandated terms shall be deemed to control in the event of a conflict with other provisions contained in this Agreement. The contractor shall not perform any act, fail to perform any act, or refuse to comply with any request that would cause the recipient to be in violation of FTA terms and conditions.

Drug & Alcohol Abuse and Testing –

The Contractor agrees to comply with the following Federal substance abuse regulations: a. Drug-Free Workplace. U.S. DOT regulations, "Drug-Free Workplace Requirements (Grants)," 49 C.F.R. Part 32, that implements the Drug-Free Workplace Act of 1988 as amended, 41 U.S.C. §§ 8103 et seq., and 2 CFR part 182, b. Alcohol Misuse and Prohibited Drug Use. FTA Regulations, "Prevention of Alcohol Misuse and Prohibited Drug Use in Transit Operations," 49 USC 5331, as amended by Map-21, 49 CFR part 40, 49 USC chapter 53, 49 CFR Part 655, to the extent applicable.

Other Federal Requirements:

Conformance with ITS National Architecture – Contractor shall conform, to the extent applicable, to the National Intelligent Transportation Standards architecture as required by SAFETEA-LU Section 5307(c), 23 U.S.C. Section 512 note and follow the provisions of FTA Notice, "FTA National Architecture Policy on Transit Projects," 66 Fed. Reg. 1455 et seq., January 8, 2001, and any other implementing directives FTA may issue at a later date, except to the extent FTA determines otherwise in writing.

Access Requirements for Persons with Disabilities – Contractor shall comply with 49 USC 5301(d), stating Federal policy that the elderly and persons with disabilities have the same rights as other persons to use mass transportation services and facilities and that special efforts shall be made in planning and designing those services and facilities to implement that policy. Contractor shall also comply with all applicable requirements of Sec. 504 of the Rehabilitation Act (1973), as amended, 29 USC 794, which prohibits discrimination on the basis of handicaps, and the Americans with Disabilities Act of 1990 (ADA), as amended, 42 USC 12101 et seq., which requires that accessible facilities and services be made available to persons with disabilities, including any subsequent amendments thereto.

Contracts Involving Federal Privacy Act Requirements - The following requirements apply to the Contractor and its employees that administer any system of records on behalf of the Federal Government under any contract:

(1) The Contractor agrees to comply with, and assures the compliance of its employees with, the information restrictions and other applicable requirements of the Privacy Act of 1974, 5 U.S.C. § 552a. Among other things, the Contractor agrees to obtain the express consent of the Federal Government before the Contractor or its employees operate a system of records on behalf of the Federal Government. The Contractor understands that the requirements of the Privacy Act, including the civil and criminal penalties for violation of that Act, apply to those individuals involved, and that failure to comply with the terms of the Privacy Act may result in termination of the underlying contract.

(2) The Contractor also agrees to include these requirements in each subcontract to administer any system of records on behalf of the Federal Government financed in whole or in part with Federal assistance provided by FTA.

Ineligible Contractors and Subcontractors - Any name appearing upon the Comptroller General's list of ineligible contractors for federally-assisted contracts shall be ineligible to act as a subcontractor for contractor pursuant to this contract. If contractor is on the Comptroller General's list of ineligible contractors for federally

financed or assisted construction, the recipient shall cancel, terminate or suspend this contract.

Compliance With Federal Regulations - Any contract entered pursuant to this solicitation shall contain the following provisions: All USDOT-required contractual provisions, as set forth in FTA Circular 4220.1F, are incorporated by reference. Anything to the contrary herein notwithstanding, FTA mandated terms shall control in the event of a conflict with other provisions contained in this Agreement. Contractor shall not perform any act, fail to perform any act, or refuse to comply with any grantee request that would cause the recipient to be in violation of FTA terms and conditions. Contractor shall comply with all applicable FTA regulations, policies, procedures and directives, including, without limitation, those listed directly or incorporated by reference in the Master Agreement between the recipient and FTA, as may be amended or promulgated from time to time during the term of this contract. Contractor's failure to so comply shall constitute a material breach of this contract.

**EXHIBIT B
STATE OF CONNECTICUT
GRANT REQUIREMENTS**

STATE OF CONNECTICUT GRANT REQUIREMENTS

Small Business Enterprises. In connection with the performance of this Agreement, the Consultant shall cooperate with the District in meeting its commitments and goals with regard to the maximum utilization of small business enterprises ("SBEs"), as defined in Section 4a-60 of the Connecticut General Statutes, and will use its best efforts to insure that SBEs shall have the maximum practicable opportunity to compete for any sub-contract work under this Agreement.

The District has agreed with the Connecticut Department of Transportation to include in the Agreement the Special Provisions Requirements of Section 46a-68j-30(9) of the Contract Compliance Regulations.

The Contractor agrees to ensure that small business enterprises as defined in Section 4a-60 of the Connecticut General Statutes have the maximum opportunity to participate in the performance of contracts and subcontracts financed in whole or in part with State funds provided under this agreement. In this regard all recipients or contractors shall take necessary and reasonable steps in accordance with Section 4a-60 of the Connecticut General Statutes to ensure that small business enterprises have the maximum opportunity to compete and perform contracts. Recipients and their contractors shall not discriminate on the basis of race, creed, color, national origin, age or sex in the award of federal assisted contracts.

Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient (the District) deems appropriate.

Non-Discrimination in Employment and Affirmative Action. In connection with the carrying out of the Project the Consultant shall not discriminate against any employee or applicant for employment because of race, color, religion, sex or national origin. The Consultant shall take affirmative action to ensure that applicants are employed, and that employees are treated during their preemployment, without regard to their race, color, religion, sex or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff, or termination; rates of pay, or other forms of compensation; and selection for training, including apprenticeship. The provisions of Executive Order No. 11246 of September 21, 1965, as amended, and all rules, regulations and orders of the Federal government issued pursuant thereto are incorporated herein by reference and made a part hereof. The Consultant agrees to comply with Title VI of the Civil Rights Act of 1964 (42 U.S.C. §2000d-4) and all requirements imposed by Title 49 C.F.R. part 21 and other pertinent directives of the federal government to the end that no person shall on the grounds of race, color, sex or national origin be excluded from participation in, or be denied the benefits of, or be otherwise subjected to discrimination under the Project.

The District has agreed with the Connecticut Department of Transportation ("CTDOT") to include in this Agreement the following Sections from the Agreement between the District and CTDOT:

Section 32 Civil Rights. (b)(1) The Second Party (the "District and its Operator") agrees and warrants that in the performance of the contract such Second Party will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, mental retardation or physical disability, including, but not limited to, blindness, unless shown by such Second Party that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the State of Connecticut. The Second Party further agrees to take affirmative action to insure that applicants with job related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, mental retardation, or physical disability, including, but not limited to, blindness, unless shown by such Second Party that such disability prevents performance of the work involved; (2) the Second Party agrees, in all solicitations or advertisements for employees placed by or on behalf of the Second Party, to state that it is an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the Commission (on Human Rights and Opportunities of the State of Connecticut); (3) the Second Party agrees to provide each labor union or representative of workers with which such Second Party has a collective bargaining agreement or other contract or understanding and each vendor with which such Second Party has a contract or understanding, a notice to be provided by the Commission advising the labor union or workers' representative of the Second Party's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (4) the Second Party agrees to comply with each provision of this section and Conn. Gen. Stat. §§ 46a-68e and 46a-68f and with each regulation or relevant order issued by said Commission pursuant to Conn. Gen. Stat. §§ 46a-56, 46a-68e, and 46a-68f; (5) the Second Party agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Second Party as they relate to the provisions of this section and § 46a-56.

Section 33. Nondiscrimination (Sexual Orientation). (a) Pursuant to § 4a.60 of the Connecticut General Statutes, (1) the Second Party agrees and warrants that in the performance of the contract such Second Party will not discriminate or permit discrimination against any person or group of persons on the grounds of sexual orientation, in any manner prohibited by the laws of the United States or of the State of Connecticut, and that employees are treated when employed without regard to their sexual orientation; (2) the Second Party agrees to provide each labor union or representative of workers with which such Second Party has a collective bargaining agreement or other contract or understanding and each vendor with which such Second Party has a contract or understanding, a notice to be provided by the Commission advising the labor union or workers' representative of the Second Party's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (3) the Second Party agrees to comply

with each provision of this section and with each regulation or relevant order issued by said Commission pursuant to § 46a-56 of the general statutes; (4) the Second Party agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Second Party as they relate to the provisions of this section and § 46a-56.

Non-Discrimination on the Basis of Disability. The Consultant shall insure that all fixed facility construction or alteration and all new equipment purchased to provide the Services comply with applicable regulations regarding Non-Discrimination on the Basis of Handicap in Programs and Activities Receiving or Benefitting from Federal Financial Assistance, set forth at Title 49, Code of Federal Regulations, Part 27, and any amendments thereto.

The Agreement shall be deemed to include the CONNECTICUT REQUIRED CONTRACT/AGREEMENT PROVISIONS including but not limited to Equal Employment Opportunity Responsibilities, Policy on SBEs, and Code of Ethics, incorporated herein by reference, and all requirements upon consultants and contractors of the "Second Party" (the "District") set forth in said PROVISIONS shall be deemed requirements upon the Consultant hereunder. In any event, the Consultant shall do nothing which would cause the District to be in violation of the requirements upon it, as the "Second Party" under said PROVISIONS.

EXHIBIT C
PROCUREMENT AND APPEALS PROCESS

GHTD PROCUREMENT PROCEDURES AND APPEALS PROCESS

It is the policy of the Greater Hartford Transit District that it is responsible for resolving all Pre-Bid, Pre-Award and Post-Award Procurement Protest disputes arising out of third party procurements using good administrative practices and sound business judgment. It is the District's intention that its procurement process provides for fair and open competition in compliance with federal and state laws and District Policies.

The District has established these pre-bid, pre-award, and post-award procurement protest policy and procedures so that all procurement protests/disputes are filed, processed and resolved in a manner consistent with the requirements of the Federal Transit Administration.

1. Pre-Bid

A pre-bid or solicitation phase protest is received prior to the bid opening or proposal due date. Pre-bid protests are those based on the content of the initial notice and/or solicitation published by the District requesting bids or proposals from vendors or other interested parties.

2. Pre-award

A pre-award protest is a protest against making an award and is received after receipt of proposals or bids, but before award of a contract.

3. Post-Award

A post-award protest is a protest received after award of a contract. A post-award protest must be received within 5 business days of the notification of the award. A post-award protest generally alleges a violation of applicable federal or state law and/or District policy or procedures relative to the seeking, evaluating and/or awarding of the contract. Each Proposer will be notified by first class mail of the decision of the District as to the selection of firm under this procurement. Included in that notification will be a proposed effective date of engagement which will be no less than 15 days following the date of notification of award.

It is the policy of the District not to proceed with the award phase of any procurement if there is a pending protest.

All Protests must be filed in writing to:

Vicki L. Shotland, Executive Director
Greater Hartford Transit District
One Union Place
Hartford, CT 06103

A Protest must be in writing and set forth the specific grounds of the dispute and shall be fully supported with technical data, test results, or other pertinent information related to the subject being protested. The Protest shall include the name and contact information of the Protester, solicitation number or description, and what remedy the Protester is seeking. The Protester is responsible for adhering to this regulation

Greater Hartford Transit District, Vicki L. Shotland, Executive Director or designee shall make a determination on the Protest generally within ten (10) working days from receipt of the Protest. The Decision of the Executive Director or Designee must be in writing and shall

include a response to each substantive issue raised in the Protest. The Executive Director's decision shall constitute the District's final administrative determination.

If the District postpones the date of Bid submission because of a Protest or Appeal of the solicitation specifications, addenda, dates or any other issue relating to the procurement, the District will notify, via addendum, all parties who are on record as having obtained a copy of the solicitation documents that a Protest/Appeal has been filed and the due date for Bid submission shall be postponed until the District has issued its final decision.

The Protester may withdraw its Protest or Appeal at any time before a final decision is issued.

A Protester must exhaust all administrative remedies with the District before pursuing a protest with the Federal Transit Administration (FTA). Reviews of protests by the FTA will be limited to (1) failure to have or to follow the District's protest procedures or failure to review a complaint or Protest or (2) violations of Federal law or regulation.

A Protest Appeal to FTA must be received within five (5) working days of the date of the final decision by the Greater Hartford Transit District is rendered. The appeal must be in writing and must include the name and address of the protestor, cite the District as the grantee, the number of the solicitation, a statement of the grounds for protest and any supporting documentation, including a copy of the local Protest filed with the District and a copy of the District's decision, if any. Protest appeals should be filed with:

Federal Transit Administration Region 1 Office,
Kendall Square
Attention: Procurement Appeal
55 Broadway, Suite 920
Cambridge, MA 02142-1093

Upon receipt of a notice that an appeal has been submitted to FTA prior to the award of a contract, the District will immediately contact the appropriate FTA official to determine if the Response Date should be postponed. If the Response Date is postponed, the District will contact all Proposers or firms who have been furnished a copy of the RFP that an appeal has been filed and that the Response Date is postponed until FTA has issued its decision. Appropriate addenda will be issued rescheduling the Response Date.

Any appeal to FTA may be withdrawn at any time before FTA has issued its decision.

FTA's decision on any appeal will be final. No further appeals will be considered by FTA.

**EXHIBIT D
BID PROPOSAL FORM**

BID PROPOSAL FORM

BID INFORMATION

Bidder: _____.

Project Name: Public Restroom Expansion and Renovations (Union Station Transportation Center).

Project Location: One Union Place, Hartford, CT.

Owner: Greater Hartford Transit District.

GHTD Project # IFB 11-020.

Architect: Tai Soo Kim Partners, LLC.

1.1 CERTIFICATIONS AND BASE BID

A. Base Bid, Single-Prime (All Trades) Contract: The undersigned Bidder, having carefully examined the Procurement and Contracting Requirements, Conditions of the Contract, Drawings, Specifications, and all subsequent Addenda, as prepared by Tai Soo Kim Partners and Architect's consultants, having visited the site, and being familiar with all conditions and requirements of the Work, hereby agrees to furnish all material, labor, equipment and services, including all scheduled allowances, necessary to complete the construction of the above-named project, according to the requirements of the Procurement and Contracting Documents, for the stipulated sum of:

1. _____ Dollars (\$_____).

1.2 BID GUARANTEE

A. The undersigned Bidder agrees to execute a contract for this Work in the above amount and to furnish a Bid Security made payable to the Greater Hartford Transit District as specified in the Invitation to Bid. If Bidder fails to execute a contract for this Work 10 days after receiving a written Notice of Award, he will forfeit to Owner the enclosed cash, certified check, cashier's check, or Bid Bond issued by a surety, as liquidated damages for such failure, in the following amount constituting five percent (5%) of the Base Bid Amount above:

1. _____ Dollars (\$_____).

B. In the event Owner does not offer Notice of Award within 120 days after receipt of Bid, Owner will return to the undersigned the cash, certified check, cashier's check, or Bid Bond.

1.3 SUBCONTRACTORS AND SUPPLIERS

A. The following companies shall execute subcontracts for the portions of the Work indicated:

1. Plumbing Work: _____.
2. HVAC Work: _____.
3. Electrical Work: _____.

1.4 TIME OF COMPLETION

A. The undersigned Bidder proposes and agrees hereby to commence the Work promptly, and shall fully complete the Work of all phases within 8 months after execution of the Contract.

1.5 ACKNOWLEDGEMENT OF ADDENDA

A. The undersigned Bidder acknowledges receipt of and use of the following Addenda in the preparation of this Bid:

1. Addendum No. 1, dated _____.
2. Addendum No. 2, dated _____.
3. Addendum No. 3, dated _____.
4. Addendum No. 4, dated _____.

1.6 CONTRACTOR'S LICENSE

A. The undersigned further states that it is a duly licensed for the type of work proposed in Connecticut, and that all fees, permits, etc., pursuant to submitting this proposal have been paid in full.

1.7 FEDERALLY REQUIRED CONTRACT CLAUSES (Exhibit A)

The undersigned acknowledges receipt of the Federally Required Contract Clauses contained in "Exhibit A" and agrees to comply with them. A signed copy of "Exhibit A" is included as part of this Bid.

1.8 REQUIRED CERTIFICATES (Exhibit E)

A. The undersigned acknowledges receipt of the Required Certificates contained in "Exhibit E" and agrees to comply with their requirements. Signed copies of the Required Certificates are included as part of this Bid.

1.9 SUBMISSION OF BID

Respectfully submitted this ____ day of _____, 2020.

Submitted By: _____
(Name of bidding firm or corporation)

Signature: _____
(Handwritten signature)

Signed By: _____
(Type or print name)

Title: _____
(Owner/Partner/President/Vice President)

Witness By: _____
(Handwritten signature)

Attest: _____
(Handwritten signature)

By: _____
(Type or print name)

Title: _____
(Corporate Secretary or Assistant Secretary)

Street Address: _____

City, State, Zip _____

Phone: _____

License No.: _____

Federal ID No.: _____

(Affix Corporate Seal Here)

END OF BID FORM

EXHIBIT E
REQUIRED FORMS AND CERTIFICATES

AFFIDAVIT

STATE OF CONNECTICUT)
) ss. _____, 20__
COUNTY OF _____)

I, _____, being duly sworn, depose and say:
(insert name of authorized agent)

1. I am the _____ of _____ (the
(insert title) (insert name of company)
"Respondent") and am authorized on behalf of the Proposer to make this Affidavit.
2. I am over 18 years of age and understand the obligations of an oath.
3. There are no delinquent real and personal property taxes due the State of Connecticut from the Respondent.
4. The Respondent is current on all monetary obligations due the State of Connecticut.
5. The Respondent is currently in compliance with all applicable laws, regulations and ordinances of the United States and, State of Connecticut.

(Insert name of company)

By:

Name: Title:

Subscribed and sworn to before me, _____, the undersigned officer this

_____ day of _____, 20__.

Notary Public

My Commission Expires:

CERTIFICATION OF ELIGIBILITY

_____ hereby certifies that neither
(Name of Proposer)
it nor its "principals" is included on the U.S. Comptroller General's Debarred Bidders List.

Signature: _____

Firm: _____

The Proposer certifies to the best of its knowledge and belief that it and its principals

- A. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in this transaction by any Federal department or agency.
- B. Have not, within a three-year period preceding the date of this Proposal, been convicted of or had a civil judgment rendered against it for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction, violation of Federal or State anti-trust statues or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statement, or receiving stolen property.
- C. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in Paragraph B of this Certification.
- D. Have not, within a three-year period preceding the date of this Proposal, had one or more public transactions (Federal, State or local) terminated for cause or default.

Where the Proposer is unable to certify to any of the statements in this certification, such Proposer shall include an explanation in such regard with its Proposal.

THE UNDERSIGNED CERTIFIES OR AFFIRMS THE TRUTHFULNESS AND ACCURACY OF THE CONTENTS OF THE STATEMENTS SUBMITTED ON OR WITH THIS CERTIFICATION AND UNDERSTANDS THAT THE PROVISIONS OF 31 U.S.C. SECTIONS 3801 ET SEQ. ARE APPLICABLE THERETO.

(Check One)

_____ I DO CERTIFY

_____ I DO NOT CERTIFY

DATE: _____

SIGNATURE: _____

TITLE: _____

CERTIFICATION OF NON-COLLUSION

The Undersigned certifies, under penalties of perjury:

That this Proposal has been made by the Proposer independently, and has been submitted without collusion, and without any agreement, understanding, or planned common course of action with any other vendor of materials, supplies, equipment , or services described in this procurement document, designed to limit independent bidding or competition;

That the contents of the proposal have not been communicated by the Proposer or it's employees or agents to any person not an employee or agent of the Proposer or it's surety or any bond furnished with the proposal, and will not be communicated to any such person prior to the official awarding of this procurement.

That I have fully informed myself regarding the accuracy of the statement made in the certificate.

SIGNATURE: _____

NAME: _____

FIRM: _____

TITLE: _____

DATE: _____

CERTIFICATION OF RESTRICTIONS ON LOBBYING

I, _____, of _____,
Name & Title Name of Firm

hereby certify that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan or cooperative agreement.
2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for making lobbying contacts to an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this federal contract, grant, loan or cooperative agreement, the undersigned shall complete and submit Standard Form, "Disclosure Form to Report Lobbying," in accordance with its instruction as amended.
3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements), and that all subrecipients shall certify and disclose accordingly.
4. The undersigned acknowledges that this certification is a material representation of fact, upon which reliance is placed at the time that the transaction concerned herewith was made or entered into, and that submission of this certification is a prerequisite for making or entering into such transaction imposed by Section 1352, Title 31, U.S. Code as amended. Any person who fails to file the required certification shall be subject to civil penalty of not less than \$10,000, and not more than \$100,000 for each such failure.
5. The undersigned certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the undersigned understands and agrees that the provisions of 31 US Code A3801, et seq., apply to this certification and disclosure, if any.

Executed this _____ day of _____, 20_____.

By: _____
Signature & Title of Authorized Official

CONTRACTOR'S STATEMENT ON SUB-CONTRACTORS

1. There are NO sub-Contractors associated with this proposal.

Authorized Signee: _____

Printed Name: _____

Title: Date: _____

For (Company): _____

OR

2. Listed below are sub-Contractors associated with this proposal. Additional sheets are attached as required. I _____ have also attached appropriate Disadvantage Business Certifications.

Name of Company: _____

Address: _____

Contact Person: _____

Telephone #: _____

E-mail: _____

Name of Company: _____

Address: _____

Contact Person: _____

Telephone #: _____

E-mail: _____

CERTIFICATION FOR DISADVANTAGED BUSINESS ENTERPRISE

It is the policy of the U.S. Department of Transportation that disadvantaged business enterprises as defined in 49 CFR Part 26 shall have the maximum opportunity to participate in the performance of contracts financed in whole or in part with State and/or Federal funds under this agreement.

The supplier or Contractor agrees to ensure that disadvantaged business enterprises as defined above have the maximum opportunity to participate in the performance of contracts and subcontracts financed in whole or in part with Federal funds provided under this agreement. In this regard all recipients or contractors shall take necessary and reasonable steps in accordance with 49 CFR Part 26 to ensure that disadvantaged business enterprises have the maximum opportunity to compete and perform contracts. Recipients and their contractors shall not discriminate on the basis of race, creed, color, national origin, age or sex in the award of federal assisted contracts.

The specific goal for this project is a minimum of **5%**.

Contractor will meet the DBE goal for this contract. Proposer is certified according to requirements of DOT 49 CFR Part 26 as a DBE eligible for participation in DOT assisted contracts, and will be performing _____ percent (_____ %) of the contract work.

Contractor will meet the DBE goal for this contract. If awarded this contract, proposer will subcontract with the DBE(s) listed below which will be performing a total of _____ percent (_____%) of the total dollar amount of contract work. Each DBE listed below is certified according to requirements of DOT 49 CFR Part 26 for participation in DOT assisted contracts.

DBE Name and Address	Description of Work	Percent of Dollar Amount of Total Contract Work
----------------------	---------------------	---

(Attach additional sheets)

Contractor (if unable to meet the DBE goal of 5%) is committed to a minimum of ___% DBE utilization on this contract and will submit documentation demonstrating good faint efforts using the attached form.

SIGNATURE: _____

NAME: _____

FIRM: _____

TITLE: _____

DATE: _____

Any contractor and/or sub-contractor utilized to meet the DBE Participation requirements must be certified through the State of Connecticut Department of Transportation's Unified Certification Program (UCP.)

DBE GOOD FAITH EFFORTS DOCUMENTATION FORM
ANNUAL DBE GOAL: 5%

If Contractor has indicated on the DBE Participation Form that it does not meet the DBE goal, proposer must submit this form with its DBE Participation Form as documentation of its good faith efforts to meet the goal. Failure to submit this form with its proposer may render this proposal non-responsive. The Greater Hartford Transit District may require that proposer provide additional substantiation of good faith efforts.

Date: _____ Area of Expertise: _____
Name: _____ Company Name: _____
Response: _____

Date: _____ Area of Expertise: _____
Name: _____ Company Name: _____
Response: _____

Date: _____ Area of Expertise: _____
Name: _____ Company Name: _____
Response: _____

Date: _____ Area of Expertise: _____
Name: _____ Company Name: _____
Response: _____

Date: _____ Area of Expertise: _____
Name: _____ Company Name: _____
Response: _____

DBE LETTER OF INTENT
(a separate form is to be submitted for each DBE firm)

Name of bidder/offeror's firm: _____

Address: _____

City: _____ State: _____ Zip: _____

Name of DBE firm: _____

Address: _____

City: _____ State: _____ Zip: _____

Telephone: _____

Description of work to be performed by DBE firm:

The bidder/offeror is committed to utilizing the above-named DBE firm for the work described above. The estimated dollar value of this work is \$ _____.

Affirmation

The above-named DBE firm affirms that it will perform the portion of the contract for the estimated dollar value as stated above and that the firm is DBE certified to perform the specific trades.

By _____ Date: _____
(Signature)

(Title)

If the bidder/offeror does not receive award of the prime contract, any and all representations in this Letter of Intent and Affirmation shall be null and void.

BUY AMERICA CERTIFICATION

The contractor agrees to comply with 49 U.S.C. 5323(j) and 49 C.F.R. Part 661, which provide that Federal funds may not be obligated unless steel, iron, and manufactured products used in FTA-funded projects are produced in the United States, unless a waiver has been granted by FTA or the product is subject to a general waiver.

Certification requirement for procurement of steel, iron, or manufactured products.

Certificate of Compliance with 49 U.S.C. 5323(j)(1)

The bidder or offeror hereby certifies that it will meet the requirements of 49 U.S.C. 5323(j)(1) and the applicable regulations in 49 C.F.R. Part 661.5.

Date _____

Signature _____

Company Name _____

Title _____

Certificate of Non-Compliance with 49 U.S.C. 5323(j)(1)

The bidder or offeror hereby certifies that it cannot comply with the requirements of 49 U.S.C. 5323(j)(1) and 49 C.F.R. 661.5, but it may qualify for an exception pursuant to 49 U.S.C. 5323(j)(2)(A), 5323(j)(2)(B), or 5323(j)(2)(D), and 49 C.F.R. 661.7.

Date _____

Signature _____

Company Name _____

Title _____

APPROVED EQUAL FORM

Bidder/ Equipment Manufacturer

IFB Equipment____ Section Number _____ Section Title _____

Bidder's Request:

The District's Response:

Approved:

Denied:

Noted:

See Addendum:

Comments:

Procurement Officer: _____ Date: _____

STATEMENT OF BIDDER'S QUALIFICATIONS

(To be submitted by the Bidder with the Bid)

All questions must be answered and the data given must be clear and comprehensive. This statement must be notarized. If necessary questions may be answered on separate attached sheets. The Bidder may submit any additional information it desires.

1. Name of Bidder: _____

2. Bidder's Tax Identification Number: _____

3. Permanent Main Office Address: _____

4. When Organized: _____

5. Organizational structure of business entity (select one):

- _____ General partnership (GP)
- _____ Limited partnership (LP)
- _____ Limited liability corporation (LLC)
- _____ Limited liability partnership (LLP)
- _____ Corporation
- _____ Individual doing business under a trade name (sole proprietor)
- _____ Other (specify)
- _____

6. If a Corporation, Where Incorporated: _____

7. How many years have you been engaged in construction under your present firm or trade name: _____

8. Contracts on hand: (Schedule these, showing gross amount of each Contract and the appropriate anticipated dates of completion).

9. General character of work performed by you:

10. Have you ever failed to complete any work awarded to you? If so, where and why:

11. Have you ever defaulted on a Contract? If so, where and why.

12. List up to six past contracts of this type/size your firm has completed within the last three (3) years:.

Project	Date	Contact Person	Phone No.

13. List your major equipment available for this Contract.

14. Experience in work similar in importance to this project.

15. Background and experience of the principal members of your organization, including the officers.

16. Give Bank reference.

17. Status of the business and its current standing with the Secretary of State's office:

Connecticut Businesses – Are all required filings current with the Secretary of State be able to issue a Certificate of Legal Existence? Yes No

_____ _____

Out-of-State (Foreign) Businesses – Have you filed a Certificate of Authority / Application of Registration with the Connecticut Secretary of State? If not, submit a copy of your Certificate of Good Standing from your state of incorporation. Yes No

_____ _____

18. Is your local organization an affiliate of a Parent company? If so, indicate the principal place of business of the parent company and the name of agent for service.

Business Name _____

Address _____

City _____ State _____ Zip _____

Name of Agent _____

19. List of Affiliated Businesses (attach additional sheets as necessary):

Business Name	Address	Ownership Interest (%)

**EXHIBIT F
STATE OF CONNECTICUT
CONTRACT REQUIREMENTS**

REQUIREMENTS OF THE STATE OF CONNECTICUT

The Agreement between the District and the Connecticut Department of Transportation has specific provisions that are passed on to all third party contractors including, but not limited to, Civil Rights, Nondiscrimination, Affirmative Action/Equal Employment Opportunities, Disadvantaged Business Enterprise, Governors' Executive Orders, Code of Ethics, and all applicable federal regulations. These provisions and all applicable appendices of the Agreement are herein incorporated by reference and made a part of this contract.

Signed:

Authorized Corporate Official

Date

CONNECTICUT REQUIRED CERTIFICATIONS

All contract certifications required by the State of Connecticut must be included with the proposal. The instructions and affidavits forms are available at the State of Connecticut, Office of Policy and Management Internet site at:

<http://www.ct.gov/opm/cwp/view.asp?A=2982&Q=386038>

Gift Certification – Form 1

Certification of State Agency Official or Employee Authorized to Execute Contract – Form 3

Consulting Agreement Affidavit – Form 5

Check this site immediately before you submit your proposal in case of any recent changes to the State's contractual requirements for State contracts for goods and services with a value of \$50,000 or more. It is the responsibility of the proposer to ensure that any and all up-to-date contract certification forms are properly filled out and submitted with your proposal.

SMALL BUSINESS ENTERPRISE (SBE) CERTIFICATION

To be eligible for the State of Connecticut's SBE certification a company must meet the legal definition of a small business or that of a minority owned firm:

SMALL BUSINESS ENTERPRISE (SBE):

Been doing business under the same ownership or management and has maintained its principal place of business in Connecticut for at least one year immediately prior to the date of application; Gross revenues not exceeding \$15,000,000 during its most recent fiscal year; and, 51% ownership held by a person(s) who exercises the operational authority over daily affairs of the business and has the power to direct policies and management and receives beneficial interests of the business.

MINORITY BUSINESS ENTERPRISE (MBE):

A small business (must meet the above-stated SBE criteria) with at least 51% ownership by one or more minority person(s) who exercises operational authority over daily affairs of the business, has the power to direct management and policies, and receives the beneficial interests of the business. A minority is a person(s) who is American Indian, Asian, Black, Hispanic, has origins in the Iberian Peninsula, a woman, or an individual with a disability.

Yes____; My Company is certified by the State of Connecticut as a SBE; attach a copy of the SBE Certification.

No____; My Company is not certified by the State of Connecticut as a SBE.

SBE Certification

The contractor hereby acknowledges that **District** has established a contract goal of **zero percent (0%)** for this project. No further action is required.

Firm Name: _____

Signature: _____

Title: _____

Date: _____

NOTE: This form is to be submitted with the Proposal. Please attach the names and addresses of any and all SBE eligible subcontractors who will perform work on this project, and the approximate dollar amounts to be paid to them. If there is no participation then this must be indicated on the form; the form executed and returned with this Proposal.

EXECUTIVE ORDERS

This Agreement is subject to the provisions of Executive Order No 7C of Governor M. Jodi Rell, promulgated July 13, 2006, concerning contracting reforms, Executive Order No. Three of Governor Thomas J. Meskill, promulgated June 16, 1971, concerning labor employment practices, Executive Order No. Seventeen of Governor Thomas J. Meskill, promulgated February 15, 1973, concerning the listing of employment openings and Executive Order No. Sixteen of Governor John G Rowland promulgated August 4, 1999, concerning violence in the workplace, all of which are incorporated into and are made a part of this agreement as if they had been fully set forth in it. For complete text of said documents, please go to:

<https://portal.ct.gov/Office-of-the-Governor/Governors-Actions/Executive-Orders>

Environmental Law Compliance

The Proposer shall be responsible to comply with all federal and state environmental laws and regulations pertaining to the operation of transit motor buses and/or facilities managed by the Second Party, including but not limited to, pollutants emissions control, storage and/or disposal of waste, fluids, fuels, oil, and chemicals in general. The Second Party shall be responsible to comply with OSHA regulations. The Second Party will hold the State and CTTRANSIT harmless of any lawsuits and/or fines with respect to any environmental and/or OSHA regulations violations.

Publication of Reports

The ownership of all data and material collected under this Agreement shall be vested in the Proposer and the State. All reports shall be submitted to District for review prior to publication. The following statement should appear on the cover or title page of any published report prepared under the terms of this Agreement:

“Prepared in cooperation with the U.S. Department of Transportation (including its participating agencies), Connecticut Department of Transportation and the Greater Hartford Transit District. The opinions, findings and conclusions expressed in this publication are those of the Second Party and do not necessarily reflect the official views or policies of the District, Connecticut Department of Transportation and/or the U.S. Department of Transportation.”

Jurisdiction and Forum Language

This Agreement shall be governed, interpreted and construed under and in accordance with the laws of the State of Connecticut, whether or not its conflict of laws principles would dictate otherwise. This Agreement shall be deemed to have been made in Hartford, Connecticut.

The Proposer irrevocably consents with respect to any claims or remedies at law or in equity, arising out of or in connection with this Agreement to the jurisdiction of the Connecticut Superior Court (except as otherwise required by law or that Agreement), and, with respect to any claim between the Parties, to venue in Judicial District of Hartford-New Britain at Hartford or the United States Federal Court, District of Connecticut, and irrevocably waives any objections that it may have to such jurisdiction on the grounds of lack of personal jurisdiction of such court or the laying of venue of such court or on the basis of forum non convenience or otherwise. Nothing herein shall be construed to waive any of the States or the District's immunities.

Litigation

The Proposer agrees that the sole and exclusive means for the presentation of any claim against the State arising from or in connection with this Agreement shall be in accordance with Chapter 53 of the Connecticut General Statutes (Claims against the State) and the Proposer further agrees not to initiate legal proceedings in any State or Federal Court in addition to, or in lieu of, said Chapter 53 proceedings.

FREEDOM OF INFORMATION ACT

The State is entitled to receive a copy of records and files related to the performance of the Proposer under this Agreement, and such records and files may be subject to the Freedom of Information Act and may be disclosed by the State pursuant to the Freedom of Information Act. No request to inspect or copy such records or files shall be valid unless the request is made to the State in accordance with the Freedom of Information Act. Any complaint by a person who is denied the right to inspect or copy such records or files shall be brought to the Freedom of Information Commission in accordance with the provisions of Sections 1-205 and 1-206 of the Connecticut General Statutes.

RIGHT TO INSPECT RECORDS

By way of its agreement with the Connecticut Department of Transportation, the District agrees to include in all its subcontracts a provision to the effect the subcontractor agrees that the State, the U.S. Department of Transportation and the Comptroller General of the United States or any of their duly authorized representatives, shall, until the expiration of three (3) years after the final payment under the subcontract, have access to and the right to examine any directly pertinent books, documents, papers, and records of such subcontractor, involving transactions related to the subcontractor. The term "subcontractor" as used in this clause excludes work not exceeding \$25,000.00.

The period of access and examination described above, for records which relate to (1) appeals for disputes, (2) litigation of the settlement of claims arising out of the performance of this contract, or (3) costs and expenses in relation to the performance of this contract to which exception has been taken by the State, the Comptroller General or any of their duly authorized representatives, shall continue until such appeals, litigation, claims or exceptions have been disposed of.

PROVISIONS DATED MARCH 6, 1998
“SPECIFIC EQUAL EMPLOYMENT OPPORTUNITY RESPONSIBILITIES”

1. General

A. Equal employment Opportunity Requirements not to discriminate and to take affirmative action to assure equal employment opportunity as required by Executive Order 11246, Executive Order 11375, the Railroad Revitalization and Regulatory Reform Act of 1976 and other U.S. Department of Transportation nondiscrimination legislation are set forth in this Required Contract/Agreement Provision. The requirements set forth in these special provisions shall constitute the specific affirmative action requirements for project activities under this contract (or agreement) and supplement the equal employment opportunity requirements set forth in other related contract provisions.

B. “Company” refers to any entity doing business with the Connecticut Department of Transportation and includes but is not limited to the following:

Contractors	Vendors (where applicable)
Subcontractors	Suppliers of Materials (where applicable)
Consultants	Municipalities (where applicable)
Subconsultants	Utilities (where applicable)

C. The Company will work with the Connecticut Department of Transportation and the federal government in carrying out equal employment opportunity obligations and in their review of his/her activities under the contract or agreement.

E. The Company and all their subcontractors or subconsultants holding subcontracts or subagreements of \$10,000 or more on federally assisted projects and \$5,000 or more on state funded projects, will comply with the following minimum specific requirement activities of equal employment opportunity. The Company will physically include these requirements in every subcontract or subagreement meeting the monetary criteria above with such modification or language as is necessary to make them binding on the subcontractor or subconsultant.

F. These Required Contract Provisions apply to all state funded and/or federally assisted projects, activities and programs in all facets of the Connecticut Department of Transportation operations resulting in contracts or agreements.

2. Equal Employment Opportunity Policy

The Company will develop, accept and adopt as its operating policy and Affirmative Action Plan utilizing as a guide the Connecticut Department of Transportation Affirmative Action Plan Guideline.

3. Equal Employment Opportunity Officer

The Company will designate and make known to the State Department of Transportation contracting officers an equal employment opportunity officer (hereinafter referred to as the EEO Officer) who will have the responsibility for and must be capable of effectively administering and

promoting an active program of equal employment opportunity and who must be assigned adequate authority and responsibility to do so.

4. Dissemination of Policy

A. All members of the Company's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the Company's equal employment opportunity policy and contractual responsibilities to provide equal employment opportunity in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

- (1) Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less than once every six (6) months thereafter, at which time the Company's equal employment opportunity policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable Company Official.
- (2) All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer or other knowledgeable Company official covering all major aspects of the Company's equal employment opportunity obligations within thirty (30) days following their reporting for duty with the Company.
- (3) All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer or appropriate Company official in the Company's procedures for locating and hiring protected class group employees.

B. In order to make the Company's equal employment opportunity policy known to all employees, prospective employees and potential sources of employees, i.e., schools, employment agencies, labor unions (where appropriate), college placement officers, etc., the Company will take the following actions:

- (1) Notices and posters setting forth the Company's equal employment opportunity policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.
- (2) The Company's equal employment opportunity policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

5. Recruitment

A. When advertising for employees, the Company will include in all advertisements for employees the notation: "An Equal Opportunity Employer". All such advertisements will be published in newspapers or other publications having a large circulation among minority groups in the area from which the project work force would normally be derived.

B. The Company will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority group applicants, including, but not limited to, State employment agencies, schools, colleges and minority group organizations. To meet this requirement, the Company

will, through its EEO Officer, identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group applicants may be referred to the Company for employment consideration.

In the event the Company has a valid bargaining agreement providing for exclusive hiring of all referrals, the Company is expected to observe the provisions of that agreement to the extent that the system permits the Company's compliance with equal employment opportunity contract provisions. (The U.S. Department of Labor has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the Company to do the same, such implementation violates Executive Order 11246, as amended.)

- C. The Company will encourage its present employees to refer minority group applicants for employment by posting appropriate notices or bulletins in the areas accessible to all such employees. In addition, information and procedures with regard to referring minority group applicants will be discussed with employees.

6. Personnel Actions

Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoffs, and termination, shall be taken without regard to race, color, religion, sex, or national origin, etc. The following procedures shall be followed:

- A. The Company will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.
- B. The Company will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practice.
- C. The Company will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the Company will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective actions shall include all affected persons.
- D. The Company will promptly investigate all complaints of alleged discrimination made to the Company in connection with his obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the Company will inform every complainant of all of his avenues of appeal.
- E. The general contract provision entitled A(76) Affirmative Action Requirements is made part of this document by reference. In conjunction with this contract provision, only the job categories will change in order to be comparable with the job categories utilized by the Company proposing to do business with the Connecticut Department of Transportation. The goals and timetables will remain the same throughout the contract provision.

7. Training and Promotion

- A. The Company will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.

- B. Consistent with the Company's work force requirements and as permissible under Federal and State regulations, the Company shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contact performance. Where feasible, 25 percent of apprentices of trainees in each occupation shall be in their first year of apprenticeship of training. In the event the Training Special Provision is provided under this contract, this subparagraph will be superseded.
- C. The Company will advise employees and applicants for employment of available training programs and entrance requirements for each.
- D. The Company will periodically review the training and promotion potential of minority group and women employees and will encourage eligible employees to apply for such training and promotion.

8. Unions

If the Company relies in whole or in part upon unions as a source of employees, it will use its best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. Actions by the Company either directly or through an association acting as agent will include the procedures set forth below:

- A. The Company will use its best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.
- B. The Company will use its best efforts to incorporate an equal employment opportunity clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, or national origin, etc.
- C. The Company is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the Company, the Company shall so certify to the Connecticut Department of Transportation and shall set forth what efforts have been made to obtain such information.
- D. In the event the union is unable to provide the Company with a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, the Company will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex or national origin, etc. making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The U.S. Department of Labor has held that there shall be no excuse that the union with which the Company has a collective bargaining agreement providing for exclusive referral failed to refer minority employees). In the event the union referral practice prevents the Company from meeting the obligations pursuant to Executive Order 11246, as amended, and these provisions, such Company shall immediately notify the Connecticut Department of Transportation.

9. Subcontracting

- A. The Company will use its best efforts to solicit Bids from and to utilize minority group subcontractors, or subcontractors with meaningful minority group and female representation among their employees. Companies shall obtain a list of applicable Disadvantaged Business Enterprise firms from the Division of Contract Compliance.
- B. The Company will use its best efforts to ensure subcontractor compliance with their equal employment opportunity obligations.
- C. The General Contract Provisions entitled "Minority Business Enterprises as Subcontractors" is made part of this document by reference and its requirements are applicable to all entities proposing to do business with the Connecticut Department of Transportation.

10. Records and Reports

For the duration of the project, the company will maintain records as are necessary to determine compliance with the Company's equal employment opportunity obligations and Affirmative Action requirements. Additionally, the company will submit all requested reports in the manner required by the contracting agency.

- A. The number of minority and non-minority group members and women employed in each work classification on the project.
- B. The progress and efforts being made in cooperation with unions to increase employment opportunities for minorities and women (applicable only to Companies which rely on whole or in part on unions as a source of their work force).
- C. The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees, and
- D. The progress and efforts being made in securing the services of minority and female owned businesses.
 - (1) All such records must be retained for a period of three (3) years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the State Department of Transportation and the U.S. Department of Transportation including consultant firms.
 - (2) If on-the-job training is being required by the "Training Special Provision", the Company will be required to furnish a Monthly Training Report and Supplement Report (1409) for each trainee.

11. Affirmative Action Plan

- A. Contractors, subcontractors, Vendors, suppliers, and all other Companies with contracts, agreements or purchase orders completely state funded will submit an Affirmative Action Plan if the contract value is \$5,000 or over.
- B. Contractors, subcontractors, Vendors, suppliers, and all other Companies with federally assisted contracts, agreements, or purchase orders valued at \$10,000 or more will submit an Affirmative Action Plan.

- C. Companies with contracts, agreements, or purchase orders with total dollar value under that which is stipulated in A and B above shall be exempt from the required submission of an Affirmative Action Plan unless otherwise directed by the Division of Contract Compliance.

EXHIBIT G
CONNECTICUT DEPARTMENT OF LABOR PREVAILING WAGE BID
PACKAGE

Minimum Rates and Classifications for Building Construction

ID#: 20-13034

**Connecticut Department of Labor
Wage and Workplace Standards Division**

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number: GHTD

Project Town: Hartford

State#: GHTD

FAP#: GHTD

Project: Public Restroom Expansion & Renovation (GHTD)

CLASSIFICATION	Hourly Rate	Benefits
1b) Asbestos/Toxic Waste Removal Laborers: Asbestos removal and encapsulation (except its removal from mechanical systems which are not to be scrapped), toxic waste removers, blasters.**See Laborers Group 7**		
1c) Asbestos Worker/Heat and Frost Insulator	40.21	30.99
2) Boilermaker	38.34	26.01
3a) Bricklayer, Cement Mason, Concrete Finisher (including caulking), Stone Masons	35.71	33.31 + a
3b) Tile Setter	34.9	25.87
3c) Terrazzo Mechanics and Marble Setters	31.69	22.35
3d) Tile, Marble & Terrazzo Finishers	26.7	21.75
3e) Plasterer	33.48	32.06
-----LABORERS-----		
4) Group 1: Laborers (common or general), acetylene burners, carpenter tenders, concrete specialists, wrecking laborers, fire watchers.	31.0	22.15
4a) Group 2: Mortar mixers, plaster tender, power buggy operators, powdermen, fireproofers/mixer/nozzleman (Person running mixer and spraying fireproof only).	31.25	22.15

Project: Public Restroom Expansion & Renovation (GHTD)

4b) Group 3: Jackhammer operators/pavement breaker, mason tender (brick), mason tender (cement/concrete), forklift operators and forklift operators (masonry).	31.5	22.15
4c) **Group 4: Pipelayers (Installation of water, storm drainage or sewage lines outside of the building line with P6, P7 license) (the pipelayer rate shall apply only to one or two employees of the total crew who primary task is to actually perform the mating of pipe sections) P6 and P7 rate is \$26.80.	32.0	22.15
4d) Group 5: Air track operator, sand blaster and hydraulic drills.	31.75	22.15
4e) Group 6: Blasters, nuclear and toxic waste removal.	34.0	22.15
4f) Group 7: Asbestos/lead removal and encapsulation (except it's removal from mechanical systems which are not to be scrapped).	32.0	22.15
4g) Group 8: Bottom men on open air caisson, cylindrical work and boring crew.	29.28	22.15
4h) Group 9: Top men on open air caisson, cylindrical work and boring crew.	28.74	22.15
4i) Group 10: Traffic Control Signalman	18.0	22.15
5) Carpenter, Acoustical Ceiling Installation, Soft Floor/Carpet Laying, Metal Stud Installation, Form Work and Scaffold Building, Drywall Hanging, Modular-Furniture Systems Installers, Lathers, Piledrivers, Resilient Floor Layers.	33.53	25.66
5a) Millwrights	34.94	26.19
6) Electrical Worker (including low voltage wiring) (Trade License required: E1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	40.0	27.67+3% of gross wage
7a) Elevator Mechanic (Trade License required: R-1,2,5,6)	55.12	34.765+a+b
-----LINE CONSTRUCTION-----		
Groundman	26.5	6.5% + 9.00
Linemen/Cable Splicer	48.19	6.5% + 22.00
8) Glazier (Trade License required: FG-1,2)	38.18	21.80 + a

As of: May 28, 2020

9) Ironworker, Ornamental, Reinforcing, Structural, and Precast Concrete Erection	36.67	35.77
-----OPERATORS-----		
Group 1: Crane handling or erecting structural steel or stone, hoisting engineer 2 drums or over, front end loader (7 cubic yards or over), work boat 26 ft. and over and Tunnel Boring Machines. (Trade License Required)	42.45	25.30 + a
Group 2: Cranes (100 ton rate capacity and over); Excavator over 2 cubic yards; Piledriver (\$3.00 premium when operator controls hammer); Bauer Drill/Caisson. (Trade License Required)	42.11	25.30 + a
Group 3: Excavator; Backhoe/Excavator under 2 cubic yards; Cranes (under 100 ton rated capacity), Grader/Blade; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar); Grader Operator; Bulldozer Fine Grade. (slopes, shaping, laser or GPS, etc.). (Trade License Required)	41.32	25.30 + a
Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper).	40.91	25.30 + a
Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24	40.28	25.30 + a
Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller; Pile Testing Machine.	40.28	25.30 + a
Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	39.95	25.30 + a
Group 7: Asphalt roller, concrete saws and cutters (ride on types), vermeer concrete cutter, Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24	39.59	25.30 + a
Group 8: Mechanic, grease truck operator, hydroblaster; barrier mover; power stone spreader; welding; work boat under 26 ft.; transfer machine.	39.17	25.30 + a
Group 9: Front end loader (under 3 cubic yards), skid steer loader regardless of attachments, (Bobcat or Similar): forklift, power chipper; landscape equipment (including Hydroseeder).	38.71	25.30 + a
Group 10: Vibratory hammer; ice machine; diesel and air, hammer, etc.	36.54	25.30 + a
Group 11: Conveyor, earth roller, power pavement breaker (whiphammer), robot demolition equipment.	36.54	25.30 + a

Group 12: Wellpoint operator.	36.48	25.30 + a
Group 13: Compressor battery operator.	35.86	25.30 + a
Group 14: Elevator operator; tow motor operator (solid tire no rough terrain).	34.66	25.30 + a
Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	34.23	25.30 + a
Group 16: Maintenance Engineer/Oiler.	33.54	25.30 + a
Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator.	38.11	25.30 + a
Group 18: Power safety boat; vacuum truck; zim mixer; sweeper; (Minimum for any job requiring a CDL license).	35.53	25.30 + a
-----PAINTERS (Including Drywall Finishing)-----		
10a) Brush and Roller	34.62	21.80
10b) Taping Only/Drywall Finishing	35.37	21.80
10c) Paperhanger and Red Label	34.12	21.05
10e) Blast and Spray	36.62	21.05
11) Plumber (excluding HVAC pipe installation) (Trade License required: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2)	43.62	32.06
12) Well Digger, Pile Testing Machine	37.26	24.05 + a
13) Roofer (composition)	37.6	20.65
14) Roofer (slate & tile)	38.1	20.65
15) Sheetmetal Worker (Trade License required for HVAC and Ductwork: SM-1,SM-2,SM-3,SM-4,SM-5,SM-6)	37.98	38.31
16) Pipefitter (Including HVAC work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4, G-1, G-2, G-8 & G-9)	43.62	32.06

-----TRUCK DRIVERS-----

17a) 2 Axle	29.86	25.79 + a
17b) 3 Axle, 2 Axle Ready Mix	29.97	25.79 + a
17c) 3 Axle Ready Mix	30.03	25.79 + a
17d) 4 Axle, Heavy Duty Trailer up to 40 tons	30.08	25.79 + a
17e) 4 Axle Ready Mix	30.13	25.79 + a
17f) Heavy Duty Trailer (40 Tons and Over)	30.35	25.79 + a
17g) Specialized Earth Moving Equipment (Other Than Conventional Type on-the-Road Trucks and Semi-Trailers, Including Euclids)	30.13	25.79 + a
18) Sprinkler Fitter (Trade License required: F-1,2,3,4)	45.92	26.08 + a
19) Theatrical Stage Journeyman	25.76	7.34

Welders: Rate for craft to which welding is incidental.

**Note: Hazardous waste removal work receives additional \$1.25 per hour for truck drivers.*

***Note: Hazardous waste premium \$3.00 per hour over classified rate*

ALL Cranes: When crane operator is operating equipment that requires a fully licensed crane operator to operate he receives an extra \$4.00 premium in addition to the hourly wage rate and benefit contributions:

- 1) Crane handling or erecting structural steel or stone; hoisting engineer (2 drums or over)***
- 2) Cranes (100 ton rate capacity and over) Bauer Drill/Caisson***
- 3) Cranes (under 100 ton rated capacity)***

Crane with 150 ft. boom (including jib) - \$1.50 extra

Crane with 200 ft. boom (including jib) - \$2.50 extra

Crane with 250 ft. boom (including jib) - \$5.00 extra

Crane with 300 ft. boom (including jib) - \$7.00 extra

Crane with 400 ft. boom (including jib) - \$10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyperson instructing and supervising the work of each apprentice in a specific trade.

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.

It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.

The annual adjustments will be posted on the Department of Labor's Web page: www.ct.gov/dol. For those without internet access, please contact the division listed below.

The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.

All subsequent annual adjustments will be posted on our Web Site for contractor access.

Contracting Agencies are under no obligation pursuant to State labor law to pay any increase due to the annual adjustment provision.

Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

Project: Public Restroom Expansion & Renovation (GHTD)

~~Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

As of: May 28, 2020

Sec. 31-53b. Construction safety and health course. New miner training program. Proof of completion required for mechanics, laborers and workers on public works projects. Enforcement. Regulations. Exceptions. (a) Each contract for a public works project entered into on or after July 1, 2009, by the state or any of its agents, or by any political subdivision of the state or any of its agents, described in subsection (g) of section 31-53, shall contain a provision requiring that each contractor furnish proof with the weekly certified payroll form for the first week each employee begins work on such project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 on such public works project, pursuant to such contract, has completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, has completed a new miner training program approved by the Federal Mine Safety and Health Administration in accordance with 30 CFR 48 or, in the case of telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268.

(b) Any person required to complete a course or program under subsection (a) of this section who has not completed the course or program shall be subject to removal from the worksite if the person does not provide documentation of having completed such course or program by the fifteenth day after the date the person is found to be in noncompliance. The Labor Commissioner or said commissioner's designee shall enforce this section.

(c) Not later than January 1, 2009, the Labor Commissioner shall adopt regulations, in accordance with the provisions of chapter 54, to implement the provisions of subsections (a) and (b) of this section. Such regulations shall require that the ten-hour construction safety and health courses required under subsection (a) of this section be conducted in accordance with federal Occupational Safety and Health Administration Training Institute standards, or in accordance with Federal Mine Safety and Health Administration Standards or in accordance with 29 CFR 1910.268, as appropriate. The Labor Commissioner shall accept as sufficient proof of compliance with the provisions of subsection (a) or (b) of this section a student course completion card issued by the federal Occupational Safety and Health Administration Training Institute, or such other proof of compliance said commissioner deems appropriate, dated no earlier than five years before the commencement date of such public works project.

(d) This section shall not apply to employees of public service companies, as defined in section 16-1, or drivers of commercial motor vehicles driving the vehicle on the public works project and delivering or picking up cargo from public works projects provided they perform no labor relating to the project other than the loading and unloading of their cargo.

(P.A. 06-175, S. 1; P.A. 08-83, S. 1.)

History: P.A. 08-83 amended Subsec. (a) by making provisions applicable to public works project contracts entered into on or after July 1, 2009, replacing provision re total cost of work with reference to Sec. 31-53(g), requiring proof in certified payroll form that new mechanic, laborer or worker has completed a 10-hour or more construction safety course and adding provision re new miner training program, amended Subsec. (b) by substituting "person" for "employee" and adding "or program", amended Subsec. (c) by adding "or in accordance with Federal Mine Safety and Health Administration Standards" and setting new deadline of January 1, 2009, deleted former Subsec. (d) re "public building", added new Subsec. (d) re exemptions for public service company employees and delivery drivers who perform no labor other than delivery and made conforming and technical changes, effective January 1, 2009.



Opportunity * Guidance * Support



THIS IS A PUBLIC WORKS PROJECT

Covered by the

PREVAILING WAGE LAW

CT General Statutes Section 31-53

**If you have QUESTIONS regarding your wages
CALL (860) 263-6790**

Section 31-55 of the CT State Statutes requires every contractor or subcontractor performing work for the state to post in a prominent place the prevailing wages as determined by the Labor Commissioner.

[New] In accordance with Section 31-53b(a) of the C.G.S. each contractor shall provide a copy of the OSHA 10 Hour Construction Safety and Health Card for each employee, to be attached to the first certified payroll on the project.

In accordance with Connecticut General Statutes, 31-53 Certified Payrolls with a statement of compliance shall be submitted monthly to the contracting agency.											PAYROLL CERTIFICATION FOR PUBLIC WORKS PROJECTS											Connecticut Department of Labor Wage and Workplace Standards Division 200 Folly Brook Blvd. Wethersfield, CT 06109													
WEEKLY PAYROLL											CONTRACTOR NAME AND ADDRESS:											SUBCONTRACTOR NAME & ADDRESS					WORKER'S COMPENSATION INSURANCE CARRIER								
PAYROLL NUMBER		Week-Ending Date		PROJECT NAME & ADDRESS											POLICY #											EFFECTIVE DATE:					EXPIRATION DATE:				
PERSON/WORKER, ADDRESS and SECTION	APPR RATE %	MALE/FEMALE AND RACE*	WORK CLASSIFICATION Trade License Type & Number - OSHA 10 Certification Number	DAY AND DATE							Total ST Hours	BASE HOURLY RATE	TYPE OF FRINGE BENEFITS Per Hour 1 through 6 (see back)	GROSS PAY FOR ALL WORK PERFORMED THIS WEEK	TOTAL DEDUCTIONS				GROSS PAY FOR THIS PREVAILING RATE JOB	CHECK # AND NET PAY															
				S	M	T	W	TH	F	S					Total O/T Hours	FICA	FEDERAL WITH-HOLDING	STATE WITH-HOLDING			LIST OTHER														
				HOURS WORKED EACH DAY									CASH																						
												\$	1. \$																						
											Base Rate	2. \$																							
											\$	3. \$																							
											Cash Fringe	4. \$																							
											\$	5. \$																							
											Cash Fringe	6. \$																							

***FRINGE BENEFITS EXPLANATION (P):**

Bona fide benefits paid to approved plans, funds or programs, except those required by Federal or State Law (unemployment tax, worker’s compensation, income taxes, etc.).

Please specify the type of benefits provided:

- 1) Medical or hospital care _____ 4) Disability _____
- 2) Pension or retirement _____ 5) Vacation, holiday _____
- 3) Life Insurance _____ 6) Other (please specify) _____

CERTIFIED STATEMENT OF COMPLIANCE

For the week ending date of _____,

I, _____ of _____, (hereafter known as Employer) in my capacity as _____ (title) do hereby certify and state:

Section A:

1. All persons employed on said project have been paid the full weekly wages earned by them during the week in accordance with Connecticut General Statutes, section 31-53, as amended. Further, I hereby certify and state the following:

- a) The records submitted are true and accurate;
- b) The rate of wages paid to each mechanic, laborer or workman and the amount of payment or contributions paid or payable on behalf of each such person to any employee welfare fund, as defined in Connecticut General Statutes, section 31-53 (h), are not less than the prevailing rate of wages and the amount of payment or contributions paid or payable on behalf of each such person to any employee welfare fund, as determined by the Labor Commissioner pursuant to subsection Connecticut General Statutes, section 31-53 (d), and said wages and benefits are not less than those which may also be required by contract;
- c) The Employer has complied with all of the provisions in Connecticut General Statutes, section 31-53 (and Section 31-54 if applicable for state highway construction);
- d) Each such person is covered by a worker’s compensation insurance policy for the duration of his employment which proof of coverage has been provided to the contracting agency;
- e) The Employer does not receive kickbacks, which means any money, fee, commission, credit, gift, gratuity, thing of value, or compensation of any kind which is provided directly or indirectly, to any prime contractor, prime contractor employee, subcontractor, or subcontractor employee for the purpose of improperly obtaining or rewarding favorable treatment in connection with a prime contract or in connection with a prime contractor in connection with a subcontractor relating to a prime contractor; and
- f) The Employer is aware that filing a certified payroll which he knows to be false is a class D felony for which the employer may be fined up to five thousand dollars, imprisoned for up to five years or both.

2. OSHA~The employer shall affix a copy of the construction safety course, program or training completion document to the certified payroll required to be submitted to the contracting agency for this project on which such persons name first appears.

_____ (Signature) _____ (Title) _____ Submitted on (Date)

Weekly Payroll Certification For Public Works Projects (Continued)

PAYROLL CERTIFICATION FOR PUBLIC WORKS PROJECTS

Week-Ending Date: _____ Contractor or Subcontractor Business Name: _____

WEEKLY PAYROLL

PERSON/WORKER, ADDRESS and SECTION	APPR RATE %	MALE/ FEMALE AND RACE*	WORK CLASSIFICATION Trade License Type & Number - OSHA 10 Certification Number	DAY AND DATE							Total ST Hours	BASE HOURLY RATE	TYPE OF FRINGE BENEFITS Per Hour 1 through 6 (see back)	GROSS PAY FOR ALL WORK PERFORMED THIS WEEK	TOTAL DEDUCTIONS				GROSS PAY FOR THIS PREVAILING RATE JOB	CHECK # AND NET PAY
				S	M	T	W	TH	F	S					FICA	FEDERAL WITH- HOLDING	STATE WITH- HOLDING	OTHER		
				HOURS WORKED EACH DAY							Total O/T Hours	TOTAL FRINGE BENEFIT PLAN CASH	1. \$	2. \$	3. \$	4. \$	5. \$	6. \$		
										\$	Base Rate									
										\$	Cash Fringe									
										\$	Base Rate									
										\$	Cash Fringe									
										\$	Base Rate									
										\$	Cash Fringe									
										\$	Base Rate									
										\$	Cash Fringe									
										\$	Base Rate									
										\$	Cash Fringe									

*IF REQUIRED

November 29, 2006

Notice
To All Mason Contractors and Interested Parties
Regarding Construction Pursuant to Section 31-53 of the
Connecticut General Statutes (Prevailing Wage)

The Connecticut Labor Department Wage and Workplace Standards Division is empowered to enforce the prevailing wage rates on projects covered by the above referenced statute.

Over the past few years the Division has withheld enforcement of the rate in effect for workers who operate a forklift on a prevailing wage rate project due to a potential jurisdictional dispute.

The rate listed in the schedules and in our Occupational Bulletin (see enclosed) has been as follows:

Forklift Operator:

- **Laborers (Group 4) Mason Tenders** - operates forklift solely to assist a mason to a maximum height of nine feet only.
- **Power Equipment Operator (Group 9)** - operates forklift to assist any trade and to assist a mason to a height over nine feet.

The U.S. Labor Department conducted a survey of rates in Connecticut but it has not been published and the rate in effect remains as outlined in the above Occupational Bulletin.

Since this is a classification matter and not one of jurisdiction, effective January 1, 2007 the Connecticut Labor Department will enforce the rate on each schedule in accordance with our statutory authority.

Your cooperation in filing appropriate and accurate certified payrolls is appreciated.

Information Bulletin ***Occupational Classifications***

The Connecticut Department of Labor has the responsibility to properly determine "job classification" on prevailing wage projects covered under C.G.S. Section 31-53(d).

Note: This information is intended to provide a sample of some occupational classifications for guidance purposes only. It is not an all-inclusive list of each occupation's duties. This list is being provided only to highlight some areas where a contractor may be unclear regarding the proper classification. If unsure, the employer should seek guidelines for CTDOL.

Below are additional clarifications of specific job duties performed for certain classifications:

- **ASBESTOS WORKERS**

Applies all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems.

- **ASBESTOS INSULATOR**

Handle, install apply, fabricate, distribute, prepare, alter, repair, dismantle, heat and frost insulation, including penetration and fire stopping work on all penetration fire stop systems.

- **BOILERMAKERS**

Erects hydro plants, incomplete vessels, steel stacks, storage tanks for water, fuel, etc. Builds incomplete boilers, repairs heat exchanges and steam generators.

- **BRICKLAYERS, CEMENT MASONS, CEMENT FINISHERS, MARBLE MASONS, PLASTERERS, STONE MASONS, PLASTERERS. STONE MASONS, TERRAZZO WORKERS, TILE SETTERS**

Lays building materials such as brick, structural tile and concrete cinder, glass, gypsum, terra cotta block. Cuts, tools and sets marble, sets stone, finishes concrete, applies decorative steel, aluminum and plastic tile, applies cements, sand, pigment and marble chips to floors, stairways, etc.

- **CARPENTERS, MILLWRIGHTS. PILEDRIVERMEN. LATHERS. RESILEINT FLOOR LAYERS, DOCK BUILDERS, DIKERS, DIVER TENDERS**

Constructs, erects, installs and repairs structures and fixtures of wood, plywood and wallboard. Installs, assembles, dismantles, moves industrial machinery. Drives piling into ground to provide foundations for structures such as buildings and bridges, retaining walls for earth embankments, such as cofferdams. Fastens wooden, metal or rockboard lath to walls, ceilings and partitions of buildings, acoustical tile layer, concrete form builder. Applies firestopping materials on fire resistive joint systems only. Installation of curtain/window walls only where attached to wood or metal studs. Installation of insulated material of all types whether blown, nailed or attached in other ways to walls, ceilings and floors of buildings. Assembly and installation of modular furniture/furniture systems. Free-standing furniture is not covered. This includes free standing: student chairs, study top desks, book box desks, computer furniture, dictionary stand, atlas stand, wood shelving, two-position information access station, file cabinets, storage cabinets, tables, etc.

- **LABORER, CLEANING**

- The clean up of any construction debris and the general (heavy/light) cleaning, including sweeping, wash down, mopping, wiping of the construction facility and its furniture, washing, polishing, and dusting.

- **DELIVERY PERSONNEL**

- If delivery of supplies/building materials is to one common point and stockpiled there, prevailing wages are not required. If the delivery personnel are involved in the distribution of the material to multiple locations within the construction site then they would have to be paid prevailing wages for the type of work performed: laborer, equipment operator, electrician, ironworker, plumber, etc.

- An example of this would be where delivery of drywall is made to a building and the delivery personnel distribute the drywall from one "stockpile" location to further sub-locations on each floor. Distribution of material around a construction site is the job of a laborer or tradesman, and not a delivery personnel.

- **ELECTRICIANS**

Install, erect, maintenance, alteration or repair of any wire, cable, conduit, etc., which generates, transforms, transmits or uses electrical energy for light, heat, power or other purposes, including the Installation or maintenance of telecommunication, LAN wiring or computer equipment, and low voltage wiring. ***License required per Connecticut General Statutes: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9.**

- **ELEVATOR CONSTRUCTORS**

Install, erect, maintenance and repair of all types of elevators, escalators, dumb waiters and moving walks. **License required by Connecticut General Statutes: R-1,2,5,6.*

- **FORK LIFT OPERATOR**

Laborers Group 4) Mason Tenders - operates forklift solely to assist a mason to a maximum height of nine (9) feet only.

Power Equipment Operator Group 9 - operates forklift to assist any trade, and to assist a mason to a height over nine (9) feet.

- **GLAZIERS**

Glazing wood and metal sash, doors, partitions, and 2 story aluminum storefronts. Installs glass windows, skylights, store fronts and display cases or surfaces such as building fronts, interior walls, ceilings and table tops and metal store fronts. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers, which require equal composite workforce.

- **IRONWORKERS**

Erection, installation and placement of structural steel, precast concrete, miscellaneous iron, ornamental iron, metal curtain wall, rigging and reinforcing steel. Handling, sorting, and installation of reinforcing steel (rebar). Metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which require equal composite workforce.

- **INSULATOR**

- Installing fire stopping systems/materials for "Penetration Firestop Systems": transit to cables, electrical conduits, insulated pipes, sprinkler pipe penetrations, ductwork behind radiation, electrical cable trays, fire rated pipe penetrations, natural polypropylene, HVAC ducts, plumbing bare metal, telephone and communication wires, and boiler room ceilings.

- **LABORERS**

Acetylene burners, asphalt rakers, chain saw operators, concrete and power buggy operator, concrete saw operator, fence and guard rail erector (except metal bridge rail (traffic), decorative security fence (non-metal)).

installation.), hand operated concrete vibrator operator, mason tenders, pipelayers (installation of storm drainage or sewage lines on the street only), pneumatic drill operator, pneumatic gas and electric drill operator, powermen and wagon drill operator, air track operator, block paver, curb setters, blasters, concrete spreaders.

- **PAINTERS**

Maintenance, preparation, cleaning, blasting (water and sand, etc.), painting or application of any protective coatings of every description on all bridges and appurtenances of highways, roadways, and railroads. Painting, decorating, hardwood finishing, paper hanging, sign writing, scenic art work and drywall hhg for any and all types of building and residential work.

- **LEAD PAINT REMOVAL**

- Painter's Rate

1. Removal of lead paint from bridges.
2. Removal of lead paint as preparation of any surface to be repainted.
3. Where removal is on a Demolition project prior to reconstruction.

- Laborer's Rate

1. Removal of lead paint from any surface NOT to be repainted.
2. Where removal is on a *TOTAL* Demolition project only.

- **PLUMBERS AND PIPEFITTERS**

Installation, repair, replacement, alteration or maintenance of all plumbing, heating, cooling and piping. ****License required per Connecticut General Statutes: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2 S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4.***

- **POWER EQUIPMENT OPERATORS**

Operates several types of power construction equipment such as compressors, pumps, hoists, derricks, cranes, shovels, tractors, scrapers or motor graders, etc. Repairs and maintains equipment. ****License required, crane operators only, per Connecticut General Statutes.***

- **ROOFERS**

Covers roofs with composition shingles or sheets, wood shingles, slate or asphalt and gravel to waterproof roofs, including preparation of surface. (demolition or removal of any type of roofing and or clean-up of any and all areas where a roof is to be relaid.)

- **SHEETMETAL WORKERS**

Fabricate, assembles, installs and repairs sheetmetal products and equipment in such areas as ventilation, air-conditioning, warm air heating, restaurant equipment, architectural sheet metal work, sheetmetal roofing, and aluminum gutters. Fabrication, handling, assembling, erecting, altering, repairing, etc. of coated metal material panels and composite metal material panels when used on building exteriors and interiors as soffits, fascia, louvers, partitions, canopies, cornice, column covers, awnings, beam covers, cladding, sun shades, lighting troughs, spires, ornamental roofing, metal ceilings, mansards, copings, ornamental and ventilation hoods, vertical and horizontal siding panels, trim, etc. The sheet metal classification also applies to the vast variety of coated metal material panels and composite metal material panels that have evolved over the years as an alternative to conventional ferrous and non-ferrous metals like steel, iron, tin, copper, brass, bronze, aluminum, etc. Fabrication, handling, assembling, erecting, altering, repairing, etc. of architectural metal roof, standing seam roof, composite metal roof, metal and composite bathroom/toilet partitions, aluminum gutters, metal and composite lockers and shelving, kitchen equipment, and walk-in coolers. To include testing and air –balancing ancillary to installation and construction.

- **SPRINKLER FITTERS**

Installation, alteration, maintenance and repair of fire protection sprinkler systems.

****License required per Connecticut General Statutes: F-1,2,3,4.***

- **TILE MARBLE AND TERRAZZO FINISHERS**

Assists and tends the tile setter, marble mason and terrazzo worker in the performance of their duties.

- **TRUCK DRIVERS**

~How to pay truck drivers delivering asphalt is under REVISION~

Truck Drivers are requires to be paid prevailing wage for time spent "working" directly on the site. These drivers remain covered by the prevailing wage for any time spent transporting between the actual construction location and facilities (such as fabrication, plants, mobile factories, batch plant, borrow pits, job headquarters, tool yards, etc.) dedicated exclusively, or nearly so, to performance of the contract or project, which are so located in proximity to the actual construction location that it is reasonable to include them. ****License required, drivers only, per Connecticut General Statutes.***

For example:

- Material men and deliverymen are not covered under prevailing wage as long as they are not directly involved in the construction process. If, they unload the material, they would then be covered by prevailing wage for the classification they are performing work in: laborer, equipment operator, etc.
- Hauling material off site is not covered provided they are not dumping it at a location outlined above.
- Driving a truck on site and moving equipment or materials on site would be considered covered work, as this is part of the construction process.

➤ *Any questions regarding the proper classification should be directed to:*
Public Contract Compliance Unit
Wage and Workplace Standards Division
Connecticut Department of Labor
200 Folly Brook Blvd, Wethersfield, CT 06109
(860) 263-6543.

Informational Bulletin

THE 10-HOUR OSHA CONSTRUCTION SAFETY AND HEALTH COURSE

(applicable to public building contracts entered into *on or after July 1, 2007*, where the total cost of all work to be performed is at least \$100,000)

- (1) This requirement was created by Public Act No. 06-175, which is codified in Section 31-53b of the Connecticut General Statutes (pertaining to the prevailing wage statutes);
- (2) The course is required for public building construction contracts (projects funded in whole or in part by the state or any political subdivision of the state) entered into on or after July 1, 2007;
- (3) It is required of private employees (not state or municipal employees) and apprentices who perform manual labor for a general contractor or subcontractor on a public building project where the total cost of all work to be performed is at least \$100,000;
- (4) The ten-hour construction course pertains to the ten-hour Outreach Course conducted in accordance with federal OSHA Training Institute standards, and, for telecommunications workers, a ten-hour training course conducted in accordance with federal OSHA standard, 29 CFR 1910.268;
- (5) The internet website for the federal OSHA Training Institute is http://www.osha.gov/fso/ote/training/edcenters/fact_sheet.html;
- (6) The statutory language leaves it to the contractor and its employees to determine who pays for the cost of the ten-hour Outreach Course;
- (7) Within 30 days of receiving a contract award, a general contractor must furnish proof to the Labor Commissioner that all employees and apprentices performing manual labor on the project will have completed such a course;
- (8) Proof of completion may be demonstrated through either: (a) the presentation of a *bona fide* student course completion card issued by the federal OSHA Training Institute; *or* (2) the presentation of documentation provided to an employee by a trainer certified by the Institute pending the actual issuance of the completion card;
- (9) Any card with an issuance date more than 5 years prior to the commencement date of the construction project shall not constitute proof of compliance;

- (10) Each employer shall affix a copy of the construction safety course completion card to the certified payroll submitted to the contracting agency in accordance with Conn. Gen. Stat. § 31-53(f) on which such employee's name first appears;
- (11) Any employee found to be in non-compliance shall be subject to removal from the worksite if such employee does not provide satisfactory proof of course completion to the Labor Commissioner by the fifteenth day after the date the employee is determined to be in noncompliance;
- (12) Any such employee who is determined to be in noncompliance may continue to work on a public building construction project for a maximum of fourteen consecutive calendar days while bringing his or her status into compliance;
- (13) The Labor Commissioner may make complaint to the prosecuting authorities regarding any employer or agent of the employer, or officer or agent of the corporation who files a false certified payroll with respect to the status of an employee who is performing manual labor on a public building construction project;
- (14) The statute provides the minimum standards required for the completion of a safety course by manual laborers on public construction contracts; any contractor can exceed these minimum requirements; and
- (15) Regulations clarifying the statute are currently in the regulatory process, and shall be posted on the CTDOL website as soon as they are adopted in final form.
- (16) Any questions regarding this statute may be directed to the Wage and Workplace Standards Division of the Connecticut Labor Department via the internet website of <http://www.ctdol.state.ct.us/wgwkstnd/wgemenu.htm>; or by telephone at (860)263-6790.

THE ABOVE INFORMATION IS PROVIDED EXCLUSIVELY AS AN EDUCATIONAL RESOURCE, AND IS NOT INTENDED AS A SUBSTITUTE FOR LEGAL INTERPRETATIONS WHICH MAY ULTIMATELY ARISE CONCERNING THE CONSTRUCTION OF THE STATUTE OR THE REGULATIONS.

**Connecticut Department of Labor
Wage and Workplace Standards Division
FOOTNOTES**

⇒ Please Note: If the “Benefits” listed on the schedule for the following occupations includes a letter(s) (+ a or + a+b for instance), refer to the information below.

Benefits to be paid at the appropriate prevailing wage rate for the listed occupation.

If the “Benefits” section for the occupation lists only a dollar amount, disregard the information below.

Bricklayers, Cement Masons, Cement Finishers, Concrete Finishers, Stone Masons
(Building Construction) and
(Residential- Hartford, Middlesex, New Haven, New London and Tolland Counties)

- a. Paid Holiday: Employees shall receive 4 hours for Christmas Eve holiday provided the employee works the regularly scheduled day before and after the holiday. Employers may schedule work on Christmas Eve and employees shall receive pay for actual hours worked in addition to holiday pay.

Elevator Constructors: Mechanics

- a. Paid Holidays: New Year’s Day, Memorial Day, Independence Day, Labor Day, Veterans’ Day, Thanksgiving Day, Christmas Day, plus the Friday after Thanksgiving.
- b. Vacation: Employer contributes 8% of basic hourly rate for 5 years or more of service or 6% of basic hourly rate for 6 months to 5 years of service as vacation pay credit.

Glaziers

- a. Paid Holidays: Labor Day and Christmas Day.

Power Equipment Operators

(Heavy and Highway Construction & Building Construction)

- a. Paid Holidays: New Year’s Day, Good Friday, Memorial day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day, provided the employee works 3 days during the week in which the holiday falls, if scheduled, and if scheduled, the working day before and the working day after the holiday. Holidays falling on Saturday may be observed on Saturday, or if the employer so elects, on the preceding Friday.

Ironworkers

- a. Paid Holiday: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

Laborers (Tunnel Construction)

- a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. No employee shall be eligible for holiday pay when he fails, without cause, to work the regular work day preceding the holiday or the regular work day following the holiday.

Roofers

- a. Paid Holidays: July 4th, Labor Day, and Christmas Day provided the employee is employed 15 days prior to the holiday.

Sprinkler Fitters

- a. Paid Holidays: Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day, provided the employee has been in the employment of a contractor 20 working days prior to any such paid holiday.

Truck Drivers

(Heavy and Highway Construction & Building Construction)

- a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas day, and Good Friday, provided the employee has at least 31 calendar days of service and works the last scheduled day before and the first scheduled day after the holiday, unless excused.

STATUTE 31-55a

- SPECIAL NOTICE -

To: All State and Political Subdivisions, Their Agents, and Contractors

Connecticut General Statute 31-55a - Annual adjustments to wage rates by contractors doing state work.

Each contractor that is awarded a contract on or after October 1, 2002, for (1) the construction of a state highway or bridge that falls under the provisions of section 31-54 of the general statutes, or (2) the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project that falls under the provisions of section 31-53 of the general statutes shall contact the Labor Commissioner on or before July first of each year, for the duration of such contract, to ascertain the prevailing rate of wages on an hourly basis and the amount of payment or contributions paid or payable on behalf of each mechanic, laborer or worker employed upon the work contracted to be done, and shall make any necessary adjustments to such prevailing rate of wages and such payment or contributions paid or payable on behalf of each such employee, effective each July first.

- The prevailing wage rates applicable to any contract or subcontract awarded on or after October 1, 2002 are subject to annual adjustments each July 1st for the duration of any project which was originally advertised for bids on or after October 1, 2002.
- Each contractor affected by the above requirement shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.
- It is the **contractor's** responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's Web Site. The annual adjustments will be posted on the Department of Labor Web page: www.ctdol.state.ct.us. For those without internet access, please contact the division listed below.
- The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project. All subsequent annual adjustments will be posted on our Web Site for contractor access.

Any questions should be directed to the Contract Compliance Unit, Wage and Workplace Standards Division, Connecticut Department of Labor, 200 Folly Brook Blvd., Wethersfield, CT 06109 at (860)263-6790.

CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION

CONTRACTORS WAGE CERTIFICATION FORM
Construction Manager at Risk/General Contractor/Prime Contractor

I, _____ of _____
Officer, Owner, Authorized Rep. Company Name

do hereby certify that the _____
Company Name

Street

City

and all of its subcontractors will pay all workers on the

Project Name and Number

Street and City

the wages as listed in the schedule of prevailing rates required for such project (a copy of which is attached hereto).

Signed

Subscribed and sworn to before me this _____ day of _____, _____.

Notary Public

Return to:

Connecticut Department of Labor
Wage & Workplace Standards Division
200 Folly Brook Blvd.
Wethersfield, CT 06109


Rate Schedule Issued (Date): _____

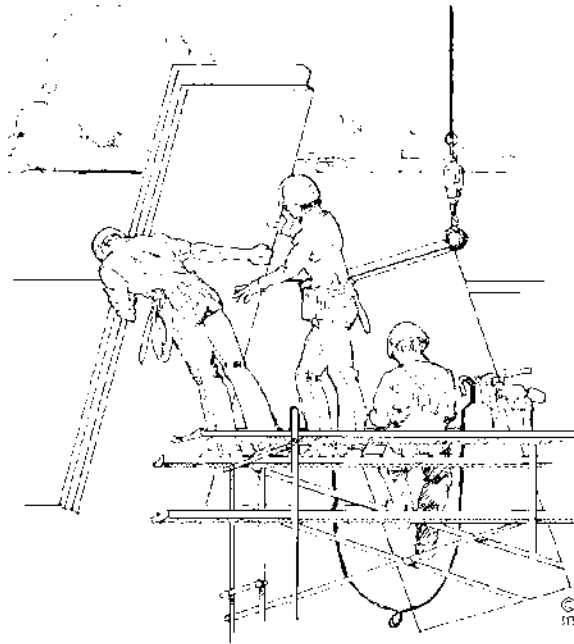
~NOTICE~

TO ALL CONTRACTING AGENCIES

Please be advised that Connecticut General Statutes Section 31-53, requires the contracting agency to certify to the Department of Labor, the total dollar amount of work to be done in connection with such public works project, regardless of whether such project consists of one or more contracts.

Please find the attached “Contracting Agency Certification Form” to be completed and returned to the Department of Labor, Wage and Workplace Standards Division, Public Contract Compliance Unit.

 Inquiries can be directed to (860)263-6543.



CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION
CONTRACT COMPLIANCE UNIT

CONTRACTING AGENCY CERTIFICATION FORM

I, _____, acting in my official capacity as _____,
authorized representative title

for _____, located at _____,
contracting agency address

do hereby certify that the total dollar amount of work to be done in connection with
_____, located at _____,
project name and number address

shall be \$_____, which includes all work, regardless of whether such project
consists of one or more contracts.

CONTRACTOR INFORMATION

Name: _____

Address: _____

Authorized Representative: _____

Approximate Starting Date: _____

Approximate Completion Date: _____

Signature

Date

Return To: Connecticut Department of Labor
Wage & Workplace Standards Division
Contract Compliance Unit
200 Folly Brook Blvd.
Wethersfield, CT 06109

Date Issued: _____

EXHIBIT H

TECHNICAL SPECIFICATIONS AND SPECIAL PROVISIONS

SERVICE DESCRIPTION

a) Purpose

The District is requesting Competitive Sealed Bids from qualified firms interested in contracting with the District to provide demolition and interior renovations of existing public restrooms and support spaces (to include the Amtrak restroom and both Amtrak locker rooms) located on the First floor of the Hartford Union Station Transportation Center at One Union Place, Hartford.

b) Scope of Work

Scope of work includes, but is not limited to, architectural, mechanical, electrical, plumbing (MEP) work and minor Site Work related to Logistic Plan. Project includes the furnishing and installation of the temporary Portable Restrooms Trailers as indicated on Drawings. TSKP Studio is the designer/engineer of record for this project. The work is as described in this document and IFB are complementary and are considered to comprise the Technical Specifications.

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AIA[®] Document A310[™] – 2010

Bid Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

BOND AMOUNT: \$

PROJECT:

(Name, location or address, and Project number, if any)

Renovation of Union Station Restrooms
One Union Place
Hartford, CT 06103

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

Init.

AIA[®] Document A101[™] – 2007

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

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

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

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

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

Renovation of Union Station Restrooms
One Union Place
Hartford, CT 06103

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

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

AIA Document A201[™]–2007, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

init.

TABLE OF ARTICLES

- 1 THE CONTRACT DOCUMENTS
- 2 THE WORK OF THIS CONTRACT
- 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
- 4 CONTRACT SUM
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- 7 TERMINATION OR SUSPENSION
- 8 MISCELLANEOUS PROVISIONS
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ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

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

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.

(Insert the date of commencement if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

If, prior to the commencement of the Work, the Owner requires time to file mortgages and other security interests, the Owner's time requirement shall be as follows:

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

§ 3.3 The Contractor shall achieve Substantial Completion of the entire Work not later than () days from the date of commencement, or as follows:

(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)

Init.

Portion of Work

Substantial Completion Date

, subject to adjustments of this Contract Time as provided in the Contract Documents.
(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial Completion on time or for bonus payments for early completion of the Work.)

ARTICLE 4 CONTRACT SUM

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

§ 4.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

§ 4.3 Unit prices, if any:

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

Item	Units and Limitations	Price Per Unit (\$0.00)
------	-----------------------	-------------------------

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

(Identify allowance and state exclusions, if any, from the allowance price.)

Item	Price
------	-------

ARTICLE 5 PAYMENTS

§ 5.1 PROGRESS PAYMENTS

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

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

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the day of a month, the Owner shall make payment of the certified amount to the Contractor not later than the day of the month. If an Application for Payment is received by the Architect after the application date fixed above, payment shall be made by the Owner not later than () days after the Architect receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

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

Init.

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

§ 5.1.6 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

- .1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of percent (%). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.9 of AIA Document A201™–2007, General Conditions of the Contract for Construction;
- .2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of percent (%);
- .3 Subtract the aggregate of previous payments made by the Owner; and
- .4 Subtract amounts, if any, for which the Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of AIA Document A201–2007.

§ 5.1.7 The progress payment amount determined in accordance with Section 5.1.6 shall be further modified under the following circumstances:

- .1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Architect shall determine for incomplete Work, retainage applicable to such work and unsettled claims; and
(Section 9.8.5 of AIA Document A201–2007 requires release of applicable retainage upon Substantial Completion of Work with consent of surety, if any.)
- .2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of AIA Document A201–2007.

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

(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.6.1 and 5.1.6.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 FINAL PAYMENT

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2.2 of AIA Document A201–2007, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 INITIAL DECISION MAKER

The Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A201–2007, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.

Init.

AIA Document A101™ – 2007. Copyright © 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, 1987, 1991, 1997 and 2007 by The American Institute of Architects. All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 15:38:21 on 06/28/2013 under Order No.0024745437_1 which expires on 08/02/2013, and is not for resale.

User Notes:

(1248152397)

(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

§ 6.2 BINDING DISPUTE RESOLUTION

For any Claim subject to, but not resolved by, mediation pursuant to Section 15.3 of AIA Document A201–2007, the method of binding dispute resolution shall be as follows:

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

- Arbitration pursuant to Section 15.4 of AIA Document A201–2007
- Litigation in a court of competent jurisdiction
- Other *(Specify)*

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2007.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2007.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2007 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

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

%

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

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

Init.

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

§ 8.6 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A101-2007, Standard Form of Agreement Between Owner and Contractor.

§ 9.1.2 The General Conditions are AIA Document A201-2007, General Conditions of the Contract for Construction.

§ 9.1.3 The Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
----------	-------	------	-------

§ 9.1.4 The Specifications:

(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

Section	Title	Date	Pages
---------	-------	------	-------

§ 9.1.5 The Drawings:

(Either list the Drawings here or refer to an exhibit attached to this Agreement.)

Number	Title	Date
--------	-------	------

§ 9.1.6 The Addenda, if any:

Number	Date	Pages
--------	------	-------

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

§ 9.1.7 Additional documents, if any, forming part of the Contract Documents:

.1 AIA Document E201™-2007, Digital Data Protocol Exhibit, if completed by the parties, or the following:

.2 Other documents, if any, listed below:

(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201-2007 provides that bidding requirements such as advertisement or invitation to bid, Instructions to Bidders, sample forms and the Contractor's bid are not part of the Contract Documents)

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User Notes:

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unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)

ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A201-2007.

(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A201-2007.)

Type of insurance or bond	Limit of liability or bond amount (\$0.00)
---------------------------	--

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

OWNER *(Signature)*

CONTRACTOR *(Signature)*

(Printed name and title)

(Printed name and title)

Init.

AIA[®] Document A312[™] – 2010

Payment Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)

CONSTRUCTION CONTRACT

Date:

Amount: \$

Description:

(Name and location)

Renovation of Union Station Restrooms

One Union Place

Hartford, CT 06103

BOND

Date:

(Not earlier than Construction Contract Date)

Amount: \$

Modifications to this Bond: None See Section 18

CONTRACTOR AS PRINCIPAL

Company: *(Corporate Seal)*

SURETY

Company: *(Corporate Seal)*

Signature: _____

Name and

Title:

(Any additional signatures appear on the last page of this Payment Bond.)

Signature: _____

Name and

Title:

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

OWNER'S REPRESENTATIVE:

(Architect, Engineer or other party:)

ADDITIONS AND DELETIONS:
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This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

Init.

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

- .1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
- .2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

Init.

§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- .1 the name of the Claimant;
- .2 the name of the person for whom the labor was done, or materials or equipment furnished;
- .3 a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- .4 a brief description of the labor, materials or equipment furnished;
- .5 the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- .6 the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- .7 the total amount of previous payments received by the Claimant; and
- .8 the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

Init.

§ 16.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

SURETY

Company:

(Corporate Seal)

Company:

(Corporate Seal)

Signature: _____

Signature: _____

Name and Title: _____

Name and Title: _____

Address: _____

Address: _____

Init.

 **AIA**® Document A312™ – 2010

Performance Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)

CONSTRUCTION CONTRACT

Date:
Amount: \$
Description:
(Name and location)
Renovation of Union Station Restrooms
One Union Place
Hartford, CT 06103

BOND
Date:
(Not earlier than Construction Contract Date)

Amount: \$
Modifications to this Bond: None See Section 16

CONTRACTOR AS PRINCIPAL
Company: *(Corporate Seal)*

SURETY
Company: *(Corporate Seal)*

Signature: _____
Name and Title:

Signature: _____
Name and Title:

(Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

Init.

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

- .1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;
- .2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
- .3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

- .1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
- .2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

Init.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

- .1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
- .2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and
- .3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 **Balance of the Contract Price.** The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 **Construction Contract.** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 **Contractor Default.** Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 **Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 **Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

SURETY

Company: _____ *(Corporate Seal)*

Company: _____ *(Corporate Seal)*

Signature: _____

Signature: _____

Name and Title: _____

Name and Title: _____

Address: _____

Address: _____

Init.

AIA[®] Document A201[™] – 2007

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

Renovation of Union Station Restrooms
One Union Place
Hartford, CT 06103

THE OWNER:

(Name, legal status and address)

THE ARCHITECT:

(Name, legal status and address)

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- 15 CLAIMS AND DISPUTES

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(1182086192)

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding requirements.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 INITIAL DECISION MAKER

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

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§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 CAPITALIZATION

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

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

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the

portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

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§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

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§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 WARRANTY

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 **Concealed or Unknown Conditions.** If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

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§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- .1 Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and

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completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 USE OF SITE

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

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§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

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

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

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§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

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§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 SUBCONTRACTUAL RELATIONS

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the

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Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

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ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

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

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount

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for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

- .1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
- .2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
- .5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

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§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration; or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

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

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

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 SCHEDULE OF VALUES

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

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

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or

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encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a separate contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

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§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 FAILURE OF PAYMENT

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

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§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

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§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents; or
- .3 terms of special warranties required by the Contract Documents.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

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§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 OWNER'S LIABILITY INSURANCE

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

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§ 11.3 PROPERTY INSURANCE

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 BOILER AND MACHINERY INSURANCE

The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 LOSS OF USE INSURANCE

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment

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property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

§ 11.3.7 WAIVERS OF SUBROGATION

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

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ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

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

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

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§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by

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such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.7 TIME LIMITS ON CLAIMS

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

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

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

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ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 INITIAL DECISION

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

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§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 MEDIATION

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 ARBITRATION

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 CONSOLIDATION OR JOINDER

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.

AIA[®] Document A305[™] – 1986

Contractor's Qualification Statement

The Undersigned certifies under oath that the information provided herein is true and sufficiently complete so as not to be misleading.

SUBMITTED TO:

ADDRESS:

SUBMITTED BY:

NAME:

ADDRESS:

PRINCIPAL OFFICE:

- Corporation
- Partnership
- Individual
- Joint Venture
- Other

NAME OF PROJECT: (if applicable) Renovation of Union Station Restrooms

TYPE OF WORK: (file separate form for each Classification of Work)

- General Construction
- HVAC
- Electrical
- Plumbing
- Other: (Specify)

§ 1 ORGANIZATION

§ 1.1 How many years has your organization been in business as a Contractor?

§ 1.2 How many years has your organization been in business under its present business name?

§ 1.2.1 Under what other or former names has your organization operated?

§ 1.3 If your organization is a corporation, answer the following:

§ 1.3.1 Date of incorporation:

§ 1.3.2 State of incorporation:

§ 1.3.3 President's name:

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This form is approved and recommended by the American Institute of Architects (AIA) and The Associated General Contractors of America (AGC) for use in evaluating the qualifications of contractors. No endorsement of the submitting party or verification of the information is made by AIA or AGC.

§ 1.3.4 Vice-president's name(s)

§ 1.3.5 Secretary's name:

§ 1.3.6 Treasurer's name:

§ 1.4 If your organization is a partnership, answer the following:

§ 1.4.1 Date of organization:

§ 1.4.2 Type of partnership (if applicable):

§ 1.4.3 Name(s) of general partner(s)

§ 1.5 If your organization is individually owned, answer the following:

§ 1.5.1 Date of organization:

§ 1.5.2 Name of owner:

§ 1.6 If the form of your organization is other than those listed above, describe it and name the principals:

§ 2 LICENSING

§ 2.1 List jurisdictions and trade categories in which your organization is legally qualified to do business, and indicate registration or license numbers, if applicable.

§ 2.2 List jurisdictions in which your organization's partnership or trade name is filed.

§ 3 EXPERIENCE

§ 3.1 List the categories of work that your organization normally performs with its own forces.

§ 3.2 Claims and Suits. (If the answer to any of the questions below is yes, please attach details.)

§ 3.2.1 Has your organization ever failed to complete any work awarded to it?

§ 3.2.2 Are there any judgments, claims, arbitration proceedings or suits pending or outstanding against your organization or its officers?

§ 3.2.3 Has your organization filed any law suits or requested arbitration with regard to construction contracts within the last five years?

§ 3.3 Within the last five years, has any officer or principal of your organization ever been an officer or principal of another organization when it failed to complete a construction contract? (If the answer is yes, please attach details.)

§ 3.4 On a separate sheet, list major construction projects your organization has in progress, giving the name of project, owner, architect, contract amount, percent complete and scheduled completion date.

§ 3.4.1 State total worth of work in progress and under contract:

§ 3.5 On a separate sheet, list the major projects your organization has completed in the past five years, giving the name of project, owner, architect, contract amount, date of completion and percentage of the cost of the work performed with your own forces.

§ 3.5.1 State average annual amount of construction work performed during the past five years:

§ 3.6 On a separate sheet, list the construction experience and present commitments of the key individuals of your organization.

§ 4 REFERENCES

§ 4.1 Trade References:

§ 4.2 Bank References:

§ 4.3 Surety:

§ 4.3.1 Name of bonding company:

§ 4.3.2 Name and address of agent:

§ 5 FINANCING

§ 5.1 Financial Statement.

§ 5.1.1 Attach a financial statement, preferably audited, including your organization's latest balance sheet and income statement showing the following items:

Current Assets (e.g., cash, joint venture accounts, accounts receivable, notes receivable, accrued income, deposits, materials inventory and prepaid expenses);

Net Fixed Assets;

Other Assets;

Current Liabilities (e.g., accounts payable, notes payable, accrued expenses, provision for income taxes, advances, accrued salaries and accrued payroll taxes);

Other Liabilities (e.g., capital, capital stock, authorized and outstanding shares par values, earned surplus and retained earnings).

§ 5.1.2 Name and address of firm preparing attached financial statement, and date thereof:

§ 5.1.3 Is the attached financial statement for the identical organization named on page one?

§ 5.1.4 If not, explain the relationship and financial responsibility of the organization whose financial statement is provided (e.g., parent-subsidiary).

§ 5.2 Will the organization whose financial statement is attached act as guarantor of the contract for construction?

§ 6 SIGNATURE

§ 6.1 Dated at this day of

Name of Organization:

By:

Title:

§ 6.2

M being duly sworn deposes and says that the information provided herein is true and sufficiently complete so as not to be misleading.

Subscribed and sworn before me this day of

Notary Public:

My Commission Expires:

UNION STATION RESTROOM RENOVATIONS

SECTION 011000 - 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. Section Includes:

- 1. Project information.
- 2. Work covered by Contract Documents.
- 3. Phased construction.
- 4. Contractor's use of site and premises.
- 5. Coordination with occupants.
- 6. Work restrictions.
- 7. Specification and Drawing conventions.
- 8. Miscellaneous provisions.

- B. Related Requirements:

- 1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.
- 2. Section 017300 "Execution" for coordination of Owner-installed products.

1.3 DEFINITIONS

- A. Work Package: A group of specifications, drawings, and schedules prepared by the design team to describe a portion of the Project Work for pricing, permitting, and construction.

1.4 PROJECT INFORMATION

- A. Project Identification: **Greater Hartford Transit District – Public Restrooms Renovations.**

- 1. Project Location: One Union Place, Hartford CT 06103.

- B. Owner: Greater Hartford Transit District.

- 1. Owner's Representatives:
 - a. DJ Gonzalez, Operations Administrator, Greater Hartford Transit District
 - b. LaShaunda S. Drake, Procurement & Contract Coordinator, Greater Hartford Transit District

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- C. Architect: TSKP Studio – One Hartford Square West – 146 Wyllys Street, Bldg. 1-203, Hartford CT 06106.

1.5 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following:
 - 1. Demolition and Interior Renovations of existing Public Restrooms and support spaces located on the First floor of the Hartford Union Station. Scope of work includes architectural, MEP work and minor Site Work related to Logistic Plan. Project includes the furnish and installation of the temporary Portable Restrooms Trailers as indicated on Drawings. Approximate 1,135 square foot of interior renovations.
- B. Type of Contract:
 - 1. Project will be constructed under a single prime contract.

1.6 PHASED CONSTRUCTION

- A. Construct the Work in phases, with each phase substantially complete as follows:
 - 1. Phase 1: All Areas except Amtrak Restroom 163.
 - 2. Phase 2: Amtrak Restroom 163.
- B. Before commencing Work of each phase, submit an updated copy of Contractor's construction schedule, showing the sequence, commencement and completion dates, and move-out and -in dates of Owner's personnel for all phases of the Work.

1.7 WORK PERFORMED BY OWNER

- A. Cooperate fully with Owner, so work may be carried out smoothly, without interfering with or delaying Work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

1.8 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Restricted Use of Site: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B. Limits on Use of Site: Limit use of Project site to Work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Driveways, Walkways and Entrances: Keep driveways parking garage, loading areas, 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 for storage of materials.

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- a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.
- D. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.9 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy Project site and existing building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
- 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
 - 2. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.

1.10 WORK RESTRICTIONS

- A. Comply with restrictions on construction operations.
- 1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work to between 7 a.m. to 5 p.m., Monday through Friday, unless otherwise indicated. Work hours may be modified to meet Project requirements if approved by Owner and authorities having jurisdiction.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others.
- D. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.
- 1. Notify Owner not less than two days in advance of proposed disruptive operations.
 - 2. Obtain Owner's written permission before proceeding with disruptive operations.
- E. Smoking and Controlled Substance Restrictions: Use of tobacco products, alcoholic beverages, and other controlled substances on Project site is not permitted.

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- F. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- G. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.
 - 1. Maintain list of approved screened personnel with Owner's representative.

1.11 SPECIFICATION AND DRAWING CONVENTIONS

- A. 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. Imperative mood and streamlined language are generally used in the Specifications. 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.
 - 2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
 - 3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
 - 4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.
- C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- D. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
 - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 - 2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings and published as part of the U.S. National CAD Standard.
 - 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

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SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

- A. 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. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
 - b. Coordination of information, including a list of changes or revisions 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 substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific

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- features and requirements indicated. Indicate deviations, if any, from the Work specified.
- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
 - m. 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.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor through Construction Manager of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

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1.7 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.
1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - b. Requested substitution does not require extensive revisions to the Contract Documents.
 - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - d. Substitution request is fully documented and properly submitted.
 - e. Requested substitution will not adversely affect Contractor's construction schedule.
 - f. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - g. Requested substitution is compatible with other portions of the Work.
 - h. Requested substitution has been coordinated with other portions of the Work.
 - i. Requested substitution provides specified warranty.

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- j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

UNION STATION RESTROOM RENOVATIONS

SECTION 012600 - 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 012500 "Substitution Procedures" 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 AIA Document G710.

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 not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request or 20 days, when not otherwise specified, 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.

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- 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 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
 7. Proposal Request Form: Use form acceptable to Architect.

1.5 ADMINISTRATIVE CHANGE ORDERS

- A. Allowance Adjustment: See Section 012100 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.

1.6 CHANGE ORDER PROCEDURES

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

1.7 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.

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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

UNION STATION RESTROOM RENOVATIONS

SECTION 012900 - 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 012600 "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 items required to be indicated as separate activities in 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.
 - 3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values coordinated with each phase of 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.

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- e. Date of submittal.
2. Arrange schedule of values consistent with format of AIA Document G703.
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 of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent. Round dollar amounts to whole dollars, with total equal to Contract Sum.
 - 1) Labor.
 - 2) Materials.
 - 3) Equipment.
4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
5. 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.
6. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate Owner payments or deposits, if any, and balance to be paid by Contractor.
7. Overhead Costs: Include total cost and proportionate share of general overhead and profit for each line item.
8. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
9. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

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 Construction Manager and paid for by Owner.
- 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.

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- C. **Payment Application Times:** Submit Application for Payment to Architect by the end of the month. The period covered by each Application for Payment is one month.
1. Submit draft copy of Application for Payment seven days prior to due date for review by Architect.
- D. **Application for Payment Forms:** Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
1. Other Application for Payment forms proposed by the Contractor shall be acceptable to Architect and Owner. Submit forms for approval with initial submittal of schedule of values.
- 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 for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- F. **Stored Materials:** Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
 - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- G. **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.

UNION STATION RESTROOM RENOVATIONS

- H. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities 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 conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- I. 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. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
 5. Products list (preliminary if not final).
 6. Sustainable design action plans, including preliminary project materials cost data, CWM Plan, IAQ Management Plan, and Integrative Pest Management Plan.
 7. Schedule of unit prices.
 8. Submittal schedule (preliminary if not final).
 9. List of Contractor's staff assignments.
 10. List of Contractor's principal consultants.
 11. Copies of building permits.
 12. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 13. Initial progress report.
 14. Report of preconstruction conference.
 15. Certificates of insurance and insurance policies.
 16. Performance and payment bonds.
 17. Data needed to acquire Owner's insurance.
- J. 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 Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- K. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

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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.
5. AIA Document G706A.
6. AIA Document G707.
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.
10. Outstanding Operation and Maintenance Manuals.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

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SECTION 013100 - 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. Coordination drawings.
 - 3. RFIs.
 - 4. Digital project management procedures.
 - 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 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 2. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

- A. BIM: Building Information Modeling.
- B. RFI: Request for Information. Request from Owner, Construction Manager, 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, telephone number, and email address 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.

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- 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 cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
 - 1. Post copies of list in project meeting room, in temporary field office, in web-based Project software directory, and in prominent location in built facility. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. 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 own 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 with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- C. 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.
- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and scheduled 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.

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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.

1.6 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated 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 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 Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
 2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within plenums to accommodate layout of light fixtures and other components indicated on Drawings. Indicate areas of conflict between light fixtures and other components.

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3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
 4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
 5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
 6. Mechanical and Plumbing Work: Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
 - c. Fire-rated enclosures around ductwork.
 7. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor-control center locations.
 - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
 8. Fire-Protection System: Show the following:
 - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
 9. Review: Architect will review coordination drawings to confirm that in general the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make suitable modifications and resubmit.
 10. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 013300 "Submittal Procedures."
- C. Coordination Drawing Process: Prepare coordination drawings in the following manner:
1. Schedule submittal and review of Fire Sprinkler, Plumbing, HVAC, and Electrical Shop Drawings to make required changes prior to preparation of coordination drawings.
 2. Commence routing of coordination drawing files with HVAC Installer, who will provide drawing plan files denoting approved ductwork. HVAC Installer will locate ductwork and piping on a single layer, using orange color. Forward drawings to Plumbing Installer.
 3. Plumbing Installer will locate plumbing and equipment on a single layer, using blue color.
 4. Fire Sprinkler Installer will locate piping and equipment, using red color. Fire Sprinkler Installer shall forward drawing files to Electrical Installer.
 5. Electrical Installer will indicate service and feeder conduit runs and equipment in green color. Electrical Installer shall forward drawing files to Communications and Electronic Safety and Security Installer.

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6. Communications and Electronic Safety and Security Installer will indicate cable trays and cabling runs and equipment in purple color. Communications and Electronic Safety and Security Installer shall forward completed drawing files to Contractor.
7. Contractor shall perform the final coordination review. As each coordination drawing is completed, Contractor will meet with Architect to review and resolve conflicts on the coordination drawings.

1.7 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
 1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
 1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. Name of Architect and Construction Manager.
 6. RFI number, numbered sequentially.
 7. RFI subject.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.
 11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Architect.
 1. Attachments shall be electronic files in PDF format.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.

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1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
 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 Section 012600 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Include the following:
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect and Construction Manager.
 4. RFI number including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Architect's response was received.
 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
 9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

1.8 DIGITAL PROJECT MANAGEMENT PROCEDURES

- A. Use of Architect's Digital Data Files: Digital data files of Architect's BIM model will be provided by Architect for Contractor's use during construction.
1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project record Drawings.
 2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.

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3. Digital Drawing Software Program: Contract Drawings are available in Revit (rvt) format.
 4. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.
 - a. Subcontractors, and other parties granted access by Contractor to Architect's digital data files shall execute a data licensing agreement in the form of Agreement acceptable to Owner and Architect.
 5. The following digital data files will be furnished for each appropriate discipline:
 - a. Floor plans.
 - b. Reflected ceiling plans.
 - c. As requested.
- B. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:
1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 2. Name file with submittal number or other unique identifier, including revision identifier.
 3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.9 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 a minimum of 10 working days prior to meeting.
 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. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, 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.
 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Responsibilities and personnel assignments.
 - b. Tentative construction schedule.

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- c. Phasing.
 - d. Critical work sequencing and long lead items.
 - e. Designation of key personnel and their duties.
 - f. Lines of communications.
 - g. Use of web-based Project software.
 - h. Procedures for processing field decisions and Change Orders.
 - i. Procedures for RFIs.
 - j. Procedures for testing and inspecting.
 - k. Procedures for processing Applications for Payment.
 - l. Distribution of the Contract Documents.
 - m. Submittal procedures.
 - n. Preparation of Record Documents.
 - o. Use of the premises.
 - p. Work restrictions.
 - q. Working hours.
 - r. Owner's occupancy requirements.
 - s. Responsibility for temporary facilities and controls.
 - t. Procedures for moisture and mold control.
 - u. Procedures for disruptions and shutdowns.
 - v. Construction waste management and recycling.
 - w. Parking availability.
 - x. Office, work, and storage areas.
 - y. Equipment deliveries and priorities.
 - z. First aid.
 - aa. Security.
 - bb. Progress cleaning.
3. 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 when required by other sections and when required for 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, Construction Manager, 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.

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- 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. Project Closeout Conference: Construction Manager will schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion.
- 1. Conduct the conference to review requirements and responsibilities related to Project closeout.
 - 2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Construction Manager, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
 - a. Preparation of Record Documents.
 - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - c. Procedures for completing and archiving web-based Project software site data files.
 - d. Submittal of written warranties.
 - e. Requirements for preparing operations and maintenance data.
 - f. Requirements for delivery of material samples, attic stock, and spare parts.
 - g. Requirements for demonstration and training.
 - h. Preparation of Contractor's punch list.
 - i. Procedures for processing Applications for Payment at Substantial Completion and for final payment.

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- j. Submittal procedures.
 - k. Coordination of separate contracts.
 - l. Owner's partial occupancy requirements.
 - m. Installation of Owner's furniture, fixtures, and equipment.
 - n. Responsibility for removing temporary facilities and controls.
4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- E. Progress Meetings: Conduct progress meetings at biweekly intervals.
- 1. Coordinate dates of meetings with preparation of payment requests.
 - 2. Attendees: In addition to representatives of Owner, Owner's Commissioning Authority and 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) Resolution of BIM component conflicts.
 - 4) Status of submittals.
 - 5) Deliveries.
 - 6) Off-site fabrication.
 - 7) Access.
 - 8) Site use.
 - 9) Temporary facilities and controls.
 - 10) Progress cleaning.
 - 11) Quality and work standards.
 - 12) Status of correction of deficient items.
 - 13) Field observations.
 - 14) Status of RFIs.
 - 15) Status of Proposal Requests.
 - 16) Pending changes.
 - 17) Status of Change Orders.
 - 18) Pending claims and disputes.
 - 19) Documentation of information for payment requests.

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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.
- F. Coordination Meetings: Conduct Project coordination meetings as required. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
 1. Attendees: In addition to representatives of Owner, Owner's Commissioning Authority and 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 meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined 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.
 - b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
 - c. Review present and future needs of each contractor present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Resolution of BIM component conflicts.
 - 4) Status of submittals.
 - 5) Deliveries.
 - 6) Off-site fabrication.
 - 7) Access.
 - 8) Site use.
 - 9) Temporary facilities and controls.
 - 10) Work hours.
 - 11) Hazards and risks.
 - 12) Progress cleaning.
 - 13) Quality and work standards.
 - 14) Status of RFIs.
 - 15) Proposal Requests.
 - 16) Change Orders.
 - 17) Pending changes.

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3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

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SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Submittal schedule requirements.
- 2. Administrative and procedural requirements for submittals.

- B. Related Requirements:

- 1. Section 012500 "Substitution Procedures".
- 2. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
- 3. Section 013100 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
- 4. Section 017700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's and Construction Manager's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's and Construction Manager's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.4 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

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1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal Category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Architect's final release or approval.

1.5 SUBMITTAL FORMATS

- A. Submittal Information: Include the following information in each submittal:
 1. Project name.
 2. Date.
 3. Name of Architect.
 4. Name of Contractor.
 5. Name of firm or entity that prepared submittal.
 6. Names of subcontractor, manufacturer, and supplier.
 7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
 8. Category and type of submittal.
 9. Submittal purpose and description.
 10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
 11. Drawing number and detail references, as appropriate.
 12. Location(s) where product is to be installed, as appropriate.
 13. Other necessary identification.
- B. Options: Identify options requiring selection by Architect.
- C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

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D. Paper Submittals:

1. Place a permanent label or title block on each submittal item for identification; include name of firm or entity that prepared submittal.
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. Action Submittals: Submit three paper copies of each submittal unless otherwise indicated. Architect will return two copies.
4. Informational Submittals: Submit two paper copies of each submittal unless otherwise indicated. Architect will not return copies.
5. 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.
6. Transmittal for Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using transmittal form.

E. PDF Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

F. Submittals for Web-Based Project Software: Prepare submittals as PDF files, or other format indicated by Project software website.

1.6 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Email: Prepare submittals as PDF package, and transmit to Architect by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Architect.
 - a. Architect will return annotated file. Annotate and retain one copy of file as a digital Project Record Document file.
2. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
3. Paper: Prepare submittals in paper form, and deliver to Architect.

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. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.

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4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections 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. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 1. Initial Review: Allow 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.
- D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked with approval notation from Architect's and Construction Manager's action stamp.
- E. 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.
- F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.7 SUBMITTAL REQUIREMENTS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 1. If information must be specially prepared for submittal because standard published data are unsuitable 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:

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- a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams that show factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before Shop Drawings, and before or concurrent with Samples.
- B. 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. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
 2. Paper Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
 - a. Two opaque (bond) copies of each submittal. Architect will return one copy(ies).
- C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
 - a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.

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- f. Specification paragraph number and generic name of each item.
 3. Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics, and identification information for record.
 4. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
 5. Paper Transmittal: Include paper transmittal including complete submittal information indicated.
 6. 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.
 7. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
 8. 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.
 - 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.
- D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.

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2. Manufacturer and product name, and model number if applicable.
 3. Number and name of room or space.
 4. Location within room or space.
- E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- G. Certificates:
1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
 2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
 3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
 4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
 5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
 6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- H. Test and Research Reports:
1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
 2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
 3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
 4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

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5. Product Test Reports: Submit written reports indicating that 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.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - a. Name of evaluation organization.
 - b. Date of evaluation.
 - c. Time period when report is in effect.
 - d. Product and manufacturers' names.
 - e. Description of product.
 - f. Test procedures and results.
 - g. Limitations of use.

1.8 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file and/or 3 paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.9 CONTRACTOR'S REVIEW

- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include 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.
 1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

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1.10 ARCHITECT'S REVIEW

- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return it.
 - 1. PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate action.
 - 2. Paper Submittals: Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
 - 3. Submittals by Web-Based Project Software: Architect will indicate, on Project software website, the appropriate action.
- B. 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.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Architect will return without review submittals received from sources other than Contractor.
- F. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013300

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SECTION 015000 - 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 011000 "Summary" for work restrictions and limitations on utility interruptions.

1.3 USE CHARGES

- A. Installation, removal, and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.
- B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use. Provide connections and extensions of services and metering as required for construction operations.
- C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use. Provide connections and extensions of services and metering as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS

- A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.
- B. Implementation and Termination Schedule: Within 15 days of date established for commencement of the Work, submit schedule indicating implementation and termination dates of each temporary utility.
- C. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.

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- D. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- E. Moisture-and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold. Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
 - 1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and requirements for replacing water-damaged Work.
 - 2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
 - 3. Indicate methods to be used to avoid trapping water in finished work.
- F. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
 - 1. Locations of dust-control partitions at each phase of work.
 - 2. HVAC system isolation schematic drawing.
 - 3. Location of proposed air-filtration system discharge.
 - 4. Waste-handling procedures.
 - 5. Other dust-control measures.
- G. Noise and Vibration Control Plan: Identify construction activities that may impact the occupancy and use of existing spaces within the building or adjacent existing buildings, whether occupied by others, or occupied by the Owner. Include the following:
 - 1. Methods used to meet the goals and requirements of the Owner.
 - 2. Concrete cutting method(s) to be used.
 - 3. Location of construction devices on the site.
 - 4. Show compliance with the use and maintenance of quieted construction devices for the duration of the Project.
 - 5. Indicate activities that may disturb building occupants and that are planned to be performed during non-standard working hours as coordinated with the Owner.
 - 6. Indicate locations of sensitive equipment areas or other areas requiring special attention as identified by Owner. Indicate means for complying with Owner's requirements.

1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. 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.

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- C. Accessible Temporary Egress: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.6 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. Dust-Control Adhesive-Surface Walk-Off Mats: Provide mats, minimum 36 by 60 inches.

2.2 TEMPORARY FACILITIES

- A. Field Offices: Owner will provide conditioned interior space for field offices for duration of Project.
- B. 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 and away from train tracks. Coordinate location with Owner.
- C. Portable Restroom Trailers: Provide portable restrooms furnished and equipped for temporary use during construction.
 - 1. Basis of Design: Portable Restroom Trailers, LLC – Oahu Series.
 - 2. Layout: As indicated on Drawings; 1 ADA station at each trailer.

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, Cooling, and Dehumidifying 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.

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3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction.
- C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities 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.

3.2 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."
- 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.
- C. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
1. Prior to commencing work, isolate the HVAC system in area where work is to be performed.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - b. Maintain negative air pressure within work area, using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

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3.3 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. There shall be NO interruptions with any utilities serving tenants and Owner. Isolate construction area as required. If interruption is unavoidable, 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. If required, connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, safety shower and eyewash 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.
 - 1. Use of Permanent Toilets: Use of Owner's existing or new toilet facilities is not permitted.
- E. Temporary 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.
 - 1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.
- F. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
- G. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
 - 1. Install electric power service overhead unless otherwise indicated.
 - 2. Connect temporary service to Owner's existing power source, as directed by Owner.
- H. 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.

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- I. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install
 1. 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.

3.4 SUPPORT FACILITIES INSTALLATION

- A. Comply with the following:
 1. Provide construction for temporary field offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible in accordance with ASTM E136. Comply with NFPA 241.
 2. Utilize designated area within existing building for temporary field offices.
 3. 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: Use designated areas of Owner's existing parking areas for construction personnel.
- D. Storage and Staging: Near Bus Bay 1 (coordinate with owner).
- E. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
 1. Identification Signs: Provide Project identification signs. Drawings to be provided by architect. Owner to provide information for sign.
 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 touch up 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 progress cleaning requirements in Section 017300 "Execution."

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- G. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
 - 1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas, so no evidence remains of correction work.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
 - 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
- 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 011000 "Summary."
- C. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- D. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- E. Temporary Egress: Provide temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction. Provide signage directing occupants to temporary egress.
- F. 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.
- G. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner and tenants from fumes and noise.
 - 1. Construct dustproof partitions with gypsum wallboard, with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
 - 2. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.

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3. Insulate partitions to control noise transmission to occupied areas.
 4. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
 5. Protect air-handling equipment.
 6. Provide walk-off mats at each entrance through temporary partition.
- H. 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. Comply with additional limits on smoking specified in other Sections.
 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition in accordance with requirements of authorities having jurisdiction.
 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
 4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign, stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.6 MOISTURE AND MOLD CONTROL

- A. Moisture and Mold Protection: Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.

3.7 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.

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2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

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SECTION 016000 - 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 012500 "Substitution Procedures" for requests for substitutions.

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 by Architect through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.
- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named

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product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications. Submit a comparable product request, if applicable.

1.4 ACTION SUBMITTALS

- A. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
 - 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days 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 seven days of receipt of additional information or documentation, whichever is later.
 - a. Form of Architect's Approval of Submittal: As specified in Section 013300 "Submittal Procedures."
 - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "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.
- B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.
 - 1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
 - 2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:

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- a. Name of product and manufacturer.
 - b. Model and serial number.
 - c. Capacity.
 - d. Speed.
 - e. Ratings.
3. See individual identification sections in Divisions 21, 22, 23, and 26 for additional identification requirements.

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. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 6. Protect stored products from damage and liquids from freezing.
 7. 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.

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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. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 017700 "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 meeting 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.
 - a. Submit additional documentation required by Architect in order to establish equivalency of proposed products. Evaluation of "or equal" product status is by the Architect, whose determination is final.
- B. Product Selection Procedures:
1. Sole 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.

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- a. Sole product may be indicated by the phrase: "Subject to compliance with requirements, provide the following: ..."
2. Sole 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.
 - a. Sole manufacturer/source may be indicated by the phrase: "Subject to compliance with requirements, provide products by the following: ..."
3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.
 - a. Limited list of products may be indicated by the phrase: "Subject to compliance with requirements, provide one of the following: ..."
4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, which complies with requirements.
 - a. Non-limited list of products is indicated by the phrase: "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following: ..."
5. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.
 - a. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following: ..."
6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, which complies with requirements.
 - a. Non-limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following: ..."
7. 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.

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- a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.
- C. Visual Matching Specification: Where Specifications require "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
 1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products: 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 proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
 2. Evidence that proposed product provides specified warranty.
 3. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 4. Samples, if requested.
- B. Submittal Requirements: Approval by the Architect of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

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SECTION 017329 - 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 01 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. Division 02 Section "Selective Demolition" for demolition of selected portions of the building including salvage of existing materials to be reused or recycled.
 - 2. Divisions 02 through 33 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
 - 3. Division 07 Section "Penetration Firestopping" for patching fire-rated construction.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore 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. 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.
 - 2. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
 - 3. Architectural Elements: Where cutting and patching involves interior or exterior masonry, submit procedure for salvage and reuse of existing materials.

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4. Construction Manager'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. Operating elements may include but are not limited to the following:
 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.
- 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 that results in increased maintenance or decreased operational life or safety. Miscellaneous elements may include but are not limited to the following:
 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.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.

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- 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 prevent 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.

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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 and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 6. Proceed with patching after construction operations requiring cutting are complete.
- 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.
- D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 017329

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SECTION 017700 - 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.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of cleaning agent.
- 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. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

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- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Construction Manager. Label with manufacturer's name and model number.
 - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner's signature for receipt of submittals.
 5. Submit testing, adjusting, and balancing records.
 6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 3. Complete startup and testing of systems and equipment.
 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
 6. Advise Owner of changeover in utility services.
 7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
 8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 9. Complete final cleaning requirements.
 10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion 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 and Construction Manager 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

UNION STATION RESTROOM RENOVATIONS

Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. 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 012900 "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.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

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. 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 and proceeding from lowest floor to highest floor.
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 and Construction Manager.
 - d. Name of Contractor.
 - e. Page number.

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1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, 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.
- C. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
- D. Warranties in Paper Form:
 - 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.
- E. 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.

UNION STATION RESTROOM RENOVATIONS

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. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. 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.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - j. 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.
 - k. Remove labels that are not permanent.
 - l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - o. 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 ACR. Provide written report on completion of cleaning.
 - p. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
 - q. Leave Project clean and ready for occupancy.

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,

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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 017700

UNION STATION RESTROOM RENOVATIONS

SECTION 024119 - 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. Salvage of existing items to be reused or recycled.

- B. Related Requirements:

- 1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
 - 2. Section 017329 "Cutting and Patching" for cutting and patching procedures.

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 deliver to Owner ready for reuse.
- 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.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

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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. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- B. 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 and other tenants' 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 elevator and stairs.
 - 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- C. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations.
- D. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
- E. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.7 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

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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. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. Hazardous materials will be removed by Owner before start of the Work.
 - 2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. 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 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding.
- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

1.11 COORDINATION

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

UNION STATION RESTROOM RENOVATIONS

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. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
 - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- D. Survey of Existing Conditions: Record existing conditions by use of measured drawings preconstruction photographs or video.
 - 1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage 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.

UNION STATION RESTROOM RENOVATIONS

1. Arrange to shut off utilities with utility companies.
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. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

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 015000 "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.

UNION STATION RESTROOM RENOVATIONS

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 adequate ventilation when using cutting torches.
 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 9. Dispose of demolished items and materials promptly.
- 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 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.
- D. 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.

UNION STATION RESTROOM RENOVATIONS

- 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."
- E. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight.
 - 1. Remove existing roof membrane, flashings, copings, and roof accessories.
 - 2. Remove existing roofing system down to substrate.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
 - 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.
- 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 024119

UNION STATION RESTROOM RENOVATIONS

SECTION 035416 - HYDRAULIC CEMENT UNDERLAYMENT

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. Polymer-modified, self-leveling, hydraulic cement underlayment for application below interior floor coverings.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Hydraulic cement underlayment.
 - 2. Reinforcement.
 - 3. Primer.
 - 4. Moisture control system.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Installer who is approved by manufacturer for application of underlayment products required for this Project.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ventilation, ambient temperature and humidity, and other conditions affecting underlayment performance.

UNION STATION RESTROOM RENOVATIONS

1. Place hydraulic cement underlayments only when ambient temperature and temperature of substrates are between 50 and 80 deg F.

PART 2 - PRODUCTS

2.1 MOISTURE VAPOR EMISSION CONTROL

- A. One-Coat Moisture Control System epoxy resin system for Concrete to receive Hydraulic Cement Underlayment.
 1. Basis of Design: ARDEX MC™ RAPID.
- B. Performance and Physical Properties: Meet or exceed the following values for material cured at 70° F+/-3°F (21° C+/-2°C) and 50% +/-5% relative humidity:
 1. Application: Manual.
 2. Material Requirements on CSP 3 Prepared Concrete: Approx. 250 - 270 sq. ft. (25 m2) per mixed unit for 10 mils, and approx. 170 – 109 sq. ft. (16 – 18 m2) per mixed unit for 14 mils.
 3. Permeability (ASTM E96): 0.06 perms.
 4. 14 pH solution (ASTM D1308): No effect.
 5. Working Time: 20 minutes.
 6. Pot Life: 20 minutes.
 7. VOC: 19.9 g/L, A+B, ASTM D2369.
 8. Walkable: Minimum of 4 hours.
 9. Install underlayment or topping: Minimum 4 hours.

2.2 HYDRAULIC CEMENT UNDERLAYMENTS

- A. Hydraulic Cement Underlayment: Polymer-modified, self-leveling, hydraulic cement product that can be applied in minimum uniform thickness of 1/4 inch and that can be feathered at edges to match adjacent floor elevations.
 1. Basis of Design: ARDEX Americas; K 15.
 2. Acceptable Manufacturers:
 - a. BASF Corporation.
 - b. Laticrete International, Inc.
 - c. MAPEI Corporation.
 - d. Maxxon Corporation.
 - e. USG Corporation.
 2. Cement Binder: ASTM C150/C150M, portland cement, or hydraulic or blended hydraulic cement as defined by ASTM C219.
 3. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C109/C109M.
- B. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch; or coarse sand as recommended by underlayment manufacturer.

UNION STATION RESTROOM RENOVATIONS

1. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.
- C. Water: Potable and at a temperature of not more than 70 deg F.
- D. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.
 1. Basis of Design: Ardex EP 2000.
- E. Surface Sealer: Designed to reduce porosity as recommended by manufacturer for type of floor covering to be applied to underlayment.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for conditions affecting performance of the Work.
- B. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare and clean substrate according to manufacturer's written instructions.
 1. Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through underlayment.
 2. Fill substrate voids to prevent underlayment from leaking.
- B. Concrete Substrates: Mechanically remove, according to manufacturer's written instructions, laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond.
 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.
 1. Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 85 percent relative humidity level measurement, or as recommended by hydraulic cement underlayment manufacturer.
- C. Nonporous Substrates: For ceramic tile, quarry tile, and terrazzo substrates, remove waxes, sealants, and other contaminants that might impair underlayment bond, and prepare surfaces according to manufacturer's written instructions.
- D. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

UNION STATION RESTROOM RENOVATIONS

3.3 INSTALLATION

- A. Mix and install underlayment components according to manufacturer's written instructions.
 - 1. Close areas to traffic during underlayment installation and for time period after installation recommended in writing by manufacturer.
 - 2. Coordinate installation of components to provide optimum adhesion to substrate and between coats.
 - 3. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.
- B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- C. Install underlayment to produce uniform, level surface.
 - 1. Install a final layer without aggregate to product surface.
 - 2. Feather edges to match adjacent floor elevations.
- D. Cure underlayment according to manufacturer's written instructions. Prevent contamination during installation and curing processes.
- E. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.
- F. Apply surface sealer at rate recommended by manufacturer.
- G. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

3.4 APPLICATION OF MOISTURE CONTROL SYSTEM

- A. Examine substrates and conditions under which materials will be installed. Do not proceed with installation until unsatisfactory conditions are corrected.
- B. Coordinate installation with adjacent work to ensure proper sequence of construction. Protect adjacent areas from contact due to mixing and handling of materials.
- C. Mixing: Comply with manufacturer's printed instructions.
- D. Application: Comply with manufacturer's printed instructions.

3.5 INSTALLATION TOLERANCES

- A. Finish and measure surface, so gap at any point between gypsum cement underlayment surface and an unlevelled, freestanding, 10-foot-long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch.

UNION STATION RESTROOM RENOVATIONS

3.6 PROTECTION

- B. Protect underlayment from concentrated and rolling loads for remainder of construction period.

END OF SECTION 035416

UNION STATION RESTROOM RENOVATIONS

SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 DEFINITIONS

- A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
- B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
 - 2. NHLA: National Hardwood Lumber Association.
 - 3. NLGA: National Lumber Grades Authority.
 - 4. SPIB: The Southern Pine Inspection Bureau.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 - 2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
 - 3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

UNION STATION RESTROOM RENOVATIONS

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Certified Wood: Lumber shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- B. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 - 3. Provide dressed lumber, S4S, unless otherwise indicated.
- C. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, and Use Category UC3b for exterior construction not in contact with the ground.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

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- D. Application: Treat items indicated on Drawings, and the following:
1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
 3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
 4. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
 5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, 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 Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
1. Use treatment that does not promote corrosion of metal fasteners.
 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
- D. Application: Treat items indicated on Drawings, and the following:
1. Plywood backing panels.

2.4 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
1. Blocking.
 2. Nailers.
 3. Cants.
 4. Furring.
- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber and any of the following species:

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1. Hem-fir (north); NLGA.
 2. Mixed southern pine; SPIB.
 3. Spruce-pine-fir; NLGA.
 4. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
 5. Northern species; NLGA.
 6. Eastern softwoods; NeLMA.
- C. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:
1. Mixed southern pine, No. 2 grade; SPIB.
 2. Eastern softwoods, No. 2 Common grade; NELMA.
 3. Northern species, No. 2 Common grade; NLGA.
- D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- E. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.5 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.6 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: NES NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Screws for Fastening to Metal Framing: ASTM C 1002, length as recommended by screw manufacturer for material being fastened.
- F. Lag Bolts: ASME B18.2.1.
- G. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.
- H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in

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unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

2.7 METAL FRAMING ANCHORS

- A. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

1. Use for interior locations unless otherwise indicated.

2.8 MISCELLANEOUS MATERIALS

- A. Adhesives for Gluing Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.

1. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

- B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Where wood-preserved-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- C. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- D. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.
- E. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

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- F. Do not splice structural members between supports unless otherwise indicated.
- G. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
- H. Provide fire blocking in furred spaces and other concealed cavities as indicated and as follows:
 - 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
 - 2. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. and to solidly fill space below partitions.
 - 3. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.
- I. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- J. Comply with AWWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 - 1. Use inorganic boron for items that are continuously protected from liquid water.
 - 2. Use copper naphthenate for items not continuously protected from liquid water.
- K. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. NES NER-272 for power-driven fasteners.
 - 2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
- L. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 WOOD SLEEPER, BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

UNION STATION RESTROOM RENOVATIONS

3.3 PROTECTION

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

END OF SECTION 061053

UNION STATION RESTROOM RENOVATIONS

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Penetration firestopping systems for the following applications:
 - a. Penetrations in fire-resistance-rated walls.
 - b. Penetrations in horizontal assemblies.
 - c. Penetrations in smoke barriers.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Approval according to FM Approval 4991, "Approval Standard for Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

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1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
 - 1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.
 - 1) UL in its "Fire Resistance Directory."

2.2 PENETRATION FIRESTOPPING SYSTEMS

- A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. 3M Fire Protection Products.
 - b. A/D Fire Protection Systems Inc.
 - c. Hilti, Inc.

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- B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
 - 1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
 - 1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
 - 2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
 - 3. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.
- D. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg.
 - 1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at and no more than 50-cfm cumulative total for any 100 sq. ft. at both ambient and elevated temperatures.
- E. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E84.
- F. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
 - 1. Permanent forming/damming/backing materials.
 - 2. Substrate primers.
 - 3. Collars.
 - 4. Steel sleeves.

2.3 FILL MATERIALS

- A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
- C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.

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- E. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.
- F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
- I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

2.4 MIXING

- A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.

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2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

- A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.
1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
- C. Install fill materials by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with minimum 0.375-inch strokes.
1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet from end of wall and at intervals not exceeding 30 feet.
- B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."

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2. Contractor's name, address, and phone number.
3. Designation of applicable testing and inspecting agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.5 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

3.6 PENETRATION FIRESTOPPING SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.

END OF SECTION 078413

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SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes sealants for the following applications, including those specified by reference to this Section:
- B. This Section includes sealants for the following applications:
 - 1. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
 - a. Perimeter joints between interior wall surfaces and frames of interior doors.
 - b. Other joints as indicated.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

1.4 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

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- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials in compliance with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer.
 - 2. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40 deg F.
 - 3. When joint substrates are wet.
- B. Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
- C. Joint-Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified in the sealant schedules at the end of Part 3.

2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range for this characteristic.

2.3 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealant Standard: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant in the Elastomeric Joint-Sealant Schedule at the

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end of Part 3, including those referencing ASTM C 920 classifications for type, grade, class, and uses.

2.4 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
 - 1. Type C: Closed-cell material with a surface skin.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants with joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint sealant manufacturer's written instructions and the following requirements:

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1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air. Porous joint surfaces include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
 3. Remove laitance and form-release agents from concrete.
 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
 - a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates where recommended in writing by joint sealant manufacturer, based on prior experience. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 1. Do not leave gaps between ends of sealant backings.
 2. Do not stretch, twist, puncture, or tear sealant backings.
 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

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- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and back of joints.
- E. Install sealants by proven techniques to 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 provided for each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealants from surfaces adjacent to joint.
 - 2. Use tooling agents that are approved by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
 - a. Use masking tape to protect adjacent surfaces of recessed tooled joints.

3.4 CLEANING

- A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from the original work.

3.6 ELASTOMERIC JOINT-SEALANT SCHEDULE

- A. Latex Sealant: For miscellaneous joints between interior materials provide:
 - 1. Products:
 - a. Bostik Findley; Chem-Calk 600.
 - b. Pecora Corporation; AC-20+.
 - c. Tremco; Tremflex 834.
 - 2. Type and Grade: P and NF.

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3. Use Related to Exposure: NT (nontraffic).
- B. Multicomponent Pourable Urethane Sealant: For joints in horizontal traffic surfaces provide:
1. Products:
 - a. SL 2; Sonneborn Building Products Div., ChemRex Inc.
 - b. THC-900; Tremco.
 - c. THC-901; Tremco.
 2. Type and Grade: M (multicomponent) and P (pourable).
 3. Class: 25.
- C. Single-Component Mildew-Resistant Neutral-Curing Silicone Sealant: Interior joints between plumbing fixtures and adjoining walls and floors.
1. Available Products:
 - a. Pecora Corporation; 898.
 - b. Tremco; Tremsil 600 White.
 2. Type and Grade: S (single component) and NS (nonsag).
 3. Class: 25.
 4. Use Related to Exposure: NT (nontraffic).
- E. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 and the following:
1. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
 2. Available Products:
 - a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.
 - b. United States Gypsum Co.; SHEETROCK Acoustical Sealant.

END OF SECTION 079200

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SECTION 081113 - 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 custom hollow-metal doors and frames.
- B. Related Requirements:
 - 1. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or ANSI/SDI A250.8.

1.4 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.
- B. Shop Drawings: Include the following:
 - 1. Elevations of each door type.
 - 2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
 - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 4. Locations of reinforcement and preparations for hardware.
 - 5. Details of each different wall opening condition.

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6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
7. Details of anchorages, joints, field splices, and connections.
8. Details of accessories.
9. Details of moldings, removable stops, and glazing.

- 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.

1.6 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of fire-rated hollow-metal door and frame assembly for tests performed by a qualified testing agency indicating compliance with performance requirements.
- B. Oversize Construction Certification: For assemblies required to be fire-rated and exceeding limitations of labeled assemblies.
- C. Field quality control reports.

1.7 CLOSEOUT SUBMITTALS

- A. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
 1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

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1. Ceco Door; ASSA ABLOY.
2. Curries Company; ASSA ABLOY.
3. Fleming Door Products Ltd.; Assa Abloy Group Company.
4. Steelcraft; an Allegion brand.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated on Drawings, based on testing at positive pressure according to NFPA 252 or UL 10C.
1. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
 2. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.

2.3 INTERIOR CUSTOM HOLLOW-METAL DOORS AND FRAMES

- A. Commercial Doors and Frames: NAAMM-HMMA 861; ANSI/SDI A250.4, Physical Performance Level A. 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: Uncoated steel sheet, minimum thickness of 0.042 inch.
 - d. Edge Construction: Continuously welded with no visible seam.
 - e. Core: Steel stiffened.
 - f. Fire-Rated Core: Manufacturer's standard vertical steel stiffener core for fire-rated doors.
 2. Frames:
 - a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch, except 0.067 inch for openings exceeding 4 feet wide.
 - b. Frames: Fabricated from same material as adjacent door frame.
 - c. Construction: Face welded.
 3. Exposed Finish: Prime.

2.4 FRAME ANCHORS

- A. Jamb Anchors:

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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. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.
- C. Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at top of underlayment.
- D. 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.

2.5 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A153/A153M.
- C. 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.

2.6 FABRICATION

- A. 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. 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.
 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.

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- B. 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.

2.7 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. Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.
- B. Hollow-Metal Frames: Comply with NAAMM-HMMA 840.
 - 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.

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- a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
4. 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.
- C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.
 1. Non-Fire-Rated Steel Doors: Comply with NAAMM-HMMA 841 and NAAMM-HMMA guide specification indicated.
 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 3. Smoke-Control Doors: Install doors according to NFPA 105.

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.

END OF SECTION 081113

UNION STATION RESTROOM RENOVATIONS

SECTION 081416 - FLUSH WOOD DOORS

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. Solid-core doors with wood veneer-faces.
 2. Factory finishing flush wood doors.
 3. Factory fitting flush wood doors to frames and factory machining for hardware.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product, including the following:
 1. Door core materials and construction.
 2. Door edge construction
 3. Door face type and characteristics.
 4. Factory- finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:
 1. Door schedule indicating door and frame location, type, size, fire protection rating, and swing.
 2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
 3. Details of frame for each frame type, including dimensions and profile.
 4. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
 5. Dimensions and locations of blocking for hardware attachment.
 6. Dimensions and locations of mortises and holes for hardware.
 7. Clearances and undercuts.
 8. Requirements for veneer matching.
 9. Doors to be factory finished and application requirements.
- C. Samples for Verification:
 1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.

UNION STATION RESTROOM RENOVATIONS

1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Special warranties.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and HVAC system is operating and maintaining temperature and relative humidity at levels designed for building occupants for the remainder of construction period.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Delamination of veneer.
 - b. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
 - c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
 - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain flush wood doors from single manufacturer.

UNION STATION RESTROOM RENOVATIONS

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Wood Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated on Drawings, based on testing at positive pressure in accordance with UL 10C or NFPA 252.
- B. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.

2.3 SOLID-CORE FIVE-PLY FLUSH WOOD VENEER-FACED DOORS FOR TRANSPARENT FINISH

- A. Interior Doors:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eggers Industries.
 - b. Lambton Doors.
 - c. Masonite Architectural.
 - d. Oshkosh Door Company.
 - e. VT Industries Inc.
 - 2. Performance Grade: ANSI/WDMA I.S. 1A Heavy Duty.
 - 3. Grade: Custom.
 - 4. Faces: Single-ply wood veneer not less than 1/50 inch thick (To match existing doors).
 - a. Species: Select Red oak.
 - b. Cut: Rotary cut.
 - c. Match between Veneer Leaves: Book match.
 - d. Assembly of Veneer Leaves on Door Faces: Balance match.
 - 5. Exposed Vertical Edges: Same species as faces or a compatible species - Architectural Woodwork Standards edge Type A.
 - a. Fire-Rated Single Doors: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed vertical edges.
 - b. Mineral-Core Doors: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
 - 6. Core for Non-Fire-Rated Doors:
 - a. ANSI A208.1, particleboard.

UNION STATION RESTROOM RENOVATIONS

- b. Either glued wood stave or WDMA I.S. 10 structural composite lumber.
- 7. Core for Fire-Rated Doors: As required to achieve fire-protection rating indicated on Drawings.
 - a. Blocking for Mineral-Core Doors: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated on Drawings as needed to eliminate through-bolting hardware.
- 8. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

2.4 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated.
 - 1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
 - 2. Comply with NFPA 80 requirements for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied.
 - 1. Locate hardware to comply with DHI-WDHS-3.
 - 2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.
 - 3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.
 - 4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.

2.5 FACTORY FINISHING

- A. Comply with referenced quality standard for factory finishing.
 - 1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 - 2. Finish faces, all four edges, edges of cutouts, and mortises.
 - 3. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors.
- C. Transparent Finish:
 - 1. ANSI/WDMA I.S. 1A Grade: Custom.
 - 2. Finish: ANSI/WDMA I.S. 1A TR-6 Catalyzed Polyurethane.
 - 3. Staining: None required.
 - 4. Sheen: Satin.

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
 - 1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Section 087100 "Door Hardware."
- B. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
- C. 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.
 - 2. Anchor frames to anchors or blocking built in or directly attached to substrates.
 - a. Secure with countersunk, concealed fasteners and blind nailing.
 - b. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.
 - 1) For factory-finished items, use filler matching finish of items being installed.
 - 3. Install fire-rated doors and frames in accordance with NFPA 80.
 - 4. Install smoke- and draft-control doors in accordance with NFPA 105.
- D. 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 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated on Drawings.

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- c. Where threshold is shown 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 at lock edge; trim stiles and rails only to extent permitted by labeling agency.
- E. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
 - F. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 FIELD QUALITY CONTROL

- A. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- B. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

3.4 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

UNION STATION RESTROOM RENOVATIONS

SECTION 083113 - ACCESS 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. Access doors and frames.
 - 2. Fire-rated access doors and frames.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, fire ratings, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Samples: For each type of access door and frame and for each finish specified, complete assembly minimum 6 by 6 inches in size.
- C. Product Schedule: For access doors and frames.

1.4 CLOSEOUT SUBMITTALS

- A. Record Documents: For fire-rated doors, list of applicable room name and number in which access door is located.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Access Doors and Frames: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, according to NFPA 252 or UL 10B.

UNION STATION RESTROOM RENOVATIONS

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. Karp Associates, Inc.
 - d. Larsens Manufacturing Company.
2. Description: Face of door flush with frame, with exposed flange and concealed hinge.
3. Locations: Ceilings; where indicated and to replace existing.
4. Metallic-Coated Steel Sheet for Door: Nominal 0.064 inch, 16 gage, factory primed.
5. Frame Material: Same material, thickness, and finish as door.
6. Latch and Lock: Cam latch, screwdriver operated.

2.3 FIRE-RATED ACCESS DOORS AND FRAMES

A. Fire-Rated, 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. Karp Associates, Inc.
 - d. Larsens Manufacturing Company.
2. Description: Door face flush with frame; with exposed flange, self-closing door, and concealed hinge.
3. Locations: Walls, where indicated on Drawings.
4. Door Size: 24 x 48 inches.
5. Fire-Resistance Rating: Not less than 2 hours.
6. Stainless Steel Sheet for Door: Nominal 0.038 inch, 20 gage, ASTM A480/A480M No. 4 finish.
7. Frame Material: Same material, thickness, and finish as door.
8. Latch and Lock: Self-latching door hardware, operated by key.

2.4 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.

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- 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 Steel 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.

2.5 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. 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.
- C. 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.
- D. 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.

2.6 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. 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.
- E. Stainless Steel Finishes:
 - 1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

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2. Polished Finish: ASTM A480/A480M No. 4 finish. Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - a. Run grain of directional finishes with long dimension of each piece.
 - b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 FIELD QUALITY CONTROL

- A. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- B. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.
- C. Prepare and submit separate inspection report for each fire-rated access door indicating compliance with each item listed in NFPA 80 and NFPA 101.

3.4 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION 083113

UNION STATION RESTROOM RENOVATIONS

SECTION 087100 - 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 Requirements:
 - 1. Section 081113 "Hollow Metal Doors and Frames".
 - 2. Section 081416 "Flush Wood Doors".

1.3 COORDINATION

- A. 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.
- B. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Door Hardware Schedule: Coordinate door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. 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.

UNION STATION RESTROOM RENOVATIONS

2. Format: Use same scheduling sequence and format and use same door numbers as in door hardware schedule in the Contract Documents.
 3. Content: Include the following information:
 - a. Identification number, location, hand, fire rating, size, and material of each door and frame.
 - b. Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
 - c. Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
 - d. Fastenings and other installation information.
 - e. Explanation of abbreviations, symbols, and designations contained in door hardware schedule.
 - f. Mounting locations for door hardware.
 - g. List of related door devices specified in other Sections for each door and frame.
- C. Keying Schedule: Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of door hardware to include in maintenance manuals.
- B. Schedules: Final door hardware and keying schedule.

1.6 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 and permanent cores to Owner by registered mail or overnight package service.

1.7 WARRANTY

- A. Special Warranty: 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.

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2. Warranty Period: Three years from date of Substantial Completion unless otherwise indicated below:
 - a. Manual Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Where fire-rated doors are indicated, provide door hardware complying with NFPA 80 that is 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.
- B. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that complies with 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. at the tested pressure differential of 0.3-inch wg of water.
- C. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- D. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the USDOJ's "2010 ADA Standards for Accessible Design", the DOT's "ADA Standards for Transportation Facilities" and ICC 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.
 2. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
 - b. 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 high.
 4. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch.
 5. Adjust spring hinges so that, from an open position of 70 degrees, the door will take at least 1.5 seconds to move to the closed position.

2.2 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

UNION STATION RESTROOM RENOVATIONS

1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.3 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
 1. Quantity: Provide the following hinge quantity:
 - a. Two Hinges: For doors with heights up to 60 inches
 - b. Three Hinges: For doors with heights 61 to 90 inches
 - c. Four Hinges: For doors with heights 91 to 120 inches
 - d. For doors with heights more than 120 inches provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches
 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
 4. Hinge Options: Comply with the following:
 - a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
 5. Manufacturers:
 - a. Bommer Industries (BO) - LB Series.
 - b. Hager Companies (HA) - CB Series.
 - c. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - TA Series.

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2.4 DOOR OPERATING TRIM

- A. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
 2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
 3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
 4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
 5. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
 - c. Trimco (TC).

2.5 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
- C. Cylinders: Original manufacturer cylinders complying with the following:
1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
 2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
 4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 5. Keyway: Match Facility Standard.
- D. Keying System: Each type of lock and cylinders to be factory keyed.
1. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
 2. Existing System: Field verify and key locks to match Owner's existing system.
- E. Key Quantity: Provide the following minimum number of keys:
1. Change Keys per Cylinder: Three (3).
 2. Master Keys (per Master Key Level/Group): Five (5).
 3. Construction Keys (where required): Ten (10).

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- F. Construction Keying: Provide construction master keyed cylinders.
- G. Key Registration List (Bitting List):
 - 1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
 - 2. Provide transcript list in writing or electronic file as directed by the Owner.

2.6 AUXILIARY LOCKS

- A. Cylindrical Deadlocks: ANSI/BHMA A156.36, Grade 1, cylindrical type deadlocks to fit standard ANSI 161 preparation and 1 3/8" to 1 3/4" thickness doors. Provide tapered collars to resist vandalism and 1" throw solid steel bolt with hardened steel roller pins. Deadlocks to be products of the same source manufacturer and keyway as other locksets.
 - 1. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - DL3200 Series.
 - b. Sargent Manufacturing (SA) - 480 Series.
 - c. Schlage (SC) - B600 Series.

2.7 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
 - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 - 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 - 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
 - 4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B. Standards: Comply with the following:
 - 1. Strikes for Mortise Locks and Latches: BHMA A156.13.
 - 2. Strikes for Bored Locks and Latches: BHMA A156.2.
 - 3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
 - 4. Dustproof Strikes: BHMA A156.16.

2.8 DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:
 - 1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size.

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Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.

2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
 3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.
 4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.
 5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
 6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
 7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
1. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - DC6000 Series.
 - b. Sargent Manufacturing (SA) - 351 Series.
 - c. Norton Door Controls (NO) - 7500 Series.

2.9 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

UNION STATION RESTROOM RENOVATIONS

3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
 - a. Stainless Steel: 300 grade, 050-inch thick.
5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
 - c. Trimco (TC).

2.10 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
 1. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
 - c. Trimco (TC).

2.11 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

UNION STATION RESTROOM RENOVATIONS

- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
 - 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
 - 1. National Guard Products (NG).
 - 2. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).
 - 3. Reese Enterprises, Inc. (RE).

2.12 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.13 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine 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 of the Work.

UNION STATION RESTROOM RENOVATIONS

- 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 door and hardware manufacturers' written instructions.

3.3 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights indicated on Drawings unless otherwise indicated or required to comply with governing regulations.
- 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. 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. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 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.

UNION STATION RESTROOM RENOVATIONS

1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
2. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 70 degrees and so that closing time complies with accessibility requirements of authorities having jurisdiction.

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. Train Owner's maintenance personnel to adjust, operate, and maintain door hardware.

3.7 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
- B. The supplier is responsible for handing and sizing all products and providing the correct option for the appropriate door type and material where more than one is presented in the hardware sets. Quantities listed are for each pair of doors, or for each single door.

Hardware Sets

Set: 1.0

Doors: 168, 173

1 Deadbolt	487	US26D	SA
1 Pull Plate	107x70C	US32D	RO
1 Push Plate	70C-RKW	US32D	RO
1 Armor Plate	K1050 >36"	US32D	RO

Notes: Note: Balance of hardware is existing to remain. Provide filler plates and custom strike as required.

UNION STATION RESTROOM RENOVATIONS

Set: 2.0

Doors: 158, 172

3 Hinge, Full Mortise	TA2714 [NRP]	US26D	MK
1 Pull Plate	107x70C	US32D	RO
1 Push Plate	70C-RKW	US32D	RO
1 Surface Closer	351 UO	EN	SA
1 Wall Stop	409	US26D	RO
3 Silencer	608-RKW		RO

END OF SECTION 087100

UNION STATION RESTROOM RENOVATIONS

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 ACTION SUBMITTALS

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C754 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C645 requirements for steel unless otherwise indicated.
 - 2. Protective Coating: Coating with equivalent corrosion resistance of ASTM A653/A653M, G40, hot-dip galvanized unless otherwise indicated.
- B. Studs and Tracks: ASTM C645.

UNION STATION RESTROOM RENOVATIONS

1. Steel Studs and Tracks:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) ClarkDietrich.
 - 2) MarinoWARE.
 - 3) SCAFCO Steel Stud Company.
 - 4) Steel Construction Systems.
 - b. Minimum Base-Steel Thickness: 0.0296 inch.
 - c. Depth: As indicated on Drawings.
- C. Slip-Type Head Joints: Where indicated, provide the following:
 1. Single Long-Leg Track System: ASTM C645 top track with 2-inch-deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
- 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.
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
 1. Minimum Base-Steel Thickness: 0.0296 inch.
- F. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-steel thickness, with minimum 1/2-inch-wide flanges.
 1. Depth: 1-1/2 inches.
 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 C645.
 1. Minimum Base-Steel Thickness: 0.0179 inch.
 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 A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.

UNION STATION RESTROOM RENOVATIONS

2.3 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.
- B. Hanger Attachments to Concrete:
 - 1. Power-Actuated Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- C. Wire Hangers: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
- 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: 2-1/2 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 C645.
 - a. Minimum Base-Steel Thickness: 0.0296 inch.
 - b. Depth: As indicated on Drawings.
 - 3. Hat-Shaped, Rigid Furring Channels: ASTM C645, 7/8 inch deep.
 - a. Minimum Base-Steel Thickness: 0.0179 inch.
 - 4. Resilient Furring Channels: 1/2-inch-deep members designed to reduce sound transmission.
 - a. Configuration: Asymmetrical or hat shaped.
- F. Grid Suspension System for Gypsum Board Ceilings: ASTM C645, direct-hung system composed of main beams and cross-furring members that interlock.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Armstrong Ceiling & Wall Solutions.
 - b. Rockfon (Rockwool International).
 - c. USG Corporation.

2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
 - 1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

UNION STATION RESTROOM RENOVATIONS

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
 - 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.
- B. Coordination with Sprayed Fire-Resistive Materials:
 - 1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling tracks to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.
 - 2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that are required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C754.
 - 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 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.

UNION STATION RESTROOM RENOVATIONS

3.4 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 - 1. Single-Layer Application: 16 inches o.c. unless otherwise indicated.
 - 2. Multilayer Application: 16 inches o.c. unless otherwise indicated.
 - 3. Tile Backing Panels: 16 inches o.c. unless otherwise indicated.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
 - 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 - 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.
 - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
 - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 - 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
 - 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
 - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
 - 5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
- E. Direct Furring:
 - 1. Screw to 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.

UNION STATION RESTROOM RENOVATIONS

3.5 INSTALLING CEILING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 - 1. Hangers: 48 inches o.c.
 - 2. Carrying Channels (Main Runners): 48 inches o.c.
 - 3. Furring Channels (Furring Members): 16 inches o.c.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, 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. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.
- F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

UNION STATION RESTROOM RENOVATIONS

- G. 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 092216

UNION STATION RESTROOM RENOVATIONS

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Interior gypsum board.
- 2. Tile backing panels.

- B. Related Requirements:

- 1. Section 092216 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.
- 2. Section 093013 "Ceramic Tiling" for cementitious backer units installed as substrates for ceramic tile.

1.3 ACTION SUBMITTALS

- A. Product Data: For the following:

- 1. Gypsum board, Type X.
- 2. Gypsum ceiling board.
- 3. Abuse-resistant gypsum board.
- 4. Cementitious backer units.
- 5. Interior trim.
- 6. Joint treatment materials.
- 7. Sound-attenuation blankets.
- 8. Acoustical sealant.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

UNION STATION RESTROOM RENOVATIONS

- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.2 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.

2.3 INTERIOR GYPSUM BOARD

- A. Gypsum Board, Type X: ASTM C1396/C1396M.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Georgia-Pacific Gypsum LLC.
 - b. National Gypsum Company.
 - c. USG Corporation.
 - 2. Thickness: 5/8 inch.
 - 3. Long Edges: Tapered and featured (rounded or beveled) for prefilling.
- B. Gypsum Ceiling Board: ASTM C1396/C1396M.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Georgia-Pacific Gypsum LLC.
 - b. National Gypsum Company.
 - c. USG Corporation.

UNION STATION RESTROOM RENOVATIONS

2. Thickness: 1/2 inch.
 3. Long Edges: Tapered.
- C. Abuse-Resistant Gypsum Board: ASTM C1396/C1396M gypsum board, tested according to ASTM C1629/C1629M.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Georgia-Pacific Gypsum LLC.
 - b. National Gypsum Company.
 - c. USG Corporation.
 2. Core: 5/8 inch, Type X.
 3. Surface Abrasion: ASTM C1629/C1629M, meets or exceeds Level 1 requirements.
 4. Indentation: ASTM C1629/C1629M, meets or exceeds Level 1 requirements.
 5. Soft-Body Impact: ASTM C1629/C1629M, meets or exceeds Level 1 requirements.
 6. Long Edges: Tapered.
 7. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.
- D. Mold-Resistant Gypsum Board: ASTM C1396/C1396M. With moisture- and mold-resistant core and paper surfaces.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Georgia-Pacific Gypsum LLC.
 - b. National Gypsum Company.
 - c. USG Corporation.
 2. Core: 5/8 inch, Type X.
 3. Long Edges: Tapered.
 4. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.4 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 and ASTM C1288 or ASTM C1325, with manufacturer's standard edges.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation.
 - b. National Gypsum Company.
 - c. USG Corporation.
 2. Thickness: 5/8 inch.
 3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

UNION STATION RESTROOM RENOVATIONS

2.5 TRIM ACCESSORIES

- A. Interior Trim: ASTM C1047.
 - 1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
 - 2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - f. Expansion (control) joint.

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 drying-type, all-purpose compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 - 3. Fill Coat: For second coat, use drying-type, all-purpose compound.
 - 4. Finish Coat: For third coat, use drying-type, all-purpose compound.
- D. Joint Compound for Tile Backing Panels:
 - 1. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.7 AUXILIARY MATERIALS

- A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Steel Drill Screws: ASTM C1002 unless otherwise indicated.
 - 1. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

UNION STATION RESTROOM RENOVATIONS

- C. 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.
- D. Acoustical Sealant: As specified in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION AND FINISHING OF PANELS, GENERAL

- A. Comply with ASTM C840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.

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- G. 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.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.
- J. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- K. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 INSTALLATION OF INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. Type X: Where required for fire-resistance-rated assembly.
 - 2. Ceiling Type: Ceiling surfaces only where indicated.
 - 3. Abuse-Resistant Type: Ceiling surfaces. Vertical surfaces unless otherwise indicated.
 - 4. Mold-Resistant Type: Where indicated.
- B. Single-Layer Application:
 - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
 - 3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
 - 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application:
 - 1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to

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- framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
 3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
 4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.
- D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.4 INSTALLATION OF TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A108.11, at showers, tubs, and where indicated to receive tile.
- B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLATION OF TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
 1. Cornerbead: Use at outside corners unless otherwise indicated.
 2. Bullnose Bead: Use where indicated.
 3. LC-Bead: Use at exposed panel edges.
 4. L-Bead: Use where indicated.
 5. U-Bead: Use where indicated.

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3.6 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile.
 - 3. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
- E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.7 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

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SECTION 093000 - TILING

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:

- A. Ceramic tile.
- B. Porcelain tile.
- C. Stone thresholds.
- D. Metal edge strips.
- E. Waterproof and crack isolation membrane.

- B. Related Sections:

- A. Division 03 "Hydraulic Cement Underlayment" for self-leveling material under tile.
- B. Division 07 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
- C. Division 09 Section "Gypsum Board" for cementitious backer units.

1.3 DEFINITIONS

- A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in "American National Standard Specifications for Installation of Ceramic Tile."
- C. Module Size: Actual tile size plus joint width indicated.
- D. Face Size: Actual tile size, excluding spacer lugs.

1.4 ACTION SUBMITTALS

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

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- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples for Verification:
 - A. Full-size units of each type and composition of tile and for each color and finish required.
 - B. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 12 inches square, but not fewer than 4 tiles. Use grout of type and in color or colors approved for completed Work.
 - C. Full-size units of each type of trim and accessory.
 - D. Stone thresholds in 6-inch lengths.
 - E. Metal edge strips in 6-inch lengths.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Product Certificates: For each type of product, signed by product manufacturer.
- C. Material Test Reports: For each tile-setting and -grouting product.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - A. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
 - B. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.7 QUALITY ASSURANCE

- A. Source Limitations for Tile: Obtain tile of each type from one source or producer.
 - A. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.

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- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:
 - A. Waterproof membrane.
 - B. Metal edge strips.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.
- E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.9 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

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. Ceramic Tile Products:
 - a. American Marrazzi Tile, Inc.
 - b. American Olean Tile Company.
 - c. Buchtal Corporation USA.
 - d. Crossville Ceramics Company.
 - e. Daltile Corporation..
 - e. Deutsche Steinzeug America, Inc.
 - f. Interceramic.
 - g. Lone Star Ceramics Company.

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- h. Seneca Tiles, Inc.
 - k.. Stone Source.
 - m. United States Ceramic Tile Company.
2. Porcelain Tile Products:
- a. Atlas Concorde.
 - b. Ergon Engineered Stone.
 - c. Floor Gres
3. Tile-Setting and -Grouting Materials:
- a. American Olean Tile Company.
 - b. Daltile Corporation.
 - c. Laticrete International, Inc.
 - d. Mapei Corporation.
 - e. SummitvilleTiles,Inc.

2.2 PRODUCTS, GENERAL

- .A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.
 - 1. Provide tile complying with Standard Grade requirements.
 - 2. For facial dimensions of tile, comply with requirements relating to tile sizes specified in Part 1 "Definitions" Article.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting Materials" and "Grouting Materials" articles.
- C. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:
 - 1. Provide Architect with selections from manufacturer's full range of colors, textures, and patterns for products of type indicated.
 - 2. Provide tile trim and accessories that match color and finish of adjoining flat tile.
- D. Factory Blending: For tile exhibiting color variations within the ranges selected during Sample submittals, blend tile in the factory and package so tile units taken from one package show the same range in colors as those taken from other packages and match approved Samples.

2.3 CERAMIC TILE PRODUCTS WT.1– TYPICAL WALL TILE

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Daltile Unity Colorbody Porcelain, Nero P406.

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- A. Composition: Porcelain.
 - B. Module size: Large format, 12" x 24".
 - C. Thickness: 3/8".
 - D. Face: Plain with square or cushioned edges.
 - E. Finish: Polished.
 - F. Breaking Strength: > 450 lbs.
 - G. Moisture Absorption: < 0.5%.
 - H. DCOF Wet: Greater than or equal to 0.42.
 - I. MOH's: 8.
 - J. Chemical Resistance: Resistant.
 - K. Grout Color: Pearl Gray 19.
- B. Trim Units: Provide tile trim units to match characteristics of adjoining tile and to comply with the following requirements:
- a. Size: As indicated, coordinated with sizes and coursing of adjoining tile where applicable.
 - b. Shapes: As follows, selected from manufacturer's standard shapes:
 - 1) Internal Corners: Field-buttet square corners, except with cap angle pieces designed to member with stretcher shapes.
 - 2) Cap: Regular flat tile.
 - 3) Cap inside/outside corner: Regular flat tile.
 - 4) Outside corner: Stainless steel edging profile for outside corners of tiled walls.
 - a) Basis of Design: Schluter – ECK-E.
- C. Installation: Stack Bond floor tile.

2.4 PORCELAIN TILE PRODUCTS FT.1 – TYPICAL FLOOR TILE

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Daltile Unity Colorbody Porcelain, Nero P406.
- a. Composition: Porcelain.
 - b. Module size: Large format, 12" x 24".
 - c. Thickness: 3/8".
 - d. Face: Plain with square or cushioned edges.
 - e. Finish: Unpolished.
 - f. Breaking Strength: > 450 lbs.
 - g. Moisture Absorption: < 0.5%.
 - h. DCOF Wet: Greater than or equal to 0.42.
 - i. MOH's: 8.
 - j. Chemical Resistance: Resistant.
 - k. Grout Color: Pearl Gray 19.
- B. Trim Units: S-36C9T, 6" x 12" cove base; SC-36C9T 1" x 6" cove base outer corner, P406 Nero unpolished.
- C. Installation: Stack Bond floor tile; align cove base with floor tile.
- D. Location: Room 163.

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2.5 STONE THRESHOLDS

- A. General: Provide stone thresholds that are uniform in color and finish, fabricated to sizes and profiles indicated to provide transition between tile surfaces and adjoining finished floor surfaces. Provide basis of design “Thassos White” by Dal Tile or approved equal.
 - 1. Fabricate thresholds to heights indicated, but not more than 1/2 inch above adjoining finished floor surfaces, with transition edges beveled on a slope of no greater than 1:2.

2.6 WATERPROOF AND CRACK ISOLATION MEMBRANE

- A. General: Manufacturer's standard product that complies with ANSI A118.10, ANSI A118.12, and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and continuous fabric reinforcement.
 - A. Products: Subject to compliance with requirements, products that may be provided, but are not limited to, the following:
 - a. Boiardi Products; a QEP company; Elastiment 344 Reinforced Waterproofing and Anti-Fracture/Crack Suppression Membrane.
 - b. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane.
 - c. MAPEI Corporation; Mapelastic HPG with MAPEI Fiberglass Mesh.

2.7 SETTING MATERIALS

- A. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4, composed as follows:
 - 1. Prepackaged Dry-Mortar Mix: Factory-prepared mixture of portland cement; dry, redispersible, ethylene vinyl acetate additive; and other ingredients to which only water needs to be added at Project site.
 - a. For wall applications, provide nonsagging, latex-portland cement mortar complying with ANSI A118.4 for mortar of this type defined in Section F-2.1.2.

2.8 GROUTING MATERIALS

- A. Latex-Portland Cement Grout: ANSI A118.6 for materials described in Section H-2.4, composed as follows:
 - 1. Factory-Prepared, Dry-Grout Mixture: Factory-prepared mixture of portland cement; dry, redispersible, ethylene vinyl acetate additive; and other ingredients to produce the following:

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- a. Unsanded grout mixture for joints 1/8 inch and narrower.
- b. Sanded grout mixture for joints 1/8 inch and wider.

2.9 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. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.10 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
 1. Verify that substrates for setting tile are firm; dry; clean; free from oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 series of tile installation standards for installations indicated.
 - B. Verify that concrete substrates for tile floors installed with bonded mortar bed or thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
 - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
 - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.

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3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust latter in consultation with Architect.

B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove coatings, including curing compounds, and other substances that contain soap, wax, oil, or silicone and are incompatible with tile-setting materials by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.
- B. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- C. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.
- D. Blending: For tile exhibiting color variations within the ranges selected during Sample submittals, verify that tile has been blended in the factory and packaged so tile units taken from one package show the same range in colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 series of tile installation standards in "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.
- B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.
 - A. For floors composed of tiles 8 by 8 inches or larger, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:
- C. Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- D. 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

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straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

- E. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- F. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are the same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, and align joints on floor and base, unless otherwise indicated.
- E. Grout tile to comply with the requirements of the following tile installation standards:
 - 1. For ceramic tile grouts, comply with ANSI A108.10.

3.4 FLOOR TILE INSTALLATION

- A. Install tile designated for floor installation to comply with requirements in the Ceramic Tile Floor Installation Schedule, including those referencing TCA installation methods and ANSI setting bed standards.
- B. Joint widths: Unless otherwise indicated, install tile with the following joint widths:
 - 1. Floor Tile: 3/8".
- C. 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.
 - B. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

3.5 WALL TILE INSTALLATION

- A. Install types of tile designated for wall installations to comply with requirements in the Ceramic Tile Wall Installation Schedule, including those referencing TCA installation methods and ANSI setting-bed standards.
- B. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
 - 1. Wall Tile: 1/16 inch.

3.6 STONE THRESHOLD INSTALLATION

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- A. Install stone thresholds in latex-portland cement mortar (thin set). Seal perimeter with elastic sealant.

3.7 WATERPROOF AND CRACK ISOLATION MEMBRANE INSTALLATION

- A. Install waterproof and crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.
- B. Do not install tile or setting materials over crack isolation membrane until membrane has cured.

3.8 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove latex-portland cement grout residue from tile as soon as possible.
 - 2. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.
 - 3. Comply with Contractor's IAQ Management Plan specified in Division 01 Section "Construction IAQ Management" for cleaning procedures.
- B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.
- C. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure tile is without damage or deterioration at the time of Substantial Completion.
 - 1. When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors.
- D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

3.9 CERAMIC TILE WALL INSTALLATION SCHEDULE

- A. Ceramic Tile Installations Over Metal Studs with Cement Backer Board: Where interior wall installations of this designation are indicated, comply with the following:
 - 1. Installation Method: TCA W244C-15.
 - 2. Setting Bed and Grout: ANSI A108.4 and A108.6 with the following mortar and grout:
 - a. Latex-portland cement mortar.
 - b. Unsanded latex-portland cement grout.

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- B. Ceramic Tile Installations Over Masonry: Where interior wall installations of this designation are indicated, comply with the following:
1. Installation Method: TCA W211-15.
 2. Setting Bed and Grout: ANSI A108.4 and A108.6 with the following mortar and grout:
 - c Latex-portland cement mortar.
 - d Unsanded latex-portland cement grout.

3.10 PORCELAIN TILE FLOOR INSTALLATION SCHEDULE

- A. Porcelain Tile Floor Installation Where Slabs Are Not Depressed: Interior floor installation for new slab on grade concrete for protection against future in-plane cracking; thin-set mortar. Where interior floor installations of this designation are indicated, comply with the following:
1. Installation Method: TCA F125A (Full Coverage).
 2. Setting Bed (Thin Set): Latex- portland cement mortar, ANSI A118.4.
 3. Grout: Standard sanded cement grout, ANSI 118.6.
 4. Movement Joint: Schluter Dilex-AKWS. Match height of porcelain tile. Provide where shown on drawings, or if not shown per guidelines in TCA EJ171. Provide perimeter joints per details in TCA EJ171.

END OF SECTION 093000

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SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Thermoplastic-rubber base.

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, not less than 12 inches long.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.6 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.

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- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 THERMOPLASTIC-RUBBER BASE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Allstate Rubber Corp.
 - 2. Burke Mercer Flooring Products; a division of Burke Industries Inc.
 - 3. Johnsonite; a Tarkett company.
 - 4. Nora Systems, Inc.
 - 5. Roppe Corporation, USA.
- B. Product Standard: ASTM F1861, Type TP (rubber, thermoplastic).
 - 1. Group: I (solid, homogeneous) or II (layered).
 - 2. Style and Location:
 - a. Style B, Cove: Provide in areas with resilient floor coverings and existing floor coverings.
 - b. Location: Corridors and ramp to access Amtrak Locker Rooms.
- C. Thickness: 0.125 inch.
- D. Height: 4 inches.
- E. Lengths: Coils in manufacturer's standard length.
- F. Outside Corners: Preformed.
- G. Inside Corners: Job formed or preformed.
- H. Colors: To be selected by Architect from manufacturer's full range .

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.

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 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.
 - 1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 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.

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- G. Preformed Corners: Install preformed corners before installing straight pieces.
- H. Job-Formed Corners:
 - 1. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
 - a. Miter or cope corners to minimize open joints.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
 - 1. Remove adhesive and other blemishes from surfaces.
 - 2. Sweep and vacuum horizontal surfaces thoroughly.
 - 3. Damp-mop horizontal surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

UNION STATION RESTROOM RENOVATIONS

SECTION 096623 - RESINOUS MATRIX TERRAZZO FLOORING

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. Thin-set, epoxy-resin terrazzo flooring.
 - a. Location: All Rooms part of the Project unless otherwise noted.

- B. Related Requirements

- 1. Section 035416 "Hydraulic Cement Underlayment" for self-leveling material under terrazzo.
- 2. Section 093000 "Tiling" for stone thresholds.

1.3 PREINSTALLATION MEETINGS

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

- 1. Review methods and procedures related to terrazzo including, but not limited to, the following:
 - a. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
 - b. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - c. Review special terrazzo designs and patterns.

1.4 ACTION SUBMITTALS

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

- B. Shop Drawings: Include terrazzo installation requirements. Include plans, sections, component details, and relationship to other work. Show layout of the following:

- 1. Divider strips.
- 2. Control-joint strips.
- 3. Accessory strips.
- 4. Abrasive strips.

UNION STATION RESTROOM RENOVATIONS

5. Terrazzo patterns.

C. Samples: For each exposed product and for each color and texture specified, 6 inches in size.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Material Certificates: For each type of terrazzo material or product.

C. Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.

D. Preinstallation moisture-testing reports.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For terrazzo to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications:

1. Engage an installer who is a contractor member of NTMA.
2. Engage an installer who is certified in writing by terrazzo manufacturer as qualified to install manufacturer's products.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockups for terrazzo including accessories.
 - a. Size: Minimum 100 sq. ft. of typical poured-in-place flooring and base condition for each color and pattern in locations directed by Architect.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in supplier's original wrappings and containers, labeled with source's or manufacturer's name, material or product brand name, and lot number if any.

B. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

UNION STATION RESTROOM RENOVATIONS

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting terrazzo installation.
- B. Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during terrazzo installation.
- C. Close spaces to traffic during terrazzo application and for not less than 24 hours after application unless manufacturer recommends a longer period.
- D. Control and collect water and dust produced by grinding operations. Protect adjacent construction from detrimental effects of grinding operations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain primary terrazzo materials from single source from single manufacturer. Provide secondary materials including patching and fill material, joint sealant, and repair materials of type and from source recommended by manufacturer of primary materials.
- B. Source Limitations for Aggregates: Obtain each color, grade, type, and variety of granular materials from single source with resources to provide materials of consistent quality in appearance and physical properties.

2.2 PERFORMANCE REQUIREMENTS

- A. NTMA Standards: Comply with NTMA's written recommendations for terrazzo type indicated unless more stringent requirements are specified.

2.3 EPOXY-RESIN TERRAZZO

- A. Epoxy-Resin Terrazzo: Comply with manufacturer's written instructions for matrix and aggregate proportions and mixing.
 - 1. Basis of design: Terroxy Resin Systems Epoxy Matrix by Terrazzo & Marble Supply Companies, Wheeling, IL (www.tmsupply.com).
 - 2. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Doyle Dickerson Terrazzo, Inc.
 - b. Hi-Tek Polymers, Inc.
 - c. Key Resin Company.
 - d. Master Terrazzo Technologies LLC.

UNION STATION RESTROOM RENOVATIONS

B. Mix Color and Pattern: Match Architect's sample.

C. Materials:

1. Moisture-Vapor-Emission-Control Membrane: Two-component, high-solids, high-density, low-odor, epoxy-based membrane-forming product produced by epoxy terrazzo manufacturer that reduces moisture emission from concrete substrate to not more than 3 lb of water/1000 sq. ft. in 24 hours.
2. Substrate-Crack-Suppression Membrane: Product of terrazzo-resin manufacturer, having minimum 120 percent elongation potential according to ASTM D412.
 - a. Reinforcement: Fiberglass scrim.
3. Primer: Manufacturer's product recommended for substrate and use indicated.
4. Epoxy-Resin Matrix: Manufacturer's standard recommended for use indicated and in color required for mix indicated.
 - a. Physical Properties without Aggregates:
 - 1) Hardness: 60 to 85 per ASTM D2240, Shore D.
 - 2) Minimum Tensile Strength: 3000 psi per ASTM D638 for a 2-inch specimen made using a "C" die per ASTM D412.
 - 3) Minimum Compressive Strength: 10,000 psi per ASTM D695, Specimen B cylinder.
 - 4) Chemical Resistance: No deleterious effects by contaminants listed below after seven-day immersion at room temperature per ASTM D1308.
 - a) Distilled water.
 - b) Mineral water.
 - c) Isopropanol.
 - d) Ethanol.
 - e) 0.025 percent detergent solution.
 - f) 1.0 percent soap solution.
 - g) 5 percent acetic acid.
 - h) 10 percent sodium hydroxide.
 - i) 10 percent hydrochloric acid.
 - j) 30 percent sulfuric acid.
 - b. Physical Properties with Aggregates: For terrazzo blended according to manufacturer's recommendations with one part epoxy resin with three parts marble aggregate consisting of 60 percent No. 1 chips and 40 percent No. 0 chips that is ground and grouted to a 1/4-inch nominal thickness, and cured for 7 days at 75 deg F plus or minus 2 deg F and at 50 percent plus or minus 2 percent relative humidity.
 - 1) Flammability: Self-extinguishing, maximum extent of burning 1/4 inch according to ASTM D635.
 - 2) Thermal Coefficient of Linear Expansion: 0.0025 inch/inch per deg F according to ASTM C531.

UNION STATION RESTROOM RENOVATIONS

5. Aggregates: Comply with NTMA gradation standards for mix indicated and contain no deleterious or foreign matter.
 - a. Abrasion and Impact Resistance: Less than 40 percent loss per ASTM C131/C131M.
 - b. 24-Hour Absorption Rate: Less than 0.75 percent.
 - c. Dust Content: Less than 1.0 percent by weight.
6. Finishing Grout: Resin based.

2.4 STRIP MATERIALS

- A. Thin-Set Divider Strips: L-type angle in depth required for topping thickness indicated.
 1. Material: Brass.
 2. Top Width: 1/8 inch.
- B. Control-Joint Strips: Separate, double L-type angles, positioned back to back, that match material and color of divider strips and in depth required for topping thickness indicated.
- C. Accessory Strips: Match divider-strip width, material, and color unless otherwise indicated. Use the following types of accessory strips as required to provide a complete installation:
 1. Base-bead strips for exposed top edge of terrazzo base.
 2. Edge-bead strips for exposed edges of terrazzo.

2.5 MISCELLANEOUS ACCESSORIES

- A. Strip Adhesive: Epoxy-resin adhesive recommended by adhesive manufacturer for this use.
- B. Anchoring Devices:
 1. Strips: Provide mechanical anchoring devices or adhesives for strip materials as recommended by manufacturer and as required for secure attachment to substrate.
- C. Patching and Fill Material: Terrazzo manufacturer's resinous product approved and recommended by manufacturer for application indicated.
- D. Joint Compound: Terrazzo manufacturer's resinous product approved and recommended by manufacturer for application indicated.
- E. Resinous Matrix Terrazzo Cleaner: Chemically neutral cleaner with pH factor between 7 and 10 that is biodegradable, phosphate free, and recommended by sealer manufacturer for use on terrazzo type indicated.
- F. Sealer: Slip- and stain-resistant, penetrating-type sealer that is chemically neutral; does not affect terrazzo color or physical properties; and is recommended by sealer manufacturer Urethane.
 1. Surface Friction: Not less than 0.6 according to ASTM D2047.
 2. Acid-Base Properties: With pH factor between 7 and 10.

UNION STATION RESTROOM RENOVATIONS

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions, including levelness tolerances, have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances, including oil, grease, and curing compounds, that might impair terrazzo bond. Provide clean, dry, and neutral substrate for terrazzo application.
- B. Concrete Slabs:
 - 1. Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with terrazzo.
 - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 - b. Repair damaged and deteriorated concrete according to terrazzo manufacturer's written instructions.
 - c. Use patching and fill material to fill holes and depressions in substrates according to terrazzo manufacturer's written instructions.
- C. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
- D. Preinstallation Moisture Testing:
 - 1. Testing Agency: Engage a qualified testing agency to perform tests.
 - 2. 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. Relative Humidity Test: Maximum 80 percent relative humidity measurement when tested according to ASTM F2170 using in-situ probes.
 - 3. Proceed with terrazzo installation only after concrete substrates pass moisture testing or after installation of moisture-vapor-emission-control membrane on substrate areas that fail testing.
- E. Moisture-Vapor-Emission-Control Membrane: Install according to manufacturer's written instructions.
 - 1. Install on concrete substrates that incorporate lightweight aggregates.
 - 2. Install concrete substrates that fail preinstallation moisture testing.

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- F. Substrate-Crack-Suppression Membrane: Install to isolate and suppress substrate cracks according to manufacturer's written instructions.
 - 1. Prepare and prefill substrate cracks with membrane material.
 - 2. Install membrane to produce full substrate coverage in areas to receive terrazzo.
 - 3. Reinforce membrane with fiberglass scrim.
- G. Protect other work from water and dust generated by grinding operations. Control water and dust to comply with environmental protection regulations.
 - 1. Erect and maintain temporary enclosures and other suitable methods to limit water damage and dust migration and to ensure adequate ambient temperatures and ventilation conditions during installation.

3.3 EPOXY-RESIN TERRAZZO INSTALLATION

- A. Comply with NTMA's written recommendations for terrazzo and accessory installation.
- B. Strip Materials:
 - 1. Divider and Control-Joint Strips:
 - a. Locate divider strips in locations indicated.
 - b. Install control-joint strips in locations indicated.
 - c. Install strips in adhesive setting bed without voids below strips, or mechanically anchor strips as required to attach strips to substrate, as recommended by strip manufacturer.
 - 2. Accessory Strips: Install as required to provide a complete installation.
- C. Apply primer to terrazzo substrates according to manufacturer's written instructions.
- D. Place, rough grind, grout, cure grout, fine grind, and finish terrazzo according to manufacturer's written instructions.
 - 1. Installed Thickness: 3/8 inch nominal.
 - 2. Terrazzo Finishing: Ensure that matrix components and fluids from grinding operations do not stain terrazzo by reacting with divider and control-joint strips.
 - a. Rough Grinding: Grind with 24-grit or finer stones or with comparable diamond abrasives. Follow initial grind with 60/80-grit stones or with comparable diamond abrasives.
 - b. Grouting: Before grouting, clean terrazzo with water, rinse, and allow to dry. Apply and cure epoxy grout.
 - c. Fine Grinding/Polishing: Delay fine grinding until heavy trade work is complete and construction traffic through area is restricted. Grind with 120-grit stones or with comparable diamond abrasives until grout is removed from surface.
 - 3. Installation Tolerance: Limit variation in terrazzo surface from level to 1/4 inch in 10 feet; noncumulative.

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- E. Install and finish poured-in-place terrazzo base at the same time the adjacent terrazzo flooring is installed.

3.4 REPAIR

- A. Cut out and replace terrazzo areas that evidence lack of bond with substrate. Cut out terrazzo areas in panels defined by strips and replace to match adjacent terrazzo, or repair panels according to NTMA's written recommendations, as approved by Architect.

3.5 CLEANING AND PROTECTION

A. Cleaning:

1. Remove grinding dust from installation and adjacent areas.
2. Wash surfaces with cleaner according to NTMA's written recommendations and manufacturer's written instructions; rinse surfaces with water and allow them to dry thoroughly.

B. Sealing:

1. Seal surfaces according to NTMA's written recommendations.
2. Apply sealer according to sealer manufacturer's written instructions.

- C. Protection: Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure that terrazzo is without damage or deterioration at time of Substantial Completion.

END OF SECTION 096623

UNION STATION RESTROOM RENOVATIONS

SECTION 099120 - PAINTING

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 surface preparation and field painting of exposed exterior and interior items and surfaces.
 - 1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
- B. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface. If a color is not indicated, Architect will select colors. Contractor should assume that different items will be different colors, e.g. exposed metal deck and exposed structural steel. Also, Contractor should assume each space will have one accent wall that is a different color from the other walls.
 - 1. Painting includes field painting of all exposed bare and covered pipes, hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
 - 1. Prefinished items include the following factory-finished components:
 - a. Architectural woodwork.
 - b. Finished mechanical and electrical equipment.
 - c. Light fixtures.
 - 2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
 - a. Furred areas.
 - b. Ceiling plenums, unless visible from below.
 - c. Pipe spaces.
 - d. Duct shafts.
 - 3. Finished metal surfaces, with the exception of piping, conduit, and exposed metal deck, include the following:
 - a. Aluminum.

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- b. Stainless steel.
 - c. Chromium plate.
 - d. Copper and copper alloys.
 - e. Bronze and brass.
 - f. Zinc coated steel (galvanized).
4. Operating parts include moving parts of operating equipment and the following:
 - a. Valve and damper operators.
 - b. Linkages.
 - c. Sensing devices.
 - d. Motor and fan shafts.
 5. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.
- D. Related Sections include the following:
1. Division 8 Section "Hollow Metal Doors and Frames" for factory priming steel doors and frames.
 2. Division 9 Section "Gypsum Board Assemblies" for surface preparation of gypsum board.

1.3 DEFINITIONS

- A. General: Standard coating terms defined in ASTM D 16 apply to this Section.
1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
 2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
 3. Semi-gloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.

1.4 SUBMITTALS

- A. Product Data: For each paint system indicated. Include block fillers and primers.
1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
 2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.
- B. Samples for Initial Selection: For each type of finish-coat material indicated.
1. After color selection, Architect will furnish color chips for surfaces to be coated.
- C. Samples for Verification: For each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.

UNION STATION RESTROOM RENOVATIONS

1. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
2. Provide a list of materials and applications for each coat of each Sample. Label each Sample for location and application.

1.5 QUALITY ASSURANCE

- A. **Applicator Qualifications:** A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. **Source Limitations:** Obtain block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.
- C. **Benchmark Samples (Mockups):** Provide a full-coat benchmark finish sample for each type of coating and substrate required. Comply with procedures specified in PDCA P5. Duplicate finish of approved sample Submittals.
 1. Architect will select one room or surface to represent surfaces and conditions for application of each type of coating and substrate.
 - a. **Wall Surfaces:** Provide samples on at least 100 sq. ft.
 - b. **Small Areas and Items:** Architect will designate items or areas required.
 2. Apply benchmark samples, according to requirements for the completed Work, after permanent lighting and other environmental services have been activated. Provide required sheen, color, and texture on each surface.
 - a. After finishes are accepted, Architect will use the room or surface to evaluate coating systems of a similar nature.
 3. Final approval of colors will be from benchmark samples.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:
 1. Product name or title of material.
 2. Product description (generic classification or binder type).
 3. Manufacturer's stock number and date of manufacture.
 4. Contents by volume, for pigment and vehicle constituents.
 5. Thinning instructions.
 6. Application instructions.
 7. Color name and number.
 8. VOC content.

UNION STATION RESTROOM RENOVATIONS

- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain storage containers in a clean condition, free of foreign materials and residue.
 - 1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily.

1.7 PROJECT CONDITIONS

- A. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F.
- B. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F.
- C. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
 - 1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

1.8 EXTRA MATERIALS

- A. Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.
 - 1. Quantity: Furnish Owner with 1 gallon of extra paint for each type of paint used in the Project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: The schedule of paint types names the products of Sherwin-Williams as the standard of quality.
- B. Manufacturers' Names: Provide products from one of the following manufacturers:
 - 1. Benjamin Moore & Co. (Benjamin Moore).
 - 2. Akzo Nobel Paints, LLC (Glidden Professional).
 - 3. PPG Industries, Inc. (Pittsburgh Paints).
 - 4. Sherwin-Williams Co. (Sherwin-Williams).

2.2 PAINT MATERIALS, GENERAL

UNION STATION RESTROOM RENOVATIONS

- A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
 - 1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.
- C. Colors: Match Architect's selections and samples.

2.3 INTERIOR PRIMERS

- A. Interior Gypsum Board Primer: Factory-formulated latex-based primer for interior application.
 - 1. Sherwin-Williams; PrepRite 200 Latex Wall Primer B28W200 Series: Applied at a dry film thickness of not less than 1.6 mils.
- B. Interior Ferrous-Metal Primer: Factory-formulated quick-drying rust-inhibitive alkyd-based metal primer.
 - 1. Sherwin-Williams; Kem Kromik Universal Metal Primer B50Z Series: Applied at a dry film thickness of not less than 3.0 mils.

2.4 INTERIOR FINISH COATS

- A. Interior Flat Acrylic Paint: Factory-formulated flat acrylic-emulsion latex paint for interior application.
 - 1. Sherwin-Williams; ProMar 200 Interior Latex Flat Wall Paint B30W200 Series: Applied at a dry film thickness of not less than 1.4 mils.
- B. Interior Eggshell Acrylic Paint: Factory-formulated eggshell acrylic-latex interior enamel.
 - 1. Sherwin-Williams; ProMar 200 Interior Latex Egg-Shell Enamel B20-2200 Series: Applied at a dry film thickness of not less than 1.6 mils.
- C. Interior Semigloss Acrylic Enamel: Factory-formulated semigloss acrylic-latex enamel for interior application.
 - 1. Sherwin-Williams; ProMar 200 Interior Latex Semi-Gloss Enamel B31-2200 Series: Applied at a dry film thickness of not less than 1.5 mils.

PART 3 - EXECUTION

3.1 EXAMINATION

UNION STATION RESTROOM RENOVATIONS

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application.
 - 1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
 - 2. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.
- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
 - 1. Notify Architect about anticipated problems when using the materials specified over substrates primed by others.

3.2 PREPARATION

- A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- B. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning.
 - 1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.
 - 1. Provide barrier coats over incompatible primers or remove and reprime.
 - 2. Cementitious Materials: Prepare concrete, concrete unit masonry, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
 - a. Use abrasive blast-cleaning methods if recommended by paint manufacturer.
 - b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces if moisture content exceeds that permitted in manufacturer's written instructions.
 - c. Clean concrete floors to be painted with a 5 percent solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, rinse, allow to dry, and vacuum before painting.

UNION STATION RESTROOM RENOVATIONS

3. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.
 - a. Blast steel surfaces clean as recommended by paint system manufacturer and according to SSPC-SP 6/NACE No. 3.
 - b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
 - c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.
- D. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
 1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
 3. Use only thinners approved by paint manufacturer and only within recommended limits.
- E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

- A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
 1. Paint colors, surface treatments, and finishes are indicated in the paint schedules.
 2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
 3. Provide finish coats that are compatible with primers used.
 4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
 5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
 7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
 8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
 9. Finish interior of wall and base cabinets and similar field-finished casework to match exterior.
 10. Sand lightly between each succeeding enamel or varnish coat.

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- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
 2. Omit primer over metal surfaces that have been shop primed and touchup painted.
 3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
 4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
 2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
 3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
- D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
- E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.
- F. Mechanical items to be painted include, but are not limited to, the following:
1. Uninsulated and insulated metal piping.
 2. Uninsulated plastic piping.
 3. Pipe hangers and supports.
 4. Tanks that do not have factory-applied final finishes.
 5. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
 6. Duct, equipment, and pipe insulation having "all-service jacket" or other paintable jacket material.
 7. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
- G. Electrical items to be painted include, but are not limited to, the following:
1. Panelboards.
 2. Electrical equipment that is indicated to have a factory-primed finish for field painting.

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- H. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.
- I. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
- J. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- K. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 CLEANING

- A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.
 - 1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.5 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
- B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.
 - 1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.6 INTERIOR PAINT SCHEDULE

- A. Gypsum Board Ceilings: Provide the following finish systems over interior gypsum board ceilings (except Toilet Room ceilings) and soffits:
 - 1. Flat Acrylic Finish: Two finish coats over a primer.
 - a. Primer: Interior gypsum board primer.
 - b. Finish Coats: Interior flat acrylic paint.
- B. Gypsum Board in Toilet Rooms: Provide the following finish systems over gypsum board in Toilet Rooms;

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1. Low-Luster Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior gypsum board primer.
 - b. Finish Coats: Interior low-luster acrylic enamel.

- C. Gypsum Board on Walls: Provide the following finish systems over gypsum board walls;
 1. Eggshell Acrylic Finish: Two finish coats over a primer.
 - a. Primer: Interior gypsum board primer.
 - b. Finish Coats: Interior eggshell acrylic paint.

- D. Ferrous Metal: Provide the following finish systems over interior ferrous metal:
 1. Alkyd-Enamel Finish: Two finish coats over a shop primer.
 - a. Primer: rust-inhibitive shop primer on new metal.
 - b. Finish Coats: Interior semi-gloss or gloss alkyd enamel as selected by the Architect.

END OF SECTION 099120

UNION STATION RESTROOM RENOVATIONS

SECTION 101423 - PANEL SIGNAGE

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. Panel signs.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For panel signs.
 - 1. Include fabrication and installation details and attachments to other work.
 - 2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
 - 3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.
- C. Samples: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:
 - 1. Panel Signs: Not less than 12 inches square, including corner.
- D. Product Schedule: For panel signs. Use same designations indicated on Drawings or specified.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For signs to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

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1.6 FIELD CONDITIONS

- A. Field Measurements: Verify locations of anchorage devices embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.

1.7 WARRANTY

- A. Special Warranty: 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 finishes beyond normal weathering.
 - b. Deterioration of embedded graphic image.
 - c. Separation or delamination of sheet materials and components.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design", the ABA standards of the Federal agency having jurisdiction and ICC A117.1.

2.2 PANEL SIGNS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ACE Sign Systems, Inc.
 - b. APCO Graphics, Inc.
 - c. ASI Sign Systems, Inc.
 - d. Best Sign Systems, Inc.
 - e. Inpro Corporation.
 - f. Mohawk Sign Systems.
 - g. Signs & Decal Corp.
- B. Panel Sign #1 – Room Signage: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
 - 1. Laminated-Sheet Sign: Photopolymer face sheet with raised graphics laminated over subsurface graphics to acrylic backing sheet to produce composite sheet.
 - a. Composite-Sheet Thickness: Manufacturer's standard for size of sign.
 - 2. Sign-Panel Perimeter: Finish edges smooth.

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- a. Edge Condition: Square cut.
 - b. Corner Condition in Elevation: Square.
 3. Mounting:
 - a. Surface mounted to wall with two-face tape or magnetic tape.
 4. Text and Typeface: Accessible raised characters and Braille typeface as selected by Architect from manufacturer's full range and variable content as scheduled. Finish raised characters to contrast with background color, and finish Braille to match background color.
 - a. Text must be in English and Spanish.
- C. Panel Sign #2 – Projecting Sign, double sided: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
1. Laminated-Sheet Sign: Photopolymer face sheet with raised graphics laminated over subsurface graphics to acrylic backing sheet to produce composite sheet.
 - a. Composite-Sheet Thickness: Manufacturer's standard for size of sign.
 2. Sign-Panel Perimeter: Finish edges smooth.
 - a. Edge Condition: Square cut.
 - b. Corner Condition in Elevation: Square.
 3. Mounting:
 - a. Projecting from wall with aluminum bracket.
 4. Text and Typeface: Typeface as selected by Architect from manufacturer's full range and variable content as scheduled.
 - a. Text must be in English and Spanish.
 5. Flatness Tolerance: Sign shall remain flat or uniformly curved under installed conditions as indicated on Drawings and within a tolerance of plus or minus 1/16 inch measured diagonally from corner to corner.

2.3 PANEL-SIGN MATERIALS

- A. Aluminum Extrusions: ASTM B221, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- B. Acrylic Sheet: ASTM D4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).
- C. Polycarbonate Sheet: ASTM C1349, Appendix X1, Type II (coated, mar-resistant, UV-stabilized polycarbonate), with coating on both sides.
- D. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

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2.4 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following unless otherwise indicated:
 - 1. Use concealed fasteners and anchors unless indicated to be exposed.
 - 2. Exposed Metal-Fastener Components, General:
 - a. Fabricated from same basic metal and finish of fastened metal unless otherwise indicated.
 - 3. Sign Mounting Fasteners:
 - a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material or screwed into back of sign assembly unless otherwise indicated.
 - b. Projecting Studs: Threaded studs with sleeve spacer, welded or brazed to back of sign material or screwed into back of sign assembly, unless otherwise indicated.
 - c. Through Fasteners: Exposed metal fasteners matching sign finish, with type of head indicated, and installed in predrilled holes.
 - 4. Inserts: Furnish inserts to be set by other installers into concrete or masonry work.
- B. Adhesive: As recommended by sign manufacturer.
- C. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch thick, with adhesive on both sides.
- D. Magnetic Tape: Manufacturer's standard magnetic tape with adhesive on one side.

2.5 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
 - 1. Preassemble signs in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
 - 2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
 - 3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
 - 4. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
 - 5. Internally brace signs for stability, to meet structural performance loading without oil-canning or other surface deformation, and for securing fasteners.
 - 6. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.

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- B. Surface-Engraved Graphics: Machine engrave characters and other graphic devices into indicated sign surface to produce precisely formed copy, incised to uniform depth.
 - 1. Engraved Metal: Fill engraved graphics with manufacturer's standard baked enamel.
 - 2. Engraved Opaque Acrylic Sheet: Fill engraved graphics with manufacturer's standard enamel.
 - 3. Face-Engraved Clear Acrylic Sheet: Fill engraved copy with manufacturer's standard enamel. Apply manufacturer's standard opaque background color coating to back face of acrylic sheet.
 - 4. Engraved Plastic Laminate: Engrave through exposed face ply of plastic-laminate sheet to expose contrasting core ply.
- C. Subsurface-Applied Graphics: Apply graphics to back face of clear face-sheet material to produce precisely formed image. Image shall be free of rough edges.
- D. Subsurface-Engraved Graphics: Reverse engrave back face of clear face-sheet material. Fill resulting copy with manufacturer's standard enamel. Apply opaque manufacturer's standard background color coating over enamel-filled copy.
- E. Shop- and Subsurface-Applied Vinyl: Align vinyl film in final position and apply to surface. Firmly press film from the middle outward to obtain good bond without blisters or fishmouths.
- F. Brackets: Fabricate brackets, fittings, and hardware for bracket-mounted signs to suit sign construction and mounting conditions indicated. Modify manufacturer's standard brackets as required.
 - 1. Aluminum Brackets: Factory finish brackets with baked-enamel or powder-coat finish to match sign-background color unless otherwise indicated.

2.6 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.
- D. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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- B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.
- C. Verify that anchorage devices embedded in permanent construction are correctly sized and located to accommodate signs.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
 - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Install signs so they do not protrude or obstruct according to the accessibility standard.
 - 3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
- B. Accessible Signage: Install in locations on walls as indicated on Drawings and according to the accessibility standard.
- C. Mounting Methods:
 - 1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
 - a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.
 - b. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.
 - 2. Projecting Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
 - a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place spacers on studs, place sign in position, and push until spacers are pinched between sign and substrate, embedding the stud ends in holes. Temporarily support sign in position until adhesive fully sets.
 - b. Thin or Hollow Surfaces: Place spacers on studs, place sign in position with spacers pinched between sign and substrate, and install washers and nuts on stud ends projecting through opposite side of surface, and tighten.
 - 3. Through Fasteners: Drill holes in substrate using predrilled holes in sign as template. Countersink holes in sign if required. Place sign in position and flush to surface. Install through fasteners and tighten.
 - 4. Brackets: Remove loose debris from substrate surface and install backbar or bracket supports in position so that signage is correctly located and aligned.

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5. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.
6. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.
7. Magnetic Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position.
8. Shim-Plate Mounting: Provide 1/8-inch-thick, concealed aluminum shim plates with predrilled and countersunk holes, at locations indicated, and where other direct mounting methods are impractical. Attach plate with fasteners and anchors suitable for secure attachment to substrate. Attach signs to plate using mounting method specified above.

3.3 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

3.4 SIGNAGE SCHEDULE (See General Information Drawing for additional requirements)

- A. Panel Sign #1: 6 x 8 inches minimum size.
 1. Location: Rooms 158, 163, 168, 172 and 173.
- B. Panel Sign #2: 10 x 10 inches minimum size.
 1. Location: Rooms 168 and 173; above door.

END OF SECTION 101423

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SECTION 102113 - TOILET COMPARTMENTS

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. Stainless-steel toilet compartments configured as toilet enclosures and urinal screens.

- B. Related Sections:

- 1. Section 102800 "Toilet Accessories, " for toilet tissue dispensers, grab bars, and similar accessories.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

- B. Shop Drawings: For toilet compartments. Include plans, elevations, sections, details, and attachments to other work.

- 1. Show locations of cutouts for compartment-mounted toilet accessories.
 - 2. Show locations of centerlines of toilet fixtures.

- C. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:

- 1. Each type of material, color, and finish required for units, prepared on 6-inch- (152-mm-) square Samples of same thickness and material indicated for Work.
 - 2. Each type of hardware and accessory.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of toilet compartment, from manufacturer.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For toilet compartments to include in maintenance manuals.

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1.6 QUALITY ASSURANCE

- A. Comply with requirements in GSA's CID-A-A-60003, "Partitions, Toilets, Complete."
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities" and ICC/ANSI A117.1 for toilet compartments designated as accessible.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum Castings: ASTM B 26/B 26M.
- B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M).
- C. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.
- D. Stainless-Steel Castings: ASTM A 743/A 743M.
- E. Zamac: ASTM B 86, commercial zinc-alloy die castings.
- F. Adhesives: Manufacturer's standard product that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 STAINLESS-STEEL UNITS

- 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. Bradley Corporation; Mills Partitions.
- B. Toilet-Enclosure Style: Floor mounted, overhead braced.
- C. Urinal-Screen Style: Wall anchored with wing bracket.
- D. Door, Panel, and Pilaster Construction: Seamless, metal facing sheets pressure laminated to core material; with continuous, interlocking molding strip or lapped-and-formed edge closures; corners secured by welding or clips and exposed welds ground smooth. Exposed surfaces shall

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be free of pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections.

1. Core Material: Manufacturer's standard sound-deadening honeycomb of resin-impregnated kraft paper in thickness required to provide finished thickness of 1 inch for doors and panels and 1-1/4 inches for pilasters.
2. Grab-Bar Reinforcement: Provide concealed internal reinforcement for grab bars mounted on units.
3. Tapping Reinforcement: Provide concealed reinforcement for tapping (threading) at locations where machine screws are used for attaching items to units.
4. Extra height doors and panels: For maximum privacy.
 - a. ADA stalls will have 69" height doors and panels, 9" AFF.
 - b. All other stalls will be 72" height, 6" AFF.

E. Urinal-Screen Construction:

1. Flat-Panel Urinal Screen: Matching panel construction.

F. Facing Sheets and Closures: Stainless-steel sheet of nominal thicknesses as follows:

1. Pilasters, Braced at Both Ends: Manufacturer's standard thickness, but not less than 0.036 inch.
2. Pilasters, Unbraced at One End: Manufacturer's standard thickness, but not less than 0.050 inch.
3. Panels: Manufacturer's standard thickness, but not less than 0.030 inch.
4. Doors: Manufacturer's standard thickness, but not less than 0.030 inch.
5. Flat-Panel Urinal Screens: Thickness matching the panels.

G. Pilaster Shoes and Sleeves: Stainless-steel sheet, not less than 0.030-inch nominal thickness and 3 inches high, finished to match hardware.

H. Brackets (Fittings):

1. Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel.

I. Stainless-Steel Finish: Manufacturer's standard textured finish on exposed faces. Protect exposed surfaces from damage by application of strippable, temporary protective covering before shipment.

2.3 ACCESSORIES

A. Hardware and Accessories: **Vandal resistant** operating hardware and accessories.

1. Material: Stainless steel.
2. Hinges: Manufacturer's standard paired, self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees.
3. Latch and Keeper: Manufacturer's standard surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.

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4. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.
 5. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
 6. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.
- B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.
- C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel.

2.4 FABRICATION

- A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories and solid blocking within panel where required for attachment of toilet accessories.
- B. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
- C. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.
- D. Door Size and Swings: Unless otherwise indicated, provide 24-inch-wide, in-swinging doors for standard toilet compartments and 36-inch-wide, out-swinging doors with a minimum 32-inch-wide, clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
1. Maximum Clearances:
 - a. Pilasters and Panels: 1/2 inch.
 - b. Panels and Walls: 1 inch.
- B. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

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3.2 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION 102113

UNION STATION RESTROOM RENOVATIONS

SECTION 102800 - TOILET ACCESSORIES

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. Washroom accessories.
 - 2. Shower room accessories.
 - 3. Hand dryers.
 - 4. Childcare accessories.
- B. Related Requirements:
 - 1. Section 093013 "Ceramic Tiling" for ceramic toilet and bath accessories.
 - 2. Section 102113 "Toilet Compartments" for accessories installed in toilet compartments.

1.3 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - 2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
 - 3. Include electrical characteristics.
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
 - 1. Identify locations using room designations indicated.
 - 2. Identify accessories using designations indicated.

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1.5 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For manufacturer's special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For accessories to include in maintenance manuals.

1.7 WARRANTY

- A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, visible silver spoilage defects.
 - 2. Warranty Period: 15 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty for Hand Dryers: Manufacturer agrees to repair or replace hand dryers that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 7 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED MATERIALS

- A. Owner-Furnished Materials: None.

2.2 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Structural Performance: Design accessories and fasteners to comply with the following requirements:
 - 1. Grab Bars: Installed units are able to resist 250 lbf concentrated load applied in any direction and at any point.

2.3 MANUFACTURERS

- A. Basis-of-Design Products: The design for toilet and bath accessories described in Part 2 are based on products indicated. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
 - 1. Toilet and Bath Accessories:

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- a. A & J Washroom Accessories, Inc.
- b. American Specialties, Inc.
- c. Bobrick Washroom Equipment, Inc.
- d. Bradley Corporation.

2.4 WASHROOM ACCESSORIES

A. Toilet Tissue (Jumbo-Roll) Dispenser:

1. Surface-Mounted Single Jumbo-Roll Toilet Tissue Dispenser
 - a. Model #B-2890 manufactured by Bobrick.
 - b. Location: Single Use Toilets.
2. Surface-Mounted Twin Jumbo-Roll Toilet Tissue Dispenser
 - a. Model #B-2892 manufactured by Bobrick.
 - b. Location: Public Toilets.

B. Waste Receptacle:

1. Recessed Waste Receptacle
 - a. Model #344-10 manufactured by Bradley.
 - b. Mounting: Open top, semi-recessed.
 - c. Minimum Capacity: 12 gallons.
2. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
3. Liner: Reusable vinyl liner.
4. Lockset: Tumbler type for waste receptacle.

C. Automatic Soap Dispenser:

1. Deck-Mounted Soap Dispenser
 - a. Model #6-3300 Verge Deck-Mounted manufactured by Bobrick.
 - b. Activation type: Infrared Sensor Operation.
 - c. Soap Type: Liquid.
 - d. Fill System: Multi Feed.
 - e. Finish Type: Brushed Stainless.
 - f. Power Supply: AC Power Adapter with Adapter splitter.

D. Grab Bar:

1. Mounting: Flanges with concealed fasteners.
2. Material: Stainless steel, 0.05 inch thick.
 - a. Finish: Smooth, No. 4 finish (satin) on ends and slip-resistant texture in grip area.
3. Outside Diameter: 1-1/2 inches.
4. Configuration and Length: As indicated on Drawings.

E. Sanitary-Napkin Disposal Unit:

1. Mounting: Partition mounted or surface mounted.
2. Door or Cover: Self-closing, disposal-opening cover.
3. Receptacle: Removable.
4. Material and Finish: Stainless steel, No. 4 finish (satin).

F. Mirror Unit:

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1. Frameless Mirror
 - a. Model #747 with clip fasteners manufactured by Bradley.
2. Size: As indicated on Drawings.
3. Hangers: Manufacturer's standard rigid, tamper and theft resistant.

G. Hook:

1. Description: Double-prong unit.
2. Material and Finish: Stainless steel, No. 4 finish (satin).
3. Location: Rooms 158, 163 and 172.

2.5 SHOWER ROOM ACCESSORIES

A. Shower Curtain Rod:

1. Included in ADA Shower Stall.

B. Shower Curtain:

1. Size: Minimum 12 inches wider than opening by 72 inches high.
2. Material: Nylon-reinforced vinyl, minimum 9 oz. or 0.008-inch-thick vinyl, with integral antibacterial and flame-retardant agents.
3. Color: As selected from manufacturer's full range.
4. Grommets: Corrosion resistant at minimum 6 inches o.c. through top hem.
5. Shower Curtain Hooks: Chrome-plated or stainless steel, spring wire curtain hooks with snap fasteners, sized to accommodate specified curtain rod. Provide one hook per curtain grommet.

C. Shower Bench:

1. Configuration: Rectangular seat.
2. Bench Tops: Manufacturer's standard one-piece units, with rounded corners and edges
 - a. Laminated clear hardwood with one coat of clear sealer on all surfaces and one coat of clear lacquer on top and sides.
3. Mounting Mechanism: Manufacturer's standard supports, with predrilled fastener holes for attaching bench top and anchoring to floor, complete with fasteners and anchors.
4. Bench Overall Dimensions: 18" long by 18" deep by 18" high at Room 172 and 36" long by 18" deep by 18" high at Room 158.

D. Soap Dish:

1. Description: Surface mounted.
2. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

E. Robe Hook:

1. Description: Double-prong unit.
2. Material and Finish: Stainless steel, No. 4 finish (satin).

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2.6 HAND DRYERS

- A. High Efficiency Heated Air Hand Dryer: XLERATOR; Hand Dryer; EPD Certified, Rapid-drying, energy efficient, rapid drying, automatic sensor, adjustable speed and sound control, adjustable heat control, electric hand dryer; surface mounted or semi-recessed; entire dryer internally grounded. Made in the USA Certified. Warranty 5 year limited.
1. Model XL-SB:
 - a. Cover: Stainless steel.
 - b. Finish: Brushed Number 4 finish.
 2. Options:
 - a. HEPA Filtration System: Filters 99.97 percent of bacteria at 0.3 microns from the air stream.
 - b. Noise Reduction Nozzle: Reduces air deflection noise level by 9 dB and increases the dry time by 2-3 seconds.
 3. Mounting:
 - a. Recessed: ADA compliant recess kit is fabricated of 22 GA 18-8 type 304 stainless steel with #4 satin finish with 16 GA 18-8 type 304 stainless steel dryer mounting plate. All welded construction. 16-3/8 inches (416 mm) wide by 26 inches (660 mm) high by 3-3/8 inches (86 mm) deep.
 4. Controls: Automatic, activated by infrared optical sensor located next to the air outlet. Dryer will operate as long as hands are under the air outlet and has a 35-second lockout feature if hands are not removed. Control includes adjustable sound and speed control mechanism, adjustable heat control with High, Medium, Low and Off settings and a filter sensor which is activated should the filter become clogged. Sensor equipped with externally visible Red LED light that flashes error codes to assist in troubleshooting. Control assembly sealed for protection against moisture, lint, dust and vandalism.
 5. Air Intake: Inlet openings on bottom of cover.
 6. Air Outlet: Delivers focused air stream of 19,000 LFM at nozzle and 16,000 LFM at average hand position of 4 inches (102 mm) below air outlet.
 7. Pre-Filter: Extends the lifespan and improves reliability. Reduces lint, dust and other airborne debris from entering the internal motor chamber. Filter sensor is activated if filter becomes clogged.
 8. Nominal Size: 11-3/4 inches (298 mm) wide by 12-11/16 inches (322 mm) high by 6-11/16 inches (170 mm) deep.
 9. Weight: 16 pounds (7.2 kg) stainless cover.
 10. Power Source:
 - a. 110 - 120 Volts, 11.3 - 12.2 Amps, 50/60 Hz, 1240 - 1450 Watts.
 11. Combination Motor and Blower: Series commutated, through-flow discharge, vacuum type; 5/8 HP, 20,000 RPM. Airflow rate: 19,000 linear feet per minute (97 meters per second) at air outlet, 16,000 linear feet per minute (81 meters per second) at average hand position of 4 inches (102 mm) below air outlet.
 12. Heater: Nichrome wire element, mounted inside blower housing to be vandal resistant. Heater Safeguard: Automatic resetting thermostat to open when airflow is restricted and close when airflow is resumed.
 13. Air Temperature: 135 degrees F (55 degrees C) measured at average hand position of 4 inches (102 mm) below air outlet. Air Heater Output: 970 watts.
 14. All metal parts coated according to Underwriters Laboratories, Inc. requirements.
 15. Mount at the following heights above floor surface:
 - a. Mount dryers at heights indicated on Drawings.
 16. Optional Accessories:
 - a. Brushed Stainless Steel Wall Guards.

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- b. XChanger Combo Kit: Recessed Model #'s 40575 (Includes #40502 & 40550) & 40576 (Includes # 40502 & 40551) retrofit kit is fabricated of 18 GA 18-8 type 304 stainless steel with #4 satin finish. All welded construction. 17-1/4 inches (416 mm) high by 56 inches (660 mm) wide by 1 inch (25 mm) deep.

2.7 CHILDCARE ACCESSORIES

A. Diaper-Changing Station:

1. Model #962 – Recess Mounted manufactured by Bradley.
2. Description: Horizontal unit that opens by folding down from stored position and with child-protection strap.
 - a. Engineered to support minimum of 250-lb static load when opened.
3. Operation: By pneumatic shock-absorbing mechanism.
4. Material and Finish: Bacterial-resistant polyethylene with brushed 20 gauge stainless steel exterior.
5. Liner Dispenser: Provide built-in dispenser for disposable sanitary liners.

2.8 MATERIALS

- A. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.031-inch-minimum nominal thickness unless otherwise indicated.
- B. Fasteners: Screws, bolts, and other devices of same material as accessory unit, unless otherwise recommended by manufacturer or specified in this Section, and tamper and theft resistant where exposed, and of stainless or galvanized steel where concealed.
- C. Mirrors: ASTM C1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.9 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six 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.
 1. Remove temporary labels and protective coatings.

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- B. Grab Bars: Install to comply with specified structural-performance requirements.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION 102800

UNION STATION RESTROOM RENOVATIONS

SECTION 105113 - METAL LOCKERS

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. Knocked-down, metal lockers.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For metal lockers. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For units with factory-applied color finishes.
- D. Maintenance data.
- E. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with the 2010 Americans with Disability Act (ADA) and ICC/ANSI A117.1-2009.
 - 1. Provide hardware that does not require tight grasping, pinching, or twisting of the wrist, and that operates with a force of not more than 5 lbf.
 - a. Quantity: Provide compliant handles for 5% of lockers provided.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver master and control keys and combination control charts to Owner by registered mail or overnight package service.

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1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal lockers that fail in materials or workmanship, excluding finish, within specified warranty period.
 - 1. Warranty Period for Metal Lockers: 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B, suitable for exposed applications.
- B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with A60 zinc-iron, alloy (galvannealed) coating designation.
- C. Fasteners: Zinc- or nickel-plated steel, slotless-type, exposed bolt heads; with self-locking nuts or lock washers for nuts on moving parts.
- D. Anchors: Material, type, and size required for secure anchorage to each substrate.
 - 1. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

2.2 HEAVY-DUTY METAL LOCKERS

- A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Art Metal Products, Div. of Fort Knox Storage Co.; Heavy-Duty Corridor.
 - 2. ASI Storage Solutions Inc.; Traditional
 - 3. DeBourgh Mfg. Co.; Worley SAT Knock Down
 - 4. Lyon Workspace Products; Standard.
 - 5. Montisa Learning.
 - 6. Penco Products, Inc., Subsidiary of Vesper Corporation; Guardian
- B. Locker Arrangement: Single tier and double tier (stacked) as indicated on Drawings.
- C. Locker size:
 - 1. 15" W x 15" D x 72" H.
 - 2. 15" W x 15" D x 60" H.
- D. Material: Cold-rolled steel sheet.
- E. Body: Fabricate from unperforated, cold-rolled steel sheet with thicknesses as follows:
 - 1. Tops, Bottoms, and Sides: 0.024 inch thick.
 - 2. Backs: 0.024 inch thick.

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3. Shelves: 0.024 inch thick, with double bend at front and single bend at sides and back.
- F. Frames: Channel formed; fabricated from 0.060-inch- thick, cold-rolled steel sheet; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames. Form continuous, integral door strike full height on vertical main frames.
1. Cross Frames between Tiers: Channel formed and fabricated from same material as main frames; welded to vertical main frames.
- G. Doors: One-piece; fabricated from 0.060-inch- thick, cold-rolled steel sheet; formed into channel shape with double bend at vertical edges, and with right-angle single bend at horizontal edges.
1. Door Style: Vented panel as follows:
 - a. Louvered Vents: Not less than two louver openings at top and bottom for single-tier and double-tier lockers.
- H. Hinges: Welded to door and attached to door frame with not less than 2 factory-installed rivets per hinge that are completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees.
1. Continuous Hinges: Manufacturer's standard, steel, full height.
- I. Recessed Door Handle and Latch: Stainless-steel cup with integral door pull, recessed so locking device does not protrude beyond face of door; pry resistant.
1. Multipoint Latching: Finger-lift latch control designed for use with built-in combination locks or padlocks; positive automatic and prelocking.
 - a. Latch Hooks: Equip doors with 2 latch hooks; fabricated from minimum 0.1116-inch- thick steel; welded to full-height door strikes; with resilient silencer on each latch hook.
 - b. Latching Mechanism: Manufacturer's standard rattle-free latching mechanism and moving components isolated to prevent metal-to-metal contact and incorporating a prelocking device that allows locker door to be locked while door is open and then closed without unlocking or damaging lock or latching mechanism.
- J. Equipment: Equip each metal locker with identification plate and the following, unless otherwise indicated:
1. Single-Tier Units: One double-prong ceiling hook and two single-prong wall hooks.
- K. Accessories:
1. Continuous Zee Base: Fabricated from, manufacturer's standard thickness, but not less than 0.060-inch nominal-thickness steel sheet.
 - a. Height: 4 inches.
 2. Recess Trim: Fabricated from 0.048-inch nominal-thickness steel sheet.
 3. Filler Panels: Fabricated from 0.048-inch nominal-thickness steel sheet.

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- L. Continuous Sloping Tops: Fabricated from 0.048-inch (1.21-mm) nominal-thickness steel sheet.
 - 1. Closures: Hipped-end type.
 - 2. Sloping-top corner fillers, mitered.
- M. Finish: Baked enamel or powder coat.
 - 1. Color(s): As selected by Architect from manufacturer's full range.

2.3 FABRICATION

- A. Fabricate metal lockers square, rigid, and without warp and with metal faces flat and free of dents or distortion. Make exposed metal edges safe to touch and free of sharp edges and burrs.
 - 1. Form body panels, doors, shelves, and accessories from one-piece steel sheet unless otherwise indicated.
 - 2. Provide fasteners, filler plates, supports, clips, and closures as required for complete installation.
- B. Fabricate each metal locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments. Factory weld frame members of each metal locker together to form a rigid, one-piece assembly.
- C. Knocked-Down Construction: Fabricate metal lockers using nuts, bolts, screws, or rivets for nominal assembly at Project site.
- D. Accessible Lockers: Fabricate as follows:
 - 1. Locate bottom shelf no lower than 15 inches above the floor.
 - 2. Where hooks, coat rods, or additional shelves are provided, locate no higher than 48 inches above the floor.
- E. Hooks: Manufacturer's standard ball-pointed type, aluminum or steel; zinc plated.
- F. Identification Plates: Manufacturer's standard, etched, embossed, or stamped aluminum plates, with numbers and letters at least 3/8 inch high.
- G. Continuous Base: Formed into channel or zee profile for stiffness, and fabricated in lengths as long as practical to enclose base and base ends of metal lockers; finished to match lockers.
- H. Filler Panels: Fabricated in an unequal leg angle shape; finished to match lockers. Provide slip-joint filler angle formed to receive filler panel.

2.4 STEEL SHEET FINISHES

- A. Baked-Enamel Finish: Immediately after cleaning, pretreating, and phosphatizing, apply manufacturer's standard thermosetting baked-enamel finish. Comply with paint manufacturer's written instructions for application, baking, and minimum dry film thickness.

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- B. Powder-Coat Finish: Immediately after cleaning and pretreating, electrostatically apply manufacturer's standard, baked-polymer, thermosetting powder finish. Comply with resin manufacturer's written instructions for application, baking, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install level, plumb, and true; shim as required, using concealed shims.
 - 1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than 36 inches o.c. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion.
 - 2. Anchor single rows of metal lockers to walls near top and bottom of lockers.
- B. Knocked-Down Lockers: Assemble with standard fasteners, with no exposed fasteners on door faces or face frames.
- C. Equipment and Accessories: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.
 - 1. Attach hooks with at least two fasteners.
 - 2. Attach door locks on doors using security-type fasteners.
 - 3. Identification Plates: Identify metal lockers with identification indicated on Drawings.
 - a. Attach plates to each locker door, near top, centered, with at least two aluminum rivets.
 - 4. Attach filler panels with concealed fasteners. Locate filler panels where indicated on Drawings.
 - 5. Attach boxed end panels with concealed fasteners to conceal exposed ends of nonrecessed metal lockers.
 - 6. Attach finished end panels with fasteners only at perimeter to conceal exposed ends of nonrecessed metal lockers.

END OF SECTION 105113

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SECTION 210500 - COMMON WORK RESULTS FOR FIRE SUPPRESSION SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The General Provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this Section.
- B. The General Requirements in Section 200050 shall also govern the work under this Section.

1.2 QUALITY ASSURANCE:

- A. Codes and Standards: All work shall comply with:
 - 1. 2018 Connecticut State Building Code and all Amendments and Supplements.
 - 2. 2018 Connecticut State Fire Safety Code
 - 3. 2013 NFPA 13 Installation of Sprinkler Systems
 - 4. 2013 NFPA 14 Stand Pipes and Hose Systems
 - 5. 2017 NFPA 70 National Electrical Code
 - 6. 2013 NFPA 72 National Fire Alarm and Signaling Code
 - 7. Factory Mutual Protection Association (FM) Publication: Approval guide
 - 8. Underwriters' Laboratories Inc. (UL)
 - 262 - Gage Valves for Fire Protection Service
 - 789 - Indicator Posts for Fire Protection Service
 - 9. American Society for Testing and Materials (ASTM) Publications:
 - A 53 Pipe, steel, welded and seamless
 - A 795 Pipe, steel, black and hot-dipped, zinc-coated, (galvanized) welded and seamless for fire protection use.
 - 10. American Water Works Association (AWWA) Publications:
 - C500 Gate valves, 3 inches through 48 inches for water and other liquids
 - C502 Latest Issue - Fire Hydrants
 - C601 Disinfecting water mains
- B. Precedence: Requirements of the above Codes and Regulations that are more restrictive than requirements of the plans and specifications shall take precedence over plans and specifications. Requirements of the plans and specifications that are more restrictive than requirements of the above Codes and Regulations shall take precedence.
- C. Wherever discrepancies occur between above regulations and agencies and contract drawings and specifications, the requirements of above shall take precedence, except that the contract drawings and specifications shall be minimum requirements and that contractors shall advise engineer of any required changes before proceeding with work.

1.3 QUALIFICATIONS OF INSTALLERS:

- A. Prior to installation, the Contractor shall submit data, for approval by the Owner and the Engineer, showing that this Contractor is licensed for sprinkler installation and has successfully installed automatic fire extinguishing sprinkler system of the same type and design as specified herein, or that he has a firm contractual agreement with a Sub-Contractor having the required experience.

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- B. The data shall include the name and locations of at least two (2) installations where the Contractor or the Sub-Contractor have installed such systems; type and design of each system and certify the satisfactory performance of said system for at least 18 months.

1.4 SCOPE OF WORK:

- A. This Contract includes all labor, material, equipment, tests, and appliances required to furnish and install a complete wet sprinkler system as shown on drawings, implied herein and specified. Contractor shall furnish and install wet sprinkler systems for totally sprinklered building.
- B. Examination of the Structural and other Mechanical trades showing all details of construction, is a requirement before submitting a proposal.
- C. Provide all necessary outside valves and appurtenances, per requirements of Local Fire Department.
- D. The drawings are diagrammatic and indicate the general arrangement of piping, etc., and do not show all major details and fittings. Such items shall be included, as well as reasonable modifications, in the layout as directed to prevent conflict with other trades.
- E. All new piping, fittings, hangers and equipment shall be of approved type, meeting all requirements of the codes.
- F. All materials and work shall fully meet the requirements of Factory Mutual underwriter.
- G. Fire protection documents are performance based, contractor to design system using hydraulic calculations.
- H. Detailed shop drawings and hydraulic calculations, prepared by the Contractor, shall be submitted and approved by the Fire Marshal, Engineer and Insurance Rating Authority.
- I. Submit signed and stamped shop drawings and hydraulic calculations to the Insurance Rating Authority. Include costs of fees, permits, etc., as required to complete the installation.
- J. Work shall include but not be limited to the following:
 - 1. Sprinklers
 - 2. Sprinkler piping
- K. Work not included:
 - 1. Excavation and backfill
 - 2. Concrete work
 - 3. Cutting of holes through concrete and block walls
- L. The Electrical Contractor shall provide required electrical wiring for the flow switches, temper switches, and fire alarm interlocks.

1.5 SUBMITTALS:

- A. Annotate descriptive data to show the specific model, type and size of each item the Contractor proposes to furnish.
- B. All applicable equipment shall be UL listed and FM approved.

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- C. Prepare working drawings on sheets not smaller than 30 inches by 42 inches in accordance with the requirements for "Working Drawing Plans" as specified in NFPA 13, and include all data essential to the proper installation of the entire system.
- D. It is the responsibility of this Contractor to coordinate with all other trades prior to proceeding with his work.
- E. Do not proceed with the work until the design and various components have been reviewed and all comments have been addressed to the satisfaction of all the reviewing authorities.
- F. Recycled Content: Provide data showing recycled materials content of materials and fabricated items provided for this project, stated as a percentage of the materials included in these items or materials provided as part of the Work of this Section.

1.6 TAGS AND CHARTS:

- A. Furnish and install tags, signs, and data as required by NFPA 13.
- B. Contractor shall identify and record all concealed valves, equipment and accessory locations requiring access.

1.7 INSTRUCTIONS:

- A. Prepare written instructions framed for the proper maintenance and operation of any special equipment furnished and installed under this Contract.
- B. Personally instruct the Owner in addition to furnishing all manuals, diagrams, etc., in the proper operation and maintenance of all equipment and piping installed under this Contract.
- C. Prepare a portfolio with all tags, operating manuals, part lists, guarantees, etc., that are packed with all equipment furnished under this contract and submit same to the Engineer.

1.8 TESTS:

- A. Furnish all labor and materials for the performance of all tests as required by the applicable codes, Inspectors having jurisdiction and as may be required by the Engineer or his authorized representative.

1.9 RECORD DRAWINGS:

- A. After completion, but before final acceptance of work, furnish a complete set of drawings of the sprinkler system as installed, for record purposes. Submit under provisions of Section 017700.

PART 2 - PRODUCTS

2.1 DESIGN OF SPRINKLER SYSTEM:

- A. Design for coordination of the wet pipe fire protection sprinkler systems shall be for light hazard occupancy, unless otherwise indicated. Final hydraulic calculations and drawings shall be submitted by Contractor to the Architect for review by the insurer, and engineer.
- B. All interior equipment shall be manufactured by Reliable Fire Protection Equipment or equal in Viking, or Grinnell.

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WATER DEMAND REQUIRMENTS			
Area	Hazard Classification	Density	Total combined inside and outside hose
		Area of sprinkler operation	
All rooms and areas not listed below.	Light	0.10 gpm/sq. ft.	100 gpm
		1500 sq. ft.	
Mechanical and Electrical room, Storage, Elev. and Elev. Machine Room, Janitor Room, and Closets.	Ordinary 1	0.15 gpm/sq. ft.	250 gpm
		1500 sq. ft.	

2.2 PIPING - BELOW GROUND:

- A. Piping shall be listed for fire protection service and comply with AWWA standards listed in NFPA 13. Underground main shall be outside-coated, cement-lined, ductile iron pipe and fittings, Class 54.

Pipe shall have mechanical joints and retaining glands at all fittings and joints.

2.3 PIPING - ABOVE GROUND:

- A. All pipe fittings, pipe joints, hangers, and piping appurtenances shall be of approved type as set forth in NFPA 13. Piping system shall withstand a minimum working pressure of 175 psi cold water. Water alarm drain piping shall be zinc-coated inside and out steel pipe and fittings.
- B. Pipe shall be standard weight black or galvanized steel for ASTM A 795, or seamless steel tube per ASTM A 53, with minimum wall thickness as listed in NFPA 13. Pipe up to and including 2” shall be Schedule 40, pipe over 2” shall be schedule 40 or schedule 10.
- C. Fittings shall be exact size required; use of bushings shall not be permitted. Fittings shall be of approved type.
- D. Joints and couplings for pipe up to 2” shall be threaded, pipe over 2” shall be threaded, welded, or roll grooved.
- E. Pipe hanger installation shall be in accordance with NFPA 13.

2.4 SPRINKLERS:

- A. Acceptable sprinkler manufacturers are Reliable, Viking, or Grinnell. Sprinklers in finished areas shall be painted white.
- B. Provide quick response concealed sprinklers painted white in all light hazard areas with finished ceiling, equal to Reliable Model G4A.
- C. In light hazard areas without ceilings, provide pendent, upright or side wall sprinklers, equal to Reliable Model F1FR.
- D. Provide concealed sprinklers painted white in all ordinary hazard areas with finished ceiling, equal to Reliable Model G4FR.

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- E. In ordinary hazard areas without ceilings, provide pendent, upright or side wall sprinklers, equal to Reliable Model G.
- F. Provide sprinkler guards on all exposed sprinklers.
- G. All sprinklers shall be U.L. listed, and approved by Factory Mutual Research Corp.
- H. Provide intermediate temperature sprinklers near heat producing equipment, mechanical rooms, as indicated on drawings and as required by NFPA 13.
- I. Sprinklers shall have nominal 1/2" orifice.
- J. Provide spare sprinklers of each type and sprinkler wrenches, quantities as required by NFPA 13.
- K. Final sprinkler, escutcheon and cover plate color shall be selected by architect.

2.5 SPARE SPRINKLER CABINETS:

- A. Provide spare sprinkler boxes, quantity to house all spare sprinklers and sprinkler wrenches, equal to Potter-Roemer Fig. 6162. Cabinets shall be installed in accessible location adjacent to the sprinkler riser as indicated on drawings.

2.5 SEISMIC RESTRAINTS:

- A. Refer to Section 210548 for seismic requirements.
- B. Refer to NFPA. 13.

PART 3 - EXECUTION

3.1 PIPING:

- A. All work shall be performed to the highest standards by qualified competent workmen. All piping shall be supported in such a way as to provide proper drainage. Joints shall be straight and true and tight, and no pipe shall be installed under a strain.
- B. In general, all piping shall be run concealed above ceiling with concealed sprinklers, except as noted.
- C. All branches shall pitch back to mains which, in turn, shall pitch to service entrance. Any trapped piping shall be drained as required by NFPA 13.
- D. All installation methods shall be as specifically approved and listed by NFPA 13.
- E. Hangers and structural attachments shall be substantially supported from the building structure, as per NFPA 13.
- F. Entire piping system shall be flushed as per NFPA 13 requirements.
- G. All pipe and fittings not normally holding water shall be galvanized both inside and outside.

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3.2 SPRINKLERS:

- A. Provide return bends for sprinklers in finished ceilings and align bi-directionally in center of tiles.
- B. Final color selection for sprinklers and associated trim by architect.

3.3 PAINTING – FIELD:

- A. Painting shall conform to Division 9.

3.4 ELECTRICAL WORK:

- A. Electrical work is specified under Division 26 and 28.
- B. Sprinkler Contractor is responsible for providing all plans, contracts, etc. and dates for the Electrical Contractor to be able to wire up the said equipment.

3.5 COOPERATION WITH OTHER TRADES:

- A. Complete drawings and specifications of all trades will be available for inspection in the construction office at the job site. Carefully check drawings and specifications before installing any of this work. After checking the above mentioned drawings and specifications, organize and lay out the work to obtain the desired results. The Contractor shall in all cases consider the work of all trades and shall cooperate with others so that the best arrangement of all equipment, piping, conduit and ducts that can be obtained. Where Contractor used pre-cut and threaded pipe, any field cutting and threading shall be his own responsibility and will not constitute cause for extra compensation. Work which interferes with the work of other trades shall be removed and reinstalled when so directed by the Engineer. It shall be understood that no extras to the Contract will be permitted to accomplish the above results.

3.6 GUARANTEE:

- A. As a condition precedent to the issuing of the final certificate of completion payment, the Contractor shall deliver to the Engineer a written guarantee that all materials, apparatus, and equipment furnished and installed hereunder shall be new and free from all defects and shall be "approved" types listed by Underwriters' and to the satisfaction of authorities having jurisdiction. Should any trouble develop within eighteen months from date of acceptance of the building, due to faulty or inferior material and/or workmanship, the trouble shall be corrected by the Contractor without expense to the Owner.

3.7 SYSTEM DESIGN CRITERIA:

- A. System design as per Water Demand Requirements Table and all applicable codes and standards.
- B. Contractor shall submit certified Hydraulic calculations with revised pipe sizes. Contractor shall obtain current flow test and perform same. Flow test shall indicate static and residual pressure at indicated flow and be performed in accordance with NFPA recommendations.

3.8 FLUSHING:

- A. To facilitate flushing of the sprinkler systems, the ends of all cross mains shall be provided with a threaded flushing connection no more than 2" in diameter.

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- B. Perform flushing of entire system for a sufficient time to ensure thorough cleaning. Minimum flow velocities as per current active NFPA 13.
- C. Provisions shall be made for proper disposal of water used for flushing or testing.

3.9 DISINFECTION:

- A. Disinfect new water piping upstream of backflow preventer in accordance with AWWA C601.
 - 1. The pipe system shall be flushed with clean, potable water until dirty water does not appear at the points of outlet.
 - 2. The system or part thereof shall be filled with a water/chlorine solution containing at least 50 parts per million (50mg/L) of chlorine, and the system or part thereof shall be valved off and allowed to stand for 24 hours; or the system or part thereof shall be filled with water/chlorine solution containing at least 200 parts per million (200mg/L) of chlorine and allowed to stand for 3 hours.
 - 3. Following the required standing time, the system shall be flushed with clean potable water until the chlorine is purged from the system.
 - 4. The procedure shall be repeated where shown by a bacteriological examination that contamination remains present in the system.

3.10 INSPECTIONS AND TESTS:

- A. System shall be hydrostatically tested at not less than 200 psig for a period of 2 hours. The test pressure shall be read from a gauge located at the low elevation point of the individual system being tested. The piping shall be installed in such a manner that there will be no visible leakage when the system is subject to the hydrostatic pressure test.
- B. All sprinklers, valves, fittings and other appurtenances shall be installed prior to conducting the final hydrostatic test, which shall be witnessed by the Owner Representative and the Engineer.
- C. A contractor's Material and Test Certificate for Aboveground Piping shall be completed and submitted, by the Contractor, to the Owner Representative and the Engineer.

END OF SECTION 210500

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SECTION 220500 -COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The General Provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this Section.

1.2 EXAMINATION OF SITE AND DRAWINGS:

- A. Before submitting his bid, Contractor shall visit site with plans and specifications in hand, shall consult with the Engineer and shall become thoroughly familiar with all conditions under which his work will be done since he will be held responsible for any assumptions he may make in regard thereto.
- B. The Contractor shall verify and obtain all necessary dimensions at the building.
- C. Certain present building clearances are available for handling equipment. All equipment shall be delivered knocked down as necessary to clear restrictions.

1.3 INTENT:

- A. Finished Work: The intent of the specifications and drawings is to call for finished work, completed, tested and ready for operation.
- B. Good Practice: It is not intended that the drawings show every pipe, fitting or minor detail and it is understood that while the drawings must be followed as closely as circumstances will permit, the systems shall be installed according to the intent and meaning of the Contract Documents and in accordance with good practice.
- C. Work under this Section shall include giving written notice to the Owner within 15 days after the Award of the Contract of any materials of apparatus believed inadequate or unsuitable or in violation of any laws or codes, or items of work omitted. In the absence of such written notice, it is mutually agreed that work under each Section has included the cost of all required items and labor for the satisfactory functioning of the entire system without extra compensation.
- D. Any apparatus, appliance, material or work not shown on drawings but mentioned in specifications or vice versa, or any incidental accessories necessary to make the work complete and perfect in all respects and ready for operation, even if not particularly specified, shall be furnished and installed by Contractor at no additional cost to Owner.
- E. Prior to receipt of bids, Contractors shall give written notice to Engineer of any materials or apparatus believed inadequate, unsuitable or in violation of laws, ordinances, rules or regulations of authorities having jurisdiction and any necessary items or work omitted. In the absence of such written notice, it is mutually agreed that Contractor has included the cost of all required items in his proposal and that he will be responsible for approved satisfactory functioning of systems without further compensation.

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- F. In all cases where apparatus is herein referred to in singular number, it is intended that such reference include as many such items as are required to complete work.
- G. If not otherwise specified or shown on plans, apparatus and materials shall be installed in accordance with manufacturer's published recommendations and instructions and to the complete satisfaction of the Architect.
- H. It is the intent of these specifications for Plumbing Contractor and/or their subcontractors or equipment suppliers to furnish all equipment complete with all accessories.

1.4 SCOPE OF WORK:

Sanitary, waste and vent systems
Domestic water systems
Plumbing fixtures and equipment

- A. This contract includes all labor, material, equipment, tests and appliances required to furnish and install all plumbing as shown on drawings, implied and herein specified.
- B. The location of the building will be as shown on drawings. A visit to the site and examination of the Architectural, Structural and other Mechanical trades showing all details of construction is a requirement before submitting a proposal.
- C. The drawings are diagrammatic and indicate the general arrangement of piping and equipment, and do not show all minor details and fittings. Such items shall be included, as well as reasonable modifications, in the layout as directed to prevent conflict with other trades.
- D. Connect all fixtures, floor drains, and equipment shown on Architectural drawings, as well as on Plumbing drawings. Check all Architectural, Structural and Mechanical drawings and coordinate all the work accordingly.
- E. Provide seismic restraints in accordance with Section 22 05 48.
- F. This Contractor shall include in his bid all costs associated with changing all of the room names and numbers at the end of the job from the names and numbers shown on the construction documents to a new set of room names and numbers, inclusive of all re-programming of all MEP and Fire protection systems, etc. Final room numbers will be provided by the Architect to the trade contractors at or around the date of Substantial Completion.

1.5 QUALITY ASSURANCE:

- A. Codes and Standards:
 - 1. 2018 Connecticut State Building Code with all the Amendments.
 - 2. 2015 International Building Code
 - 3. 2015 Life Safety Code- NFPA 101
 - 4. 2015 International Plumbing Code
 - 5. 2015 International Mechanical Code
 - 6. 2015 National Fuel Gas Code- NFPA 54.
 - 7. 2015 International Energy Conservation Code
 - 8. State of Connecticut Public Health Code
 - 9. 2009 Accessible and Usable Buildings and Facilities - ICC/ANSI A117.1
 - 10. Americans with Disabilities Act – ADA

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- B. Precedence: Requirements of the above Codes and Regulations that are more restrictive than requirements of the plans and specifications shall take precedence over plans and specifications. Requirements of the plans and specifications that are more restrictive than requirements of the above Codes and Regulations shall take precedence.”
- C. Equipment construction standards shall be as follows: Pressure vessels shall be constructed in accordance with the ASME Code, all electrical equipment shall be UL listed and approved and conform to the N.E.C., gas equipment shall be approved by A.G.A. and conform to N.F.P.A. Codes, piping materials, fittings, valves and accessories shall be constructed in accordance with A.S.T.M. and A.N.S.I. standards for class of work involved. All equipment and materials shall be new and of domestic manufacture. All the above codes shall be referenced and dated in the Connecticut Basic Building Code.
- D. Wherever discrepancies occur between above regulations and agencies and contract drawings and specifications, the requirements of above shall take precedence, except that the contract drawings and specifications shall be minimum requirements and that contractors shall advise engineer of any required changes before proceeding with work.

1.6 PERMITS, FEES:

- A. Include all necessary notices, obtain all permits and pay all governmental taxes, fees, and other costs. File all necessary plans, prepare all documents and obtain all necessary approvals of all governmental departments having jurisdiction. Obtain all required Certificates of the Owner before request for acceptance and final payment for the work.

1.7 DEFINITIONS:

- A. Words "finish" or "finished" refer to all rooms and areas listed in Finish Schedule on Architect's Drawings. All rooms and areas not covered in Schedule, including underground tunnels and areas above ceilings, shall be considered not finished except as otherwise noted.
- B. The word "provide" means to "furnish and install" referenced item.

1.8 PROTECTION:

- A. Work under each section shall include protecting the work and materials of all other sections from damage by work or workmen, and shall include making good any and all damage thus caused.
- B. This section shall be responsible for work and equipment until finally inspected, tested and accepted. Protect work against theft, weather, injury or damage and carefully store material and equipment received on site which is not immediately installed. Close open ends of work with temporary covers or plugs during construction to prevent entry of obstructing materials.
- C. If so specified under this section, work may include receiving, unloading, uncrating, storing, protecting, setting in place and connecting up completely of any equipment having plumbing service connections which may be furnished by Owner or furnished under another section.

Work under this section shall include exercising special care in handling and protecting equipment and fixtures. Any of the above equipment and fixtures which are missing or damaged by reason of mishandling or failure to protect shall be replaced at no additional cost to the Owner.

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1.9 DRAWINGS:

- A. The plumbing, mechanical, electrical, structural, and architectural drawings are intended to supplement each other and are to be considered as a unit which, taken together in conjunction with the specifications, completely describes the work to be done. All drawings shall be checked to verify spaces in which work will be installed. Where headroom or space conditions appear inadequate, notification shall be given to Engineer before proceeding with installation.
- B. The Engineer may without charge, make modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work.
- C. Note that the drawings are diagrammatic and indicate the general arrangement of the Plumbing equipment and systems, without showing every detail and fitting.
- D. Where conflicts occur between drawings and specifications or within either, the item or arrangement of better quality, greater quality or highest cost shall be included in Contract price. Engineer shall determine the manner or item with which work shall be installed.
- E. Keep one complete set of all drawings, specifications, shop drawings and addenda on the premises at all times in good condition and available to the Engineer and the Owner.
- F. This Contractor shall coordinate his work with the work of other contractors and shall develop coordination drawings. All waste and vent piping, water piping and rain leaders will be superimposed by the Plumbing Contractor. A coordination meeting of all parties involved shall be held and all possible conflicts shall be resolved. No work shall commence without approval from the Architect and the Mechanical and the Structural Engineer.

1.10 REVIEWS:

- A. The materials, workmanship, design and arrangement of all work installed under the Plumbing sections shall be subject to the review of the Engineer.
- B. Where any specific material process of method of construction or manufactured article is specified by name or by reference to the catalog number of a manufacturer, the specifications are to be used as a guide and not intended to take precedence over the basic duty and performance specified or noted on drawings. In all cases, the specific characteristics of the equipment offered for approval, shall be indicated on the shop drawings.
- C. All component parts of each item of equipment or device shall bear the manufacturer's nameplate, giving name of manufacturer, description, size, type, serial or model number, electrical characteristics, etc. in order to facilitate maintenance or replacement. The nameplate of a subcontractor or distributor will not be acceptable.
- D. If material or equipment is installed before it is reviewed, it shall be removed and replaced at no extra charge to the Owner if, in the opinion of the Engineer, the material or equipment does not meet the intent of the drawings and specifications.

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1.11 SUBMITTALS:

- A. Submit under provisions of Section 01 33 00.
- B. Contractor shall submit for review shop drawings of all new equipment, materials, piping, and reports in electronic format. Engineer's review of shop drawings must be completed before any equipment is purchased or any work is installed.
- C. Shop drawings shall consist of manufacturer's certified scale drawings, cuts or catalog, including descriptive literature and complete certified characteristics of equipment, showing dimensions, capacity, code requirements, motor and drive testing as indicated on the drawings or specifications.
- D. Samples, drawings, specifications, catalogs, etc. submitted for review shall be properly labeled indicating specific service for which material or equipment is to be used, division and article number of specifications governing Contractor's name and name of job.
- E. Catalog, pamphlets or other documents submitted to describe items on which review is being requested, shall be specific and identification in catalog, pamphlet, etc. of item submitted shall be clearly made in ink. Data of a general nature will not be accepted.
- F. Review stamp rendered on shop drawings shall not be considered as a guarantee of measurements of building conditions. Where drawings are reviewed, said review does not mean that drawings have been checked in detail. Said review does not in any way relieve the Contractor from his responsibility or necessity of furnishing material or performing work as required by the Contract Drawings and Specifications.
- G. Failure by the Contractor to submit shop drawings in ample time for checking shall not entitle him to an extension of Contract and no claim for extension by reason of such default will be allowed.
- H. Prior to submission of shop drawings, the Contractor shall thoroughly check each shop drawing, reject those not conforming to the specifications and indicate by his signature that the shop drawings submitted in his opinion meet Contract requirements.
- I. Shop Drawings: submit shop drawings, test data and product data for the following:
 - Plumbing fixtures and trim
 - Cleanouts
 - Valves
 - Floor drains
 - Pipe, fittings and couplings
 - Hose Bibbs
 - Water hammer arrestors
 - Hangers and supports
- J. Before ordering fixtures, Contractor shall submit brochures of all fixtures and trim to the Architect for review.

1.12 PAINTING:

- A. Painting is specified elsewhere in the Specifications, under Division 09.
- B. Refer to Division 09, for color coded painting of all piping in Mechanical Rooms.

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1.13 CONCRETE WORK:

- A. Concrete work is specified elsewhere in the specifications under Division 03.

1.14 EXCAVATION AND BACKFILLING:

- A. Excavating and backfilling for all plumbing work inside and outside of building shall be done in accordance with Division 31 unless otherwise specified.

1.15 CUTTING AND PATCHING:

- A. Cutting and patching shall be done in accordance with Division 01, section 01 73 29 unless otherwise specified.
- B. The General Contractor will leave all openings and built-in sleeves, etc. as required, provided he receive same with the proper information and cooperation from the Plumbing Contractor in due time as the construction progresses.
All cutting of openings in walls, floors, partitions, etc. not thus provided for must, however, be done by the Plumbing Contractor as required to install the work including all cutting of existing construction work, and this Contractor shall restore to its original condition any work disturbed.

1.16 WATER FOR CONSTRUCTION PURPOSES:

- A. Contractor is referred to Section 01 50 00, Temporary Facilities and Controls, for full description of temporary services.

1.17 PLUMBING SYSTEM DESCRIPTION:

- A. Furnish and install all plumbing fixtures shown in the drawings and herein specified. All fixtures shall be complete and perfect and properly connected to the soil, waste, vent and water supply as required and left in complete operation satisfactory to the Architect.
- B. All fixture trim shall be furnished in polished brass chrome plated, including supplies, valves, traps, wall flanges and exposed piping.
- C. Contractor shall furnish all hangers, chair carriers, bolts and other devices for all fixtures as required to make new fixtures ready for operation in a safe, strong and convenient manner. Fixtures shall be set plumb and true.
- D. Contractor shall include all permit fees and connection charges.

PART 2 – PRODUCTS

2.1 MATERIALS AND WORKMANSHIP:

- A. All materials and apparatus used shall be new, of first class quality and shall be furnished, delivered, erected, connected and finished in every detail. No materials or apparatus used shall be discontinued or about to be discontinued items.
- B. The Engineer shall have the right to reject any part of the work in case material or workmanship is not of satisfactory quality.

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- C. Any unacceptable work and material shall be replaced with acceptable work and material at no additional expense to the Owner.
- D. In case there is any doubt of the acceptability of any material, submit samples to the Engineer for approval and only definite approval in writing from the Engineer shall be evidence of such approval. Such approval shall also be subject to the satisfactory installation of the material.
- E. The work in each of these sections shall be constantly under the direction of a competent and thoroughly experienced superintendent who shall be on the premises during such period as the work is in progress. The superintendent shall familiarize himself with the work of all other trades involved insofar as they relate to or in any way affect the work of these sections, and shall coordinate the work.
- F. Unless otherwise noted, all equipment and materials shall be installed and/or applied in accordance with the recommendations of the manufacturer of said equipment, including the performance of any tests recommended by the manufacturer.

2.2 EQUIPMENT VARIATIONS:

- A. In these specifications and on the accompanying drawings, one or more makes of materials, apparatus or appliances have been specified for use in this installation. This has been done for convenience in fixing the standard of workmanship performance of any materials, apparatus or appliance which shall be substituted for those mentioned herein shall also conform to these standards.
- B. Where no specified make or material, apparatus or appliance is mentioned, any first class product made by a reputable manufacturer may be used, providing it conforms to the requirements of these specifications and meets the approval of the Engineer.
- C. Refer to Section 01 25 00 "Substitution Requirements" and "General Conditions of the Contract for Construction for Construction Manager At Risk Article 15 Paragraphs 15.3.1 and 15.3.2 for substitution requirements. *Requests for substitutions must be made in writing in prior to bid day. No requests for substitutions will be considered afterwards.*

2.3 PIPE AND FITTINGS:

- A. Listed below are references to the specification standards or recognized authorities to which pipe and fitting materials must conform.
- B. All reference shall be the current edition as recognized by the active codes. Each pipe length shall have the manufacturer's name cast, stamped or rolled on. Each fitting shall have the manufacturer's symbol and pressure rating cast, stamped or rolled on.
- C. Underground and above ground storm, sanitary, waste drain and vent pipes (non plenum areas only) shall be PVC.
 - a. Solid-Wall PVC Pipe: ASTM D 2665, drain, waste, and vent.
 - b. Cellular-Core PVC Pipe: ASTM F 891, Schedule 40.
 - c. PVC Socket Fittings: ASTM D 2665, made to ASTM D 3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.
 - d. Adhesive Primer: ASTM F 656.
 - i. Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

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- ii. Adhesive primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
 - e. Solvent Cement: ASTM D 2564.
 - i. PVC solvent cement shall have a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - ii. Solvent cement shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- D. Above-ground No-Hub Cast Iron Soil Pipe and Fittings (plenum areas only): To conform to CISPI Standard 301. Joints shall be made with neoprene sleeve, stainless steel shield and clamp assembly equal to Tyler wide body 4 clamp arrangement. Other acceptable manufacturers are Mission or MIFAB. Torque clamp screws to the recommended torque by code.
- E. Above-ground copper drainage tube type DWV shall conform to ASTM B 306 and fittings to ASME B16.29.
- F. Underground Copper Water Pipe and fittings shall conform to ASTM B 88 Standard Specification for Seamless Copper Water Tube, Type K or Ductile Iron complying with Standard AWWA C151/A21.51; AWWA C115/A21.15.
- G. Above-ground Copper Tubing: To be Type "K" or "L" seamless conforming to ASTM B 88. Cast bronze fittings to conform to ASME B16.18 and wrought copper fittings to conform to ASME B16.22.
- H. Solder: To be 95% tin, 5% antimony (lead free) conforming to ASTM B 32, grade 5A.
- I. CPVC PIPING (non-plenum areas only; in walls or pipe chases)): CPVC Pipe: ASTM F 441/F 441M, (Schedule 40)
CPVC Socket Fittings: (ASTM F 438 for Schedule 40) CPVC Piping System: ASTM D 2846/D 2846M, SDR 11, pipe and socket fittings. CPVC Tubing System: ASTM D 2846/D 2846M, SDR 11, tube and socket fittings.
Solvent Cements for Joining CPVC Piping and Tubing: ASTM F 493.
CPVC solvent cement shall have a VOC content of 490 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
Solvent cement and adhesive primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- J. PEX TUBE AND FITTINGS (non-plenum areas only, in walls or pipe chases) : PEX Distribution System: ASTM F 877, SDR 9 tubing. Fittings for PEX Tube: ASTM F 1807, metal-insert type with copper or stainless-steel crimp rings and matching PEX tube dimensions. Manifold: Multiple-outlet, plastic or corrosion-resistant-metal assembly complying with ASTM F 877; with plastic or corrosion-resistant-metal valve for each outlet.

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2.4 HANGERS:

- A. Securely hang and anchor pipe as shown and required with proper provision for expansion, contraction and elimination of undue stress and strain on piping.
- B. Provide a pipe hanger within two (2) feet of each elbow, tee, wye, valve, strainer and similar device.
- C. Secure and support runs at base and at sufficiently close intervals to hold pipe at alignment and to carry safely the weight of piping and contents without undue stress thereon.
- D. Except as indicated to the contrary, secure and support all horizontal piping as follows and required to prevent sagging, undue pipe movement and preserve proper alignment in each run.

Piping	Size	Maximum Interval
Cast Iron	All sizes	At each hub or joint
Copper Tubing	1 ¼" and smaller	Five (5) feet
Copper Tubing	1 ½" and larger	Eight (8) feet
CPVC Pipe	1" and smaller	Three (3) feet
CPVC Pipe	1 ¼" and larger	Four (4) Feet
PEX Pipe	All sizes	32"

- E. Hangers up to and including 2" shall be the adjustable band type equal to Empire. Figure 310 for iron pipe and Fig. 310CT for copper tubing. Other acceptable manufacturers are Tolco or Erico.
- F. Hangers for piping 2-1/2" and up shall be the clevis type, equal to Empire. Figure 11 for iron pipe and Figure 110CT for copper tubing. Other acceptable manufacturers are Tolco or Erico.
- G. Hangers shall be suspended from one of the following devices:
 - 1. "C" clamps.
 - 2. Trapeze hanger assemblies consisting of back-to-back horizontal steel channels with end-type rod hangers.
 - 3. Expansion shield embedded into concrete or masonry.
 - 4. Anchor hangers to steel structural members, concrete or masonry. Do not anchor to metal floor deck, steel deck tabs or metal roof deck.
- H. Provide seismic restraints in accordance with Section 22 05 48.

2.5 SLEEVES:

- A. All outside piping passing through exterior walls, foundation walls and floors shall be furnished with flanged C.I. wall sleeves by Zurn, J.R. Smith, MIFAB or Josam. Furnish with flashing clamp where sleeve passes through waterproof membrane or damproofing.
- B. All pipes and conduits passing through floors, walls or partitions shall be provided with sleeves sized to give a minimum of 1/2" clearance between sleeve and the outside diameter of the pipe, conduit or insulation, enclosing the pipe or conduit. Penetrations through fire rated partitions shall be as specified in Section 07 84 13.
- C. Sleeves through concrete floors or interior masonry walls shall be Schedule 40 steel pipe, set flush with finished wall or ceiling surfaces, but extending 2 inches above finished floors or shall be in

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accordance with details on drawings. In all mechanical equipment rooms or penthouses, sleeves shall extend 6 inches above finished floor. Penetrations through fire rated partitions shall be as specified in Section 07 84 13.

- D. Inserts shall be individual or strip type of steel or malleable iron construction for removable nuts and threaded rods up to 3/4" diameter, permitting lateral adjustment.
- E. Provide escutcheons on all pipes wherever they pass through floors, ceilings, walls, or partitions in finished areas. Escutcheons for pipes passing through floors shall be RITTER PATTERN AND CASTING COMPANY, No. 36A or approved equal in BrassCraft or Watts, split-hinged, cast brass type designated to fit pipe on one end and cover alcove projecting through floor on the other end.
Escutcheons for pipes shall be RITTER PATTERN AND CASTING COMPANY, No. 3A or approved equal in BrassCraft or Watts - split-hinged, cast brass, chromium plated type.

2.6 CLEANOUTS:

- A. Cleanouts installed in underground lines shall be extended up to point below finished floor and Contractor shall furnish and install brass frame and flush brass cover located so as to finish flush with finished floor or finished floor covering, whichever applies.
- B. Cleanout frames and covers : Jay R Smith Series 4023 for floors and 4422 for walls. Type used to suit finish surface. All exposed tops, flanges and frames shall be of polished brass or stainless steel. Tops in all the mechanical rooms shall be special duty type. Cleanouts of equal quality and design in Zurn, Josam, MIFAB or Wade will be acceptable. In areas where floor covering is provided, furnish cover frame recessed to accept floor covering material such that frame of cover is flush with surrounding finish material.
- C. The Contractor shall furnish and install all cleanouts on all sanitary and roof drainage lines at all changes in direction and on straight lines not more than 100'-0" centers, and in any other special locations as may be required by the engineer. Each cleanout shall have a plug and ferrule. Provide access door/cover for all cleanouts installed in concealed sanitary/waste and storm stacks.

2.7 TRAPS:

- A. Traps shall be of the same material, finish and size as the pipes on which they occur. All traps shall be provided with suitable openings for cleaning and every trap shall be vented unless otherwise noted, to the full approval of the Plumbing Inspector. The traps used shall in every case meet with approval of the Plumbing Inspector. All traps shall be provided with brass cleanout plug at bottom unless allowed to be omitted in special cases by the Plumbing Inspector.

2.8 FLOOR DRAINS:

- A. Refer to the floor drain schedule on Drawing. Floor drains shall be furnished in J.R. Smith, Josam, Watts, Zurn, MIFAB or Wade.
- B. All floor drains on slab or grade floors shall be furnished with flashing clamp. All floor drains shall be provided with deep seal trap, for min. 4" water seal.

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2.9 HOSE BIBBS:

- A. Furnish and install at locations shown on drawings: Woodford B26 3/4" hose bibbs with polished bronze casing and finish, wheel handle shut off and vacuum breaker. Install according to manufacturer's instructions. Install faucets 24 inches above floor (or as specified on drawings; coordinate with Architectural). Other acceptable equals are in T&S Brass, JR Smith or Josam. Coordinate with interior elevations shown by architectural.

2.10 ACCESS DOORS AND PANELS:

- A. Access doors shall be of sufficient size to permit easy replacement of complete units and all groupings of valves and equipment shall have necessary clearance for this same purpose. Doors shall bear the same or greater fire rating as the wall or ceiling in which they occur. Size of doors to be determined after valves are installed and shall be of adequate size to operate same.
- B. Furnish and install one flush type access panel or access door for each and every shutoff valve or group of valves located above ceiling or in furred spaces; also for each cleanout located in furred space above ceiling, concealed walls or chases and below floor. Panels shall have metal frames, hinges, and latch. Refer to Section 08 31 16 for additional requirements.
- C. All panels occurring in ceilings which are of special finish shall be furnished with 7/8" or 1" depth panel filled in with material to match ceiling. Where panels occur in walls or ceilings which are of plaster, furnish flush panels with metal frame complete.
- B. No access panels will be required where "lay-in" ceilings occur, provided suitable plastic markers identifying exact location of valves, cleanouts, etc., on lay-in ceilings are applied directly below valve grouping and identified by a number, this number to be used as a marking on valve chart.

2.11 WATER-HAMMER ARRESTOR:

- A. Contractor shall furnish and install water hammer arrestors at ends of headers of all batteries of fixtures and at all individual fixtures on all hot and cold water lines.

The water hammer arrestors shall extend full size of headers.

- B. Water hammer arrestors shall be constructed of same type of pipe as used on the system on which it is installed and shall be located so as to be most effective to prevent water hammer or vibration in piping. PPP Water Hammer Arrestors, Wolverine "Tap-Traps" or Nibco Air Chambers may be used.

2.12 INSULATION:

- A. Refer to Section 22 07 00.

2.13 VALVES:

- A. This Contractor shall furnish and install valves where shown on plans and also wherever necessary to make the system complete in its operation. All valves shall be as manufactured by Stockham, Jamesbury, Appollo, Centerline or Milwaukee as specified.

Hot water and cold water (domestic)

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2" and smaller

Ball valves Apollo - 71-100/200

Check valves Stockham B-310-T

2.14 BACKFLOW PREVENTER:

- A. 4" Reduced pressure Zone Assembly: Watts Model 957RPDA with non-rising stem gate valves, UL classified and FM approved. Provide with air gap fitting.
- B. ¾", 1", & 2" Reduced pressure Zone Assemblies: Watts Model 909 with ball valves. Provide with air gap fitting.
- C. Other acceptable manufacturers are Ames or Fabco.

2.15 PLUMBING FIXTURES:

- A. Furnish all hangers, carriers, bolts and other devices for all fixtures as required to make new fixtures ready for operation in a safe, strong and convenient manner. Fixtures shall be set plumb and true.
- B. Provide all hangers, supports, brackets and carriers for proper installation of the lavatories, sinks, and water closets requiring support. Such supports shall be in accordance with the recommendations of the manufacturers of the fixtures, and if built into partitions or walls, shall be set as the wall progresses. All carrier supports shall be bolted to the floor. Carriers shall be by Jay R. Smith. Other acceptable manufacturers are Josam, Zurn or Mifab.
- C. All fittings, escutcheons, faucets, traps, and exposed piping shall be brass, chrome plated over nickel plate with polished finish. Any hanger visible shall likewise be chrome plated over nickel plate.
- D. Provide lavatories with chrome plated stops supply pipes, traps and tail pieces.
- E. Refer to drawings for plumbing fixture specifications.
- F. Vitreous china plumbing fixtures shall be manufactured by Kohler. Subject to compliance with the requirements of the specified product, provide the named fixtures or equal fixtures by American Standard or Toto. Flush valves shall be manufactured by Sloan. Subject to compliance with the requirements of the specified product, provide the named fixtures or equal fixtures by Toto or Zurn. Faucets shall be manufactured by Kohler. Subject to compliance with the requirements of the specified product, provide the named fixtures or equal fixtures by Toto or American Standard.
- G. Stainless steel sinks and faucets shall be manufactured by Elkay. Subject to compliance with the requirements of the specified product, provide the named fixtures or equal fixtures by Just or Advanced Tabco. Subject to compliance with the requirements of the specified product, provide the named fixtures or equal fixtures by Delta or Chicago.
- H. Electric Water Coolers shall be manufactured by Elkay. Subject to compliance with the requirements of the specified product, provide the named fixtures or equal fixtures by Halsey Taylor or Oasis.

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PART 3 - EXECUTION

3.1 CONNECTING TO EXISTING UTILITIES:

- A. Connections to existing utilities that will interrupt the service to the present campus buildings or surrounding neighborhood shall be made at a time agreed upon by the Owner and Contractor.
- B. If it is necessary to make connections to existing utilities outside the regular working hours, this shall be noted on the written work order and the respective Contractor will be paid for the additional cost of labor over and above what it would cost at regular day time rates.

3.2 FREIGHT, CARTING AND RIGGING:

- A. Contractor shall pay all freight and carting charges necessary to deliver all equipment furnished under his Contract to the site and furnish all necessary rigging to properly rig and set the apparatus on the pads, foundations, frames, etc.
- B. All cranes, lifts, scaffolding, blocks and tackle, ropes and chains and other equipment necessary to rig and set the apparatus shall be furnished by the Contractor.
- C. The Contractor shall set, level and align all equipment before starting operations.

3.3 INSTALLATION:

- A. This Contractor shall check all architectural, plumbing, fire protection, HVAC and electrical drawings as well as the structural drawings to make sure that his piping will not conflict with such work.
- B. All piping work shall be installed with provisions to allow for expansion and contraction of lines so as to prevent any undue strains on pipe and fittings, any trapping of lines or lifting or dislocating of any appliances. Rectify without cost to the Owner any conditions of noisy circulation due to trapped or air bound lines, including the expense of cutting and repairing of the building structure incident to making such alterations.
- C. Install the work to conform to space conditions and the work of other trades. The drawings indicate generally the runs and the sizes of piping and although the size must not be decreased, nor the drawings deviated from except as unforeseen space conditions may require, the Engineer reserves the right to make minor changes in the arrangement of the work to meet the conditions arising during construction.

3.4 COOPERATION WITH OTHER TRADES:

- A. No piping shall be installed until the entire run has been checked for clearance and the work has been coordinated between all the trades. This Contractor shall be responsible for taking his own field measurements and maintaining proper clearance from the Owner's equipment and the work of other trades, and for coordinating his work with that of other Contractors and Owner. Furnish all necessary information, dimensions, templates, etc. in order that a perfectly coordinated job will result.
- B. This Contractor shall carry out his work in conjunction with other trades and shall give full cooperation to other trades. This Contractor shall furnish all information necessary to permit work of all trades to be installed in a satisfactory manner.

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- C. Where space is so limited that Contractor's work shall be installed in close proximity to the work of other trades or where it is evident that Contractor's work will interfere with other trades, he shall assist in working out space conditions to make satisfactory adjustments. The Contractor shall prepare composite working drawings, in addition to the coordination drawings, and sections of not less than 3/4" -1'-0" scale clearly showing how his work is to be installed in conjunction with other trades; he shall make corrections necessary to satisfactorily complete installation at no additional cost to the Owner.
- D. All supports for hanging material to be connected to steel structure shall be installed prior to installation of fire proofing materials. Refer to Division 7 of the specifications. Any damage to fireproofing caused by late installation of hanging material shall be repaired by the Fire-proofing Contractor at the expense of the Contractor responsible.
- E. This Contractors shall give to the Electrical Contractor all information on switches, controls, pilots, etc. furnished under the Plumbing Contract, together with makes and catalog numbers where required to permit the Electrical Contractor to leave the proper boxes to receive same. This information shall be given well in advance so that the Electrical Contractor may install his work as construction progresses. In the event that this information is not given in time to permit the Electrical Contractor to leave proper boxes, etc. as construction progresses, it shall be the responsibility of the Contractor to pay all costs of cutting and patching construction required because of this neglect.

3.5 TESTS:

- A. Furnish all labor and materials for the performance of all tests on water piping, sewers, waste piping, vent piping as may be required by the authorized inspectors having jurisdiction or as may be required by the Architect or his authorized representative.

3.6 GRADES:

- A. Pipes shall be laid to a uniform grade not less than 1/8" to the foot unless otherwise indicated on plans. Consult with the Contractor under other Sections concerning the pipes to be laid in trenches. All vertical lines shall be set plumb and true. All changes in direction shall be made with Y-1/8 or 1/16 bends with cleanouts at every change in direction greater than 45 deg.

3.7 UNDERGROUND WASTE AND VENT PIPING:

- A. All work below floors and in fill inside building shall PVC. All underground pipe shall be pitched at least 1/8" per foot. Openings through outside walls shall be provided for all lines running through walls at proper elevation. Drainage piping shall be sized as shown by Drawings but not less than 3 inches diameter. Vent piping shall be sized as shown by Drawings but not less than 2 inches diameter.

3.8 ABOVEGROUND WASTE AND VENT PIPING:

- A. All soil, waste and vent piping, in non-plenum areas, shall be shall be PVC. In plenum areas, pipes shall be cast iron, DWV or Type "L" copper tubing and drainage fittings shall be allowed for branch and 2" and smaller piping.
- B. Traps of all plumbing fixtures shall be vented to prevent loss of trap seal.

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- C. All vents shall be sized as shown by Drawings but not less than 1 ½ inches. All vent terminals through the roof shall be sized not less than 4 inches.
- D. All soil, waste and vent pipes to be concealed in finished areas.
- E. All soil, waste and vent piping shall be subject to the full approval of the local Plumbing Inspector.
- F. In special cases, because of appearance or limited space conditions, install wastes in copper-nickel alloy steel screwed pipe, or copper tubing of weight required by local codes.
- G. All vent pipes shall be properly connected to the vertical vent stacks and extended through the roof. Vent lines from various stacks may be connected together in the space between ceiling and roof so that the number of vents passing through roof may be kept at a minimum.

The location of all vents passing through the roof shall be approved by the Architect before being installed.

3.9 COLD WATER PIPING:

- A. All water piping shall be run concealed in ceilings and in pipe spaces in ceilings and in finished area.
- B. At low points, provide valved drain with hose connection. Arrange piping to pitch to low points or fixtures so that entire system may be drained.
- C. Provide ball valves on all branches off main and sectional valves on main. Provide stops at each individual fixture. All valves shall be tagged.
- D. All cold water piping shall be Type "L" hard tempered copper tubing with wrought copper sweat fittings or pro-press fittings
- E. All exposed un-insulated water piping to individual fixtures in finished rooms shall be chrome plated.
- F. Install PEX piping with loop at each change of direction of more than 90 degrees

3.10 HOT WATER PIPING:

- A. Extend the hot water piping as shown on plans which, in general, will follow the cold water. All piping in finished rooms shall be run concealed throughout. Extend piping to fixtures and equipment as shown on the plans, providing ball valve shutoffs in all branches and drains with hose cocks at all low points.
- B. All hot water piping shall be Type "L" hard tempered copper tubing with wrought copper sweat fittings or pro-press fittings.
- C. All exposed piping to individual fixtures, in finished rooms, shall be chrome plated.
- D. Install PEX piping with loop at each change of direction of more than 90 degrees

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3.11 PIPING JOINTS:

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - a. Apply appropriate tape or thread compound to external pipe threads.
 - b. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- D. Brazed Joints for Copper Tubing: Comply with CDA's "Copper Tube Handbook," "Braze Joints" chapter.
- E. Soldered Joints in Copper Tube: Cut the ends of tubes square, remove burrs, clean tube ends and fitting sockets with emery cloth, and remove all particles before applying flux and making the joint. Insert tubes to full socket depth. All solder joints shall be made up with 95/5 solder.
- F. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."
- G. Pressure-Sealed Joints for Copper Tubing: Join copper tube and pressure-seal fittings with tools recommended by fitting manufacturer.
- H. Push-on Joints for Copper Tubing: Clean end of tube. Measure insertion depth with manufacturer's depth gage. Join copper tube and push-on-joint fittings by inserting tube to measured depth.
- I. Extruded-Tee Connections: Form tee in copper tube according to ASTM F 2014. Use tool designed for copper tube; drill pilot hole, form collar for outlet, dimple tube to form seating stop, and braze branch tube into collar.
- J. Joint Construction for Grooved-End Copper Tubing: Make joints according to AWWA C606. Roll groove ends of tubes. Lubricate and install gasket over ends of tubes or tube and fitting. Install coupling housing sections over gasket with keys seated in tubing grooves. Install and tighten housing bolts.
- K. Joint Construction for Grooved-End, Ductile-Iron Piping: Make joints according to AWWA C606. Cut round-bottom grooves in ends of pipe at gasket-seat dimension required for specified (flexible or rigid) joint. Lubricate and install gasket over ends of pipes or pipe and fitting. Install coupling housing sections over gasket with keys seated in piping grooves. Install and tighten housing bolts.
- L. Joint Construction for Grooved-End Steel Piping: Make joints according to AWWA C606. [Square cut] [Roll] groove ends of pipe as specified. Lubricate and install gasket over ends of pipes or pipe and fitting. Install coupling housing sections over gasket with keys seated in piping grooves. Install and tighten housing bolts.

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- M. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.
 - N. Joint Construction for Solvent-Cemented Plastic Piping: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - a. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements. Apply primer.
 - b. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
 - c. PVC Piping: Join according to ASTM D 2855.
 - O. Joints for PEX Piping: Join according to ASTM F 1807.
 - P. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.
 - R. Plumbing Contractor shall be held responsible for any damages caused by water from poorly made joint.
- 3.12 CAST IRON JOINTS:
- A. All joints on buried cast iron shall be with compression type gaskets.
 - B. All joints on above ground cast iron shall be with no-hub couplings.
- 3.13 SLEEVES, INSERTS AND ANCHOR BOLTS:
- A. This section shall provide and shall be held responsible for the location and position of all sleeves, inserts, and anchor bolts required by the work. Failure to do so, which requires cutting and patching of finished work, shall be done at no additional cost to Contract.
 - B. All pipes passing through floors, walls or partitions shall be provided with sleeves sized to give a minimum of 1/2" clearance between sleeve and the outside diameter of the pipe, conduit or insulation, enclosing the pipe or conduit.
 - C. Sleeves through concrete floors or interior masonry walls shall be Schedule 40 steel pipe, set flush with finished wall or ceiling surfaces, but extending 2 inches above finished floors or shall be in accordance with details on drawings.

In all mechanical equipment rooms or penthouses, sleeves shall extend 6 inches above finished floor.
 - D. Inserts shall be individual or strip type of steel or malleable iron construction for removable nuts and threaded rods up to 3/4" diameter, permitting lateral adjustment.
 - E. Provide escutcheons on all pipes and conduits wherever they pass through floors, ceilings, walls, or partitions in finished areas. Escutcheons for pipes passing through floors shall be RITTER PATTERN AND CASTING COMPANY, No. 36A or approved equal in BrassCraft or Watts, split-hinged, cast brass type designated to fit pipe on one end and cover alcove projecting through floor on the other end.

Escutcheons for pipes shall be RITTER PATTERN AND CASTING COMPANY, No. 3A or approved equal in BrassCraft or Watts - split-hinged, cast brass, chromium plated type.

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3.14 REAMING OF PIPES:

- A. All pipes to be carefully reamed after cutting and threading.
- B. All pipes on brass, iron or steel pipe lines shall be reamed carefully before they are threaded. They shall be reamed smooth on the inside to give the full area of pipe in all cases.
- C. All copper tubing shall be carefully cut square and true, carefully reamed and thoroughly cleaned. The inside of fittings shall be carefully cleaned. On tubing 1-1/2" and larger, the end of tubing shall be thoroughly tinned. All tubing shall be inserted fully to the shoulder of fittings.

3.15 FIRE STOPPING:

A. General

- 1. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in fire rated wall and floor assemblies. See division 07 84 13 for additional requirements.

- B. General Description of the Work : Only tested firestop systems shall be used in specific locations as follows: Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.

C. References

- 1. Test Requirements: ASTM E-814, "Standard Method of Fire Tests of Through Penetration Fire Stops" (July 1997).
- 2. Underwriters Laboratories (UL) of Northbrook, IL runs ASTM E-814 under their designation of UL 1479 and publishes the results in their "FIRE RESISTANCE DIRECTORY" that is updated annually.
- 3. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments
- 4. Test Requirements: ASTM E 84-96, "Surface burning characteristics".
- 5. 2016 Connecticut State Building code with amendments..
- 6. Test Requirements: ASTM E-119, "Fire Test of Building Construction and Materials" (UL 263)

D. Quality Assurance

- 1. Firestop System installation must meet requirements of ASTM E-119, ASTM E-814, ASTM E-84-96, UL 236, UL 1479 or UL 2079 tested assemblies that provide a fire rating equal to that of construction being penetrated.
- 2. Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.

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E. Submittals

1. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of UL firestop systems to be used and manufacturer's installation instructions to comply with Section 01 33 00.
2. Submit material safety data sheets provided with product delivered to job-site.

F. Installer Qualifications

1. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements.
2. FM Approved firestop systems shall be installed by FM Approved firestop contractors.

G. Products, General

1. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.
2. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing Owner for the designated fire-resistance-rated systems.
3. Firestopping Materials are either "cast-in-place" (integral with concrete placement) or "post installed." Provide cast-in-place firestop devices prior to concrete placement.

H. Acceptable Manufacturers

1. Subject to compliance with through penetration firestop systems (XHEZ) and joint systems (XHBN) listed in Volume II of the UL Fire Resistance Directory, provide products of the following manufacturers as identified below:
 - a. Hilti, Inc., Tulsa, Oklahoma 800-879-8000
 - b. Nelson Firestop Products.
 - c. Specified Technologies Inc.
 - d. 3M Fire Protection Products Division.

I. Materials

1. Use only firestop products that have been UL 1479, ASTM E-814, or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.
2. Provide a firestop system with a "F" Rating as determined by UL 1479 or ASTM E814 which is equal to the time rating of construction being penetrated.
3. Provide a firestop system with an Assembly Rating as determined by UL 2079 which is equal to the time rating of construction being penetrated.

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J. Preparation

1. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
 - a. Verify penetrations are properly sized and in suitable condition for application of materials.
 - b. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may effect proper adhesion.
 - c. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
 - d. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
 - e. Do not proceed until unsatisfactory conditions have been corrected.

K. Coordination

1. Coordinate location and proper selection of cast-in-place Firestop Devices with trade responsible for the work. Ensure device is installed before placement of concrete.
2. Responsible trade to provide adequate spacing of field run pipes to allow for installation of cast-in-place firestop devices without interferences.

L. Installation

1. Regulatory Requirements: Install firestop materials in accordance with UL Fire Resistance Directory.
2. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration and construction joint materials.
 - a. Seal all holes or voids made by penetrations to ensure an air and water resistant seal.
 - b. Consult with project manager, and damper manufacturer prior to installation of UL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
 - c. Protect materials from damage on surfaces subjected to traffic.

M. Field Quality Control

1. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.
2. Keep areas of work accessible until inspection by applicable code authorities.
3. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

N. Adjusting and Cleaning

1. Remove equipment, materials and debris, leaving area in undamaged, clean condition.
2. Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

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3.16 ACCESSIBILITY:

- A. Locate all equipment which must be serviced, operated or maintained in fully accessible positions. If required for better accessibility, furnish access doors for this purpose. Access doors shall be selected by the Architect/Engineer to specific area finishes. Minor deviations from drawings may be made to allow for better accessibility, only if approved by the Engineer. Provide fire rated access doors in rated walls, access doors shall be provided in accordance with Section 08 31 16.
- B. In the event that any equipment is not installed to permit convenient servicing, disassemble, removal of parts, etc. the Contractor shall, at his own expense, make all corrections necessary to accomplish this.

3.17 TAGS, CHARTS AND NAMEPLATES:

- A. Each valve and any piece of apparatus installed under these sections shall be properly identified.
- B. Each sectional shutoff valve shall have a brass tag with identifying number. Tag shall be secured to valve stem with sufficient length of copper coated jack chain to allow tag to be easily read.
- C. All other equipment shall be provided with a suitable laminated plastic nameplate fastened with screws or rivets. Small equipment labels may use a pressure sensitive tape.
- D. All nameplates and labels shall identify components by proper nomenclature and numbered according to equipment schedule or as designated.
- E. Charts shall be furnished in duplicate and shall include the valve identification number, location and purpose. One chart shall be mounted in frame with a clear glass front and secured to wall in location directed. Second chart shall be for use throughout building and shall be provided with transparent plastic closure for top and attached 8" bead chain for hanging. Holes to be reinforced with brass grommets. Tags and closures as manufactured by Seton Name Plate Corp., New Haven, Conn., or approved equal in Brady or Kolbi.

3.18 INSTRUCTIONS:

- A. Prepare written instructions frames for the proper maintenance and operation of any special equipment furnished and installed under this Contract.
- B. Personally instruct the Owner's Maintenance Staff or official representative in addition to furnishing all manuals, diagrams, etc. in the proper operation and maintenance of all equipment and piping installed under this Contract.
- C. Prepare a portfolio with all tags, operating manuals, parts lists, guarantees, etc. that are packed with all equipment furnished under this Contract and submit same to the Architect.

3.19 PIPING CODE MARKERS:

- A. All service piping which is accessible for maintenance operations, except piping in finished spaces, shall be identified with vinyl plastic color bands and legends at each branch and riser take-off, at each passage through wall, floor and ceiling, adjacent to each valve and on all pipe runs marked each 20'-0" on center.

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Vinyl plastic bands shall not be used in plenum ceilings. Use self-Adhesive aluminum pipe markers or pipe stencils in plenum areas.

- B. Pipe markers to conform to A.S.A. Bulletin A-13. Where pipes are too small for legends, brass identification tags 1-1/2" in diameter with depressed 1/2" high black filled letters shall be fastened with chain. Pipe markers and tags as manufactured by the Seton Name Plate Corp., New Haven, Conn., or equal approved in Brady or Kolbi.

3.20 EQUIPMENT NOT IN CONTACT AND FURNISHED UNDER OTHER SECTIONS:

- A. Furnish all piping and make all closing connections to equipment furnished by other Trade Contractors and Owner; include installation of all special traps, control valves and supplies furnished with such equipment. Refer to section in which outlines equipment requirements and all other specifications sections as may be pertinent to comply with intent of this Article.
- B. Unless otherwise detailed on drawings, roughing of proper size and capacity for equipment indicated on Architectural Mechanical or Electrical drawings as "Future" or "NIC" shall be provided and installed in such a manner and location that future final connection can be made with a minimum of work and without cutting or patching walls, partitions, ceilings or floors.
- C. Engineers' drawings are, of necessity, schematic for special equipment as exact roughing and requirements may vary with different manufacturers. Contractor is also referred to Architectural drawings and details.
- D. Contractor shall obtain approved shop drawings of equipment being furnished for extent of final connections and exact roughing required.

3.21 TOILET ROOM ACCESSORIES:

- A. Toilet room accessories are furnished and installed under another section of the specifications.

3.22 EQUIPMENT PREPURCHASED BY OWNER:

- A. The Owner has purchased plumbing equipment listed elsewhere. This Contractor shall be given the purchase order and shall, at that time, assume full responsibility for delivery, installation and guarantee of said equipment as if he has purchased the equipment.

3.23 CLEANING PIPING, CONDUITS AND EQUIPMENT:

- A. Thoroughly clean all piping and equipment of all foreign substances inside and out before being placed in operation.
- B. If any part of a system should be stopped or otherwise impacted by any foreign matter after being placed in operation, the system shall be disconnected, cleaned and reconnected wherever necessary to locate and remove obstructions. Any work damaged in the course of removing obstructions shall be repaired or replaced when the system is reconnected at no additional cost to the Owner.
- C. During the course of construction, all pipes shall be capped in an approved manner to insure adequate protection against the entrance of foreign matter, moisture, etc.

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3.24 CLEANING UP:

- A. After completion of the work, remove all waste, rubbish and other materials left as a result of operations and leave the premises in clean condition.
- B. All fixtures, equipment, etc. installed under the Plumbing Sections shall be free of dirt, grease and other foreign material and left in perfectly clean condition and ready to use.

3.25 WARRANTY:

- A. Provide a minimum of 18 months warranty on all parts and labor specified under this section with start date of owner's acceptance of job. The warranty shall include all parts, labor, and associated costs incurred by the manufacturer to provide factory authorized on-site service.
- B. If during that warranty period, any part of the work installed fails, becomes unsatisfactory or does not function properly due to any fault in material or workmanship, whether or not manufactured or job built, each section shall upon notice from the Owner, promptly proceed to repair or replace such faulty material or workmanship without expense to the Owner, including cutting, patching and painting or any other collateral work involved and including repair or restoration of any damaged sections of the premises resulting from such faults.
- C. In the event, that a repetition of any one defect occurs, indicating the probability of further failure, and which can be traced to faulty product design, materials or workmanship, then repairs or replacement shall not continue to be made but, the fault shall be remedied by a complete replacement of the entire defective unit.
- C. In addition to the general warranty, obtain and transmit to the Owner any guarantees or warranties from manufacturers of specialties but only as a supplement to the general warranty which will not be invalidated by same.

3.26 OWNER'S INSTRUCTIONS AND SYSTEM OPERATION:

- A. Contractor shall submit Instructions on CD-ROM of on-site video. Refer to Section 01 77 00, paragraph 1.5.G for additional requirements.
- B. Upon completion of all work and of all tests, Contractor shall furnish the necessary skilled labor and helpers for operating the system and equipment for a period of four (4) days of eight (8) hours. During this period, instruct the Owner or its representative fully in operation, adjustment and maintenance of all equipment furnished. Give at least forty-eight (48) hours notice to the Owner in advance of this period.

3.27 OWNER'S ACCEPTANCE TEST:

- A. After the various systems are complete as determined by preliminary operating tests, the Contractor shall arrange for the Owner's final acceptance tests.
- B. The Contractor shall have present at each acceptance test, representatives of the several Contractors whose work is directly or indirectly involved, with instruments as necessary to validate proper performance in accordance with the design and to include the following:
 - 1. All equipment installed and operating in accordance with manufacturer's instructions and performance guarantee.

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2. All systems operating in accordance with specifications.
3. All distribution systems properly adjusted for distribution to equipment as specified.
4. The various systems properly flushed, cleaned, and free of entrapped air and dirt.
5. All "as built" drawings, valve charts, etc. as specified in various parts of the specifications installed and/or ready for delivery to the Owner.

3.28 TEST:

- A. All piping testing to be performed in accordance with all applicable Codes including, but not limited to IPC.
- B. All involved parties are to be notified at least two weeks in advance of a scheduled test.
- C. Conducting Tests: Conduct all tests as required and repair or replace any defects. Perform all tests in the presence of and to the satisfaction of the Engineer and such other parties as may have legal jurisdiction.
- D. Defective Work: The Owner shall have the privilege of stopping any of the work not being properly installed. All such defective work shall be repaired or replaced and the tests shall be repeated.
- E. Repair Damaged Work: Repair all damages resulting from tests and replace damaged materials.

3.29 DISINFECTION:

- A. Disinfect new water piping in accordance with AWWA C651.
 1. The pipe system shall be flushed with clean, potable water until dirty water does not appear at the points of outlet.
 2. The system or part thereof shall be filled with a water/chlorine solution containing at least 50 parts per million (50mg/L) of chlorine, and the system or part thereof shall be valved off and allowed to stand for 24 hours; or the system or part thereof shall be filled with water/chlorine solution containing at least 200 parts per million (200mg/L) of chlorine and allowed to stand for 3 hours.
 3. Following the required standing time, the system shall be flushed with clean potable water until the chlorine is purged from the system.
 4. The procedure shall be repeated where shown by a bacteriological examination that contamination remains present in the system.
 5. Contractor shall submit chlorination test results for review and acceptance by the Code official.

END OF SECTION 220500

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SECTION 220700- PLUMBING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The General Provisions of the Contract, including General and Supplementary Conditions and Division 01, General requirements, apply to the work specified in this Section.
- B. The requirements in Section 22 05 00 shall also govern the work under this Section.
- C. Scope of Work: This Section contains details for the insulation of pipe and equipment installed under Division 22.

1.2 SUBMITTALS:

- A. In accordance with Section 01 33 00, the following items shall be submitted for approval.

Piping insulation
Fitting insulation

1.3 MECHANICAL SYSTEMS INSULATION:

- A. Furnish and install all thermal and protective insulation as specified herein for piping and equipment as shown on the drawings.
- B. The following mechanical items shall be insulated:
Piping – hot, recirculated hot, cold and horizontal storm drain
Fittings - Valve bodies, Victaulic couplings, elbows, tees, etc.
Equipment insulation

1.4 SYSTEM PERFORMANCE

- A. Insulation materials furnished and installed hereunder should meet the minimum thickness requirements of ASHRAE 90.1 (2010), "Energy Efficient Design of New Buildings," of the American Society of Heating, Refrigeration, and Air Conditioning Engineers. However, if other factors such as condensation control or personnel protection are to be considered, the selection of the thickness of insulation should satisfy the controlling factor.
- B. Insulation materials furnished and installed hereunder shall comply with NFPA 255 and shall have a maximum flame spread index of 25 and a maximum smoke developed index of 50 when tested in accordance with the following testing standard:

Underwriters' Laboratories, Inc. UL 723

Adhesives used for applying the sealed jackets shall also conform to these same ratings. The use of wheat paste or any other material not meeting these requirements will not be allowed.

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1.5 QUALITY ASSURANCE

- A. Insulation materials and accessories furnished and installed hereunder shall, where required, be accompanied by manufacturers' current submittal or data sheets showing compliance with applicable specifications.
- B. Insulation materials and accessories shall be installed in a workmanlike manner by skilled and experienced workers who are regularly engaged in commercial insulation work.
- C. All covering and insulating materials shall be manufactured by Johns Manville, Knauf, Owens-Corning or Armstrong.

1.6 DELIVERY AND STORAGE OF MATERIALS

- A. All of the insulation materials and accessories covered by this specification shall be delivered to the job site and stored in a safe, dry place with appropriate labels and/or other product identification.
- B. The contractor shall use whatever means are necessary to protect the insulation materials and accessories (wick material, sealing tape, etc) before, during, and after installation. No insulation material shall be installed that has become damaged in any way. The contractor shall also use all means necessary to protect work and materials installed by other trades.

PART 2 – PRODUCTS

2.1 PIPING:

- A. Insulate all new domestic hot, cold and recirculating hot water lines with Johns Manville Fiberglass ASJ with S.S.L. II, pipe insulation with double self-sealing lap having a factory applied jacket. All horizontal and vertical insulated piping located below 8'-0" AFF level and not protected with enclosures shall be protected with Zeston 2000 P.V.C. 30 Mil jacketing. Outdoor, exposed piping shall be protected with aluminum jacket. Acceptable equals are by Speed Line or Proto.
- B. All concealed piping shall be covered as follows: Apply insulation to clean dry pipe with side and end joints butted tightly. Seal lap of jacket and butt joint strips with Benjamin Foster 82-07 vapor barrier lap adhesive. Insulate fittings, flanges and valves of piping with mitered pipe insulation, or F/G premolded fittings made smooth with insulating cement and jacket with glass cloth saturated with Benjamin Foster 30-60 lagging adhesive. Vinyl or plastic fitting jackets will be allowed.
- C. Insulate domestic cold water, water cooler waste,) in the same as for hot piping above except vapor seal all joints, seams, elbows and fittings.
- D. Foam insulation:
 - 1. Piping and Fittings. MicroLok plain pipe insulation shall be wired or taped in place over clean, dry pipe with all joints butted firmly together. Vapor retarder shall be Micro-Lok AP-T plus.
 - 2. The insulation shall be finished with metal jacketing with a laminated moisture retarder. Metal jacketing shall be overlapped 2 to 3 inches (51 to 76 mm) and held in place with sheet metal screws or metal bands.

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- 3. Elbows and tees shall be finished with matching metal fitting covers. Other fittings in metal-jacketed systems shall be finished with conventional weather-resistant insulating materials with painted aluminum finish.

- E. Provide minimum insulation thickness in accordance with the following table.
Minimum Pipe Insulation

Piping System Types	Fluid Temp. Range	Runouts 2 in +	1 in. and less	1-1/4 to 2 in.	2-1/2 to 4 in.	5 and Larger
	F	in.	in.	in.	in.	in.
Plumbing Systems						
Hot Water	100-200	1.0	1.5	1.5	2	2
Cold Water	Below 70	0.5	1.5	1.5	1.5	1.5

Reinsulate piping where insulation has been disturbed under this contract and feather to remaining insulation.

2.2 HANDICAP SINKS:

- A. Provide Trubro Lav Guard 2 insulation kits on drain tailpiece, traps, angle valves and water pipes below handicap Lavatories and Sinks. When protected from access, drain, water pipes and angle valves below handicap fixtures do not need the insulation kits.

2.3 FITTING COVERS:

- A. Fitting covers may be used in lieu of insulating cement and jacket. Provide fitting covers in Zeston - 2000 P.V.C. (20 Mil thickness) by Johns Manville. Acceptable comparable products are by Speed Line or Proto.
- B. General - The matching insert (fiberglass) should either be wrapped completely around the fitting or snugly positioned inside the fitting for proper fit. The insert shall cover the full inner surface area of the fitting cover. The fitting cover is then to be applied over the fitting and insert, and the throat secured by either tack fastening, taping, or banding.
- C. Cold Pipe - Fitting systems below ambient temperature must have a continuous vapor barrier, either with pressure sensitive PVC Tape, or an approved adhesive system. When PVC Tape is used, a 2" downward lap is required. On cold lines in severe ambient temperatures, the fiberglass insert shall be the same thickness as the adjacent pipe insulation. All joints shall then be sealed with PVC Tape.
- D. Hot Pipe - For hot piping which requires pipe insulation over 1-1/2" wall, an extra inch of wall thickness in the pipe insulation shall be applied. If the surface temperature of insulation exceeds 155 degrees F. fitting covers should not be used. The throat seam shall be riveted or tacked on hot piping.

PART 3 – EXECUTION

PLUMBING INSULATION

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3.1 SITE INSPECTION

- A. Before starting work under this section, carefully inspect the site and installed work of other trades and verify that such work is complete to the point where installation of materials and accessories under this section can begin.
- B. Verify that all materials and accessories can be installed in accordance with project drawings and specifications and material manufacturer's recommendations.
- C. Verify, by inspecting product labeling, submittal data, and/or certifications which may accompany the shipments, that all materials and accessories to be installed on the project comply with applicable specifications and standards and meet specified thermal and physical properties.

3.2 PREPARATION

- A. Ensure that insulation is clean, dry, and in good mechanical condition and that all factory-applied facings are intact and undamaged. Wet, dirty, or damaged insulation is not acceptable for installation.
- B. Ensure that pressure testing of piping, duct and fittings has been completed prior to installing insulation.

3.3 INSTALLATION

A. General

- 1. Install all insulation materials and accessories in accordance with manufacturer's published instructions and recognized industry practices to ensure that it will serve its intended purpose.
- 2. Install insulation on piping/duct subsequent to painting, and acceptance tests.
- 3. Install insulation materials with smooth and even surfaces. Insulate each continuous run of piping with full-length units of insulation, with single cut piece to complete run. Do not use cut pieces or scraps abutting each other. Butt insulation joints firmly to ensure complete, tight fit over all piping surfaces.

B. Fittings

- 1. Wrap valves, fittings, and similar items in each piping system with wicking material to ensure a continuous path (100% coverage) for the removal of condensation.
- 2. Cover valves, fittings, and similar items in each piping system using one of the following:
 - a. Mitered sections of insulation equivalent in thickness and composition to that installed on straight pipe runs.
 - b. PVC Fitting Covers insulated with material equal in thickness and composition to adjoining insulation.
- 3. Seal all fitting joints with contractor supplied VaporWick Sealing Tape or approved vapor retarder mastic compound.

C. Penetrations

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Extend piping without interruption through walls, floors and similar piping penetrations.

3.4 SEAMS:

- A. On exposed insulation, all longitudinal seams shall be kept at the top and back of the pipe and circumferential joints shall be kept to a minimum. Raw end of insulation shall be concealed by neatly folding the ends of the jackets. Fittings, valve bodies and flanges shall be furnished with the same jacket materials used on adjoining insulation.

3.5 PRIOR TESTING:

- A. Covering shall not be applied until all parts of the work have been tested by the Contractor and reviewed by the Engineer.

3.6 VAPOR BARRIER:

- A. Vapor barrier shall be applied in accordance with the manufacturer's instructions to maintain the integrity of the vapor barrier on cold systems.
- B. An approved vapor retarder mastic compatible with PVC must be applied between pipe insulation and fitting cover, and on fitting cover and throat overlap seam.
- C. For fittings where operating temperature is below 45 deg. For where pipe insulation thickness is greater than 1 ½", two or more layers of Hi-Lo temp insulation inserts shall be installed beneath fitting cover.

3.7 METAL SHIELDS:

- A. Metal shields, 16 gauge galvanized, shall be applied between hangers or supports and the pipe insulation. Shields shall be roll formed to fit the insulation and shall extend up to the center line of the pipe and the length specified for the insert. Insulation shall be rigid type for length of shield to prevent crushing.

3.8 FIELD QUALITY ASSURANCE

- A. Upon completion of all insulation work covered by this specification, visually inspect the work and verify that it has been correctly installed. This may be done while work is in progress, to assure compliance with requirements herein to cover and protect insulation materials during installation.
- B. Replace any ceiling damage caused by condensation due to improper covering and sealing during the guarantee period of this job.

3.9 PROTECTION

- A. Replace damaged, removed or disturbed insulation with appropriate fiberglass insulation.
- B. The insulation contractor shall advise the general and/or the mechanical contractor as to requirements for protection of the insulation work during the remainder of the construction period, to avoid damage and deterioration of the finished insulation work.

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3.10 SAFETY PRECAUTIONS

- A. Insulation contractor's employees shall be properly protected during installation of all insulation. Protection shall include proper attire when handling and applying insulation materials, and shall include (but not be limited to) disposable dust respirators, gloves, hard hats, and eye protection.
- B. The insulation contractor shall conduct all job site operations in compliance with applicable provisions of the Occupational Safety and Health Act, as well as with all state and/or local safety and health codes and regulations that may apply to the work.

END OF SECTION 220700

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SECTION 230500 - COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The General provisions of the Contract, including General and Supplementary Conditions, General Requirements apply to the work specified in this Section.
- B. Scope of Work: This Section contains special provisions for Divisions 23.

1.2 EXAMINATION OF SITE AND DRAWINGS:

- A. Before submitting his bid, Contractor shall visit site with plans and specifications in hand, shall consult with the Engineer and shall become thoroughly familiar with all conditions under which his work will be done since he will be held responsible for any assumptions he may make in regard thereto.
- B. The Contractor shall verify and obtain all necessary dimensions at the building.
- C. Certain present building clearances are available for handling equipment. All equipment shall be delivered knocked down as necessary to clear restrictions.

1.3 INTENT:

- A. Finished Work: The intent of the specifications and drawings is to call for finished work, completed, tested and ready for operation.
- B. Good Practice: It is not intended that the drawings show every pipe, fitting or minor detail and it is understood that while the drawings must be followed as closely as circumstances will permit, the systems shall be installed according to the intent and meaning of the Contract Documents and in accordance with good practice.
- C. Work under this Section shall include giving written notice to the Owner within 15 days after the Award of the Contract of any materials of apparatus believed inadequate or unsuitable or in violation of any laws or codes, or items of work omitted. In the absence of such written notice, it is mutually agreed that work under each Section has included the cost of all required items and labor for the satisfactory functioning of the entire system without extra compensation.
- D. Any apparatus, appliance, material or work not shown on drawings but mentioned in specifications or vice versa, or any incidental accessories necessary to make the work complete and perfect in all respects and ready for operation, even if not particularly specified, shall be furnished and installed by Contractor at no additional cost to the Owner.
- E. Prior to receipt of bids, Contractors shall give written notice to Engineer of any materials or apparatus believed inadequate, unsuitable or in violation of laws, ordinances, rules or regulations of authorities having jurisdiction and any necessary items or work omitted. In the absence of such written notice, it is mutually agreed that Contractor has included the cost of all required items in his proposal and that he will be responsible for approved satisfactory functioning of systems without further compensation.

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- F. In all cases where apparatus is herein referred to in singular number, it is intended that such reference include as many such items as are required to complete work.
- G. If not otherwise specified or shown on plans, apparatus and materials shall be installed in accordance with manufacturer's published recommendations and instructions and to the complete satisfaction of the Architect.
- H. It is the intent of these specifications for Mechanical and Electrical Contractors and/or their subcontractors or equipment suppliers to furnish all equipment complete with all accessories.

1.4 REGULATIONS:

- A. Codes: All work shall be done in strict accordance with the 2018 Connecticut State Building, 2018 Connecticut State Fire Safety Code, 2015 IBC, 2015 IPC, 2015 IMC, Connecticut Public Health Code, 2015 NFPA 101, all applicable NFPA Codes, NEC, UL, NEMA, O.S.H.A., with all requirements of local utility companies and the requirements of all governmental departments having jurisdiction.
- B. Precedence: Requirements of the above Codes and Regulations that are more restrictive than requirements of the plans and specifications shall take precedence over plans and specifications. Requirements of the plans and specifications that are more restrictive than requirements of the above Codes and Regulations shall take precedence.
- C. Equipment construction standards shall be as follows: Pressure vessels shall be constructed in accordance with the ASME Code, all electrical equipment shall be UL listed and approved and conform to the N.E.C., gas equipment shall be approved by A.G.A. and conform to N.F.P.A. Codes, piping materials, fittings, valves and accessories shall be constructed in accordance with A.S.T.M. and A.N.S.I. standards for class of work involved. All equipment and materials shall be new and of domestic manufacture. All the above codes shall be referenced and dated in the Connecticut Basic Building Code.
- D. Wherever discrepancies occur between above regulations and agencies and contract drawings and specifications, the requirements of above shall take precedence, except that the contract drawings and specifications shall be minimum requirements and that contractors shall advise engineer of any required changes before proceeding with work.

1.5 APPROVED FITTINGS:

- A. No material other than that contained in the "Latest List of Electric Fittings" approved by the Underwriters' Laboratories, Inc., shall be used in any part of the work. All wiring, conduit, switches and other material for which label service has been established, shall bear the label of the Underwriters' Laboratories, Inc.

1.6 PERMITS, FEES:

- A. Include all necessary notices, obtain all permits and pay all governmental taxes, fees, and other costs. File all necessary plans, prepare all documents and obtain all necessary approvals of all governmental departments having jurisdiction. Obtain all required Certificates of the Owner before request for acceptance and final payment for the work.

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1.7 DEFINITIONS:

- A. Words "finish" or "finished" refer to all rooms and areas listed in Finish Schedule on Architect's Drawings. All rooms and areas not covered in Schedule, including underground tunnels and areas above ceilings, shall be considered not finished except as otherwise noted.
- B. The word "provide" means to "furnish and install" referenced item.

1.8 PROTECTION:

- A. Work under this section shall include protecting the work and materials of all other sections from damage by work or workmen, and shall include making good any and all damage thus caused.
- B. This section shall be responsible for work and equipment until finally inspected, tested and accepted. Protect work against theft, weather, injury or damage and carefully store material and equipment received on site which is not immediately installed. Close open ends of work with temporary covers or plugs during construction to prevent entry of obstructing materials.
- C. If so specified under the respective section, work may include receiving, unloading, uncrating, storing, protecting, setting in place and connecting up completely of any motor starters, control equipment having mechanical/electrical service connections which may be furnished by Owner or furnished under another section.

Work under this section shall include exercising special care in handling and protecting equipment and fixtures. Any of the above equipment and fixtures which are missing or damaged by reason of mishandling or failure to protect shall be replaced at no additional cost to the Owner.

1.9 EQUIPMENT SUBSTITUTIONS AND DEVIATIONS:

- A. Wherever more than one manufacturer is mentioned in specifications and drawings, any of these named are considered equally acceptable to that upon which design was based and, providing all requirements are met, insofar as performance, space requirements, noise levels and special accessories or materials are concerned, any of those named may be included in Contractor's bid. Please refer to section 01 25 00 for additional requirements specific to substitutions.
- B. Where Contractor proposes to use an item of equipment which differs from that upon which design was based, which required any redesign of structure, partitions, foundations, piping, wiring or of any other part of Mechanical, Electrical or Architectural Layout, all such redesign, new drawings or detailing required shall be prepared by Contractor at his own expense for approval of Engineer.
- C. Where approved substitutions or deviations require a different quantity, size or arrangement of structural supports, wiring, conduit, piping, ductwork, and equipment from that upon which design was based, all additional items required by the systems shall, with the approval of Engineer, be furnished by Contractor at no additional cost to Owner.
- D. Refer to Section 012500 "Substitution Requirements" and "General Conditions of the Contract for Construction for Construction Manager At Risk Article 15 Paragraphs 15.3.1 and 15.3.2 for substitution requirements. *Requests for substitutions must be made in writing prior to bid day. No requests for substitutions will be considered afterwards.*

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1.10 DRAWINGS:

- A. The, mechanical, fire protection, plumbing, electrical, structural, and architectural drawings are intended to supplement each other and are to be considered as a unit which, taken together in conjunction with the specifications, completely describes the work to be done. All drawings shall be checked to verify spaces in which work will be installed. Where headroom or space conditions appear inadequate, notification shall be given to Engineer before proceeding with installation.
- B. The Engineer may without charge, make modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work.
- C. Note that the drawings are diagrammatic and indicate the general arrangement of the Mechanical and Electrical Equipment and systems, without showing every detail and fitting.
- D. Where conflicts occur between drawings and specifications or within either, the item or arrangement of better quality, greater quality or highest cost shall be included in Contract price. Engineer shall determine the manner or item with which work shall be installed.
- E. Keep one complete set of all drawings, specifications, shop drawings and addenda on the premises at all times in good condition and available to the Engineer and Owner.

1.11 COORDINATION DRAWING SUBMITTAL:

- A. The Sheet Metal Contractor shall initiate a 1/4" or 3/8" equal to one foot composite construction drawing of all areas for all the trades. He shall provide a drawing showing his proposed ductwork installation in detail including ceiling heights, duct heights, all light fixtures, all registers and diffusers and structural steel. The drawing shall be in electronic format and shall be accessible by other contractors.
- B. All electrical distribution conduits, wires and panels and any other electrical work which may conflict with the sheet metal ducts and with piping will then be drawn on the transparency under Division 26. All waste and vent piping, water piping and rain leaders will then be superimposed by the Plumbing Contractor. The Fire Protection Contractor shall superimpose sprinkler piping.
- C. Finally all major heating and process piping shall be superimposed by the Heating Contractor.
- D. Each trade shall indicate necessary seismic restraints in accordance with later paragraph in this section.
- E. Each shall use a different color code. A coordination meeting of all parties involved is then to be held and all possible conflicts are to be resolved. The Sheet Metal Subcontractor shall then include on his original tracings, any electrical or piping work in the area of his ducts as resolved, shall have all trades sign approval of the drawing and then make eight (8) prints of each drawing for review.
- F. Contractor shall submit to the engineer 1/4" scale floor plans showing proposed locations and sizes of all floor slab penetrations for each trade. This shall include all piping, ductwork, conduit, and cable penetrations. The floor slab penetration drawings shall be subject to approval by the Structural Engineer. No work shall commence without approval from the Architect and the Mechanical and the Structural Engineer.

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1.12 REVIEWS:

- A. The materials, workmanship, design and arrangement of all work installed under the Mechanical section shall be subject to the review of the Engineer.
- B. Where any specific material process or method of construction or manufactured article is specified by name or by reference to the catalog number of a manufacturer, the specifications are to be used as a guide and not intended to take precedence over the basic duty and performance specified or noted on drawings. In all cases, the specific characteristics of the equipment offered for approval, shall be indicated on the shop drawings.
- C. All component parts of each item of equipment or device shall bear the manufacturer's nameplate, giving name of manufacturer, description, size, type, serial or model number, electrical characteristics, etc. in order to facilitate maintenance or replacement. The nameplate of a subcontractor or distributor will not be acceptable.
- D. If material or equipment is installed before it is reviewed, it shall be removed and replaced at no extra charge to the Owner if, in the opinion of the Engineer, the material or equipment does not meet the intent of the drawings and specifications.

1.13 SHOP DRAWINGS:

- A. Contractor shall submit for review shop drawings of all new equipment, materials, piping and reports in electronic format. Engineer's review of shop drawings must be completed before any equipment is purchased or any work is installed. Please refer to section 01 33 00 for additional submittal requirements.
- B. Shop drawings shall consist of manufacturer's certified scale drawings, cuts or catalog, including descriptive literature and complete certified characteristics of equipment, showing dimensions, capacity, code requirements, motor and drive testing as indicated on the drawings or specifications. Also, sheet metal fabrication drawings drawn to scale of 1/4" to the foot or larger.
- C. Certified performance curves for all pumping equipment shall be submitted for review.
- D. Samples, drawings, specifications, catalogs, etc. submitted for review shall be properly labeled indicating specific service for which material or equipment is to be used, division and article number of specifications governing Contractor's name and name of job.
- E. Catalog, pamphlets or other documents submitted to describe items on which review is being requested, shall be specific and identification in catalog, pamphlet, etc. of item submitted shall be clearly made in ink. Data of a general nature will not be accepted.
- F. Review stamp rendered on shop drawings shall not be considered as a guarantee of measurements of building conditions. Where drawings are reviewed, said review does not mean that drawings have been checked in detail. Said review does not in any way relieve the Contractor from his responsibility or necessity of furnishing material or performing work as required by the Contract Drawings and Specifications.
- G. Failure by the Contractor to submit shop drawings in ample time for checking shall not entitle him to an extension of Contract and no claim for extension by reason of such default will be allowed.

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- H. Prior to submission of shop drawings, the Contractor shall thoroughly check each shop drawing, reject those not conforming to the specifications and indicate by his signature that the shop drawings submitted in his opinion meet Contract requirements.

1.14 QUIET OPERATION:

- A. Mechanical equipment shall operate without objectionable noise or vibration as determined by the Architect/Engineer. Noise level in any normally occupied area shall not exceed that of an NC-28 curve (noise criteria-28) as established in the latest edition of the ASHRAE Guide.
- B. Mechanical Contractor shall carry an allowance for performing sound pressure measurements in areas designated by the Owner and/or Engineer as unacceptable. Each test shall be performed on a time and material bases. Tests shall be performed after regular working hours.
- C. The Contractor shall demonstrate compliance with the design noise criteria, by measuring the sound pressure levels in octave-bands from 125Hz to 8000 Hz. Measurements shall be taken 5ft. above the floor, at four locations as directed by the Engineer. Sound pressure shall be determined as an average of these octave band readings. Contractor shall use Type 1 sound level meters with octave-band filters. Contractor shall demonstrate that the instruments used in the measuring process have been calibrated by a recognized testing facility within one year. In processing the test results, the Contractor shall follow the recommendation of ARI Standard 885-90.
- D. If objectionable noise or vibration are produced and transmitted to occupied portions of the building by apparatus, piping, or other parts of the mechanical and electrical work, changes or additions, as are necessary, shall be made to the system, as approved, without extra cost to the Owner.

1.15 PAINTING:

- A. Painting is specified elsewhere in the Specifications, under Division 09.
- B. Refer to Division 09, for color coded painting of all piping in Mechanical Rooms.

1.16 CONCRETE WORK:

- A. Concrete work is specified elsewhere in the specifications under Division 03.

1.17 EXCAVATION AND BACKFILLING:

- A. Excavating and backfilling for all mechanical and electrical work inside and outside of building shall be done in accordance with Division 31 unless otherwise specified.

1.18 CUTTING AND PATCHING:

- A. Cutting and patching shall be done in accordance with Division 01, section 01 73 29 unless otherwise specified.
- B. The General Contractor will leave all openings and built-in sleeves, etc. as required, provided he receive same with the proper information and cooperation from the Electrical and/or Mechanical Contractor in due time as the construction progresses.
All cutting of openings in walls, floors, partitions, etc. not thus provided for must, however, be done by the Electrical and/or Mechanical Contractor as required to install the work including all

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cutting of existing construction work, and this Contractor shall restore to its original condition any work disturbed.

1.19 TEMPORARY HEAT:

- A. Contractor is referred to Section 01 50 00, Temporary Facilities and Controls for full description of temporary services.
- B. New air distribution systems *shall not* be used for temporary heating, cooling or ventilation.
- C. Contractor shall provide extended warranties for all equipment used for temporary services.

PART 2 - PRODUCTS

2.1 MATERIALS AND WORKMANSHIP:

- A. All materials and apparatus used shall be new, of first class quality and shall be furnished, delivered, erected, connected and finished in every detail. No materials or apparatus used shall be discontinued or about to be discontinued items.
- B. The Engineer shall have the right to reject any part of the work in case material or workmanship is not of satisfactory quality.
- C. Any unacceptable work and material shall be replaced with acceptable work and material at no additional expense to the Owner.
- D. In case there is any doubt of the acceptability of any material, submit samples to the Engineer for approval and only definite approval in writing from the Engineer shall be evidence of such approval. Such approval shall also be subject to the satisfactory installation of the material.
- E. The work in each of these sections shall be constantly under the direction of a competent and thoroughly experienced superintendent who shall be on the premises during such period as the work is in progress. The superintendent shall familiarize himself with the work of all other trades involved insofar as they relate to or in any way affect the work of these sections, and shall coordinate the work.
- F. Unless otherwise noted, all equipment and materials shall be installed and/or applied in accordance with the recommendations of the manufacturer of said equipment, including the performance of any tests recommended by the manufacturer.

2.2 EQUIPMENT VARIATIONS:

- A. In these specifications and on the accompanying drawings, one or more makes of materials, apparatus or appliances have been specified for use in this installation. This has been done for convenience in fixing the standard of workmanship performance of any materials, apparatus or appliance which shall be substituted for those mentioned herein shall also conform to these standards.
- B. Where no specified make or material, apparatus or appliance is mentioned, any first class product made by a reputable manufacturer may be used, providing it conforms to the requirements of these specifications and meets the approval of the Engineer.

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- C. To substitute other makes of materials, apparatus or appliance, than those mentioned under the mechanical or electrical sections, a request in writing to be allowed to make the substitution shall be made only per section 23 05 00 paragraph 1.9C. This request shall be accompanied by complete plans and specifications of the substitution offered. If so requested by the Architect or Engineer, also submit samples of both the specified material or appliance and the substitute.

2.3 ELECTRICAL MOTOR STARTERS:

- A. Motor starters and variable frequency drives (VFD'S) shall be furnished by this Contractor for motor driven equipment provided under this section. The Electrical Contractor shall install the starters and VFD'S, and shall provide all power wiring to the starters and VFD'S, and from the starters and VFD'S to the motors they control.
- B. Motor starters and VFD'S shall conform to requirements of NEC, NEMA, UL, CSA, and ANSI and shall be suitable for the required horsepower, duty, voltage, phase, frequency, service, and location. All starters and VFD'S shall be furnished in NEMA enclosures suitable for the environment in which they are to be located.
- C. All starters shall be of the same manufacture and shall be furnished in Cutler-Hammer, General Electric, Square D, or Allen Bradley.
- D. Thermal Overloads:
 - 1. All motors 1/8 horsepower or larger shall be provided with thermal-overload protection. Thermal overloads shall be melting alloy ambient temperature compensating type.
 - 2. Thermal overloads shall be sized in accordance with NEC requirements for the nameplate data of the motor(s) as actually delivered to the site.
- E. Starters for manual control of single phase motors up to one (1) horsepower furnished without integral thermal overloads shall be combination manual disconnect switch and starters with thermal overload protection for each ungrounded leg. Starters shall be inoperable if a thermal unit is removed. These starters shall be 2-pole and shall be provided with green neon pilot light and handle guard/lock-off.
- F. Starters for three phase motors shall be full voltage, circuit breaker combination magnetic starters. All circuit breaker combination magnetic starters shall include melting alloy type thermal overload protection, low voltage protection, and two (2) sets of auxiliary normally open and normally closed contacts. Thermal overload protection shall be provided in each ungrounded leg. Starters shall be inoperable if a thermal unit is removed. All circuit breaker combination magnetic starters shall be equipped with control power circuits. Provide starters with control power transformers of secondary voltage required for the control power circuitry. Provide control power transformers with primary and secondary fusing. The disconnect handle on circuit breaker combination magnetic starters shall always be in control of the disconnect device with the door opened or closed. The disconnect handle shall be clearly marked as to whether the disconnect device is "on" or "off", and shall include a two- color handle grip, the black side visible in the "off" position, and the red side visible in the "on" position.
 - 1. All circuit breaker combination magnetic starters for manual control of three phase motors shall have start-stop push buttons in the cover and shall be provided with red and green pilot lights.
 - 2. All circuit breaker combination magnetic starters for automatic or interlocking control of three phase motors shall have hand-off-automatic selector switches in the cover and shall be provided with red and green pilot lights.

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2.4 ACCESS DOORS:

- A. Access doors shall be of sufficient size to permit easy replacement of complete units and all groupings of complete units and all groupings of valves and equipment shall have necessary clearance for this same purpose. Provide access doors for each valve, damper, control, fire damper, etc., not accessible (such as above a non-lift out ceiling, wall or chase). See Division 08 31 16 for detailed requirements for access doors and frames. Doors shall bear the same or greater fire rating as the wall or ceiling in which they occur. Size of doors to be determined after valves or dampers are installed and shall be of adequate size to operate same.
- B. Where access is required to dampers, valves, etc., that occur above lay-in ceilings, these access doors may be omitted, provided suitable plastic markers identifying exact location of valves, dampers, etc., on lay-in ceilings are applied directly below valve grouping and identified by a number, this number to be used as a marking on valve or damper chart. Tags shall be applied on the ceiling grid, not on the ceiling tiles. Tag samples shall be submitted to the Architect and Engineer for approval prior to fabrication and installation of said tags.

PART 3 - EXECUTION

3.1 CONNECTING TO EXISTING UTILITIES:

- A. Connections to existing utilities that will interrupt the service to the present campus buildings or surrounding neighborhood shall be made at a time agreed upon by the Owner, Architect and Contractor.
- B. If it is necessary to make connections to existing utilities outside the regular working hours, this shall be noted on the written work order and the respective Contractor will be paid for the additional cost of labor over and above what it would cost at regular day time rates.

3.2 FREIGHT, CARTING AND RIGGING:

- A. Contractor shall pay all freight and carting charges necessary to deliver all equipment furnished under his Contract to the site and furnish all necessary rigging to properly rig and set the apparatus on the pads, foundations, frames, etc.
- B. All cranes, lifts, scaffolding, blocks and tackle, ropes and chains and other equipment necessary to rig and set the apparatus shall be furnished by the Contractor.
- C. The Contractor shall set, level and align all equipment before starting operations.

3.3 COOPERATION WITH OTHER TRADES:

- A. No piping, ducts, valves, boxes, etc., shall be installed until the entire run has been checked for clearance and the work has been coordinated between all the trades. This Contractor shall be responsible for taking his own field measurements and maintaining proper clearance from the Owner's equipment and the work of other trades, and for coordinating his work with that of other Contractors and Owner. Furnish all necessary information, dimensions, templates, etc. in order that a perfectly coordinated job will result.
- B. This Contractor shall carry out his work in conjunction with other trades and shall give full cooperation to other trades. Contractor shall furnish all information necessary to permit work of all trades to be installed in a satisfactory manner.

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- C. Where space is so limited that Contractor's work shall be installed in close proximity to the work of other trades or where it is evident that Contractor's work will interfere with other trades, he shall assist in working out space conditions to make satisfactory adjustments. If required or directed by Engineer, the Contractor shall prepare composite working drawings, in addition to the coordination drawings, and sections of not less than 3/4" -1'-0" scale clearly showing how his work is to be installed in conjunction with other trades; he shall make corrections necessary to satisfactorily complete installation at no additional cost to Owner.
- D. All supports for hanging material to be connected to steel structure shall be installed prior to installation of fire proofing materials. Refer to Division 7 of the specifications. Any damage to fireproofing caused by late installation of hanging material shall be repaired by the Fire-proofing Contractor at the expense of the Contractor responsible.
- E. The Plumbing and Heating Contractors shall give to the Electrical Contractor all information on switches, controls, pilots, etc. furnished under the Plumbing and Heating Contracts, together with makes and catalog numbers where required to permit the Electrical Contractor to leave the proper boxes to receive same. This information shall be given well in advance so that the Electrical Contractor may install his work as construction progresses. In the event that this information is not given in time to permit the Electrical Contractor to leave proper boxes, etc. as construction progresses, it shall be the responsibility of the Contractor to pay all costs of cutting and patching construction required because of this neglect.

3.4 INFORMATION FOR ELECTRICAL CONTRACTOR:

- A. Deliver to the Electrical Contractor all information on motors and controls furnished under the Mechanical Contract, together with makes and catalog numbers, to permit the Electrical Contractor to leave the proper boxes and wiring.
- B. Each electric motor of 1/2 h.p. or more shall be furnished with an automatic starter.
- C. Starters shall be furnished in type to be remotely controlled and fed from dual voltage transformer 208/460 120 volts.
- D. Starters to have overload and undervoltage protection. Starters shall be of the combination disconnect switch and starter type.

3.5 SLEEVES, INSERTS AND ANCHOR BOLTS:

- A. This section shall provide and shall be held responsible for the location and position of all sleeves, inserts, and anchor bolts required by the work. Failure to do so, which requires cutting and patching of finished work, shall be done at no additional cost to Contract.
- B. All pipes passing through floors, walls or partitions shall be provided with sleeves sized to give a minimum of 1/2" clearance between sleeve and the outside diameter of the pipe, conduit or insulation, enclosing the pipe or conduit.
- C. Sleeves through concrete floors or interior masonry walls shall be Schedule 40 steel pipe, set flush with finished wall or ceiling surfaces, but extending 2 inches above finished floors or shall be in accordance with details on drawings.
- D. Inserts shall be individual or strip type of steel or malleable iron construction for removable nuts and threaded rods up to 3/4" diameter, permitting lateral adjustment.

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- E. Provide escutcheons on all pipes and conduits wherever they pass through floors, ceilings, walls, or partitions in finished areas. Escutcheons for pipes passing through floors shall be RITTER PATTERN AND CASTING COMPANY, No. 36A or approved equal in BrassCraft or Watts, split-hinged, cast brass type designated to fit pipe on one end and cover alcove projecting through floor on the other end.

Escutcheons for pipes shall be RITTER PATTERN AND CASTING COMPANY, No. 3A or approved equal in BrassCraft or Watts - split-hinged, cast brass, chromium plated type.

3.6 FIRE STOPPING:

- A. As specified by section 07 84 13 and as follows:

- 1. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in fire rated wall and floor assemblies. See division 07 84 13 for additional requirements.

- B. General Description of the Work : Only tested firestop systems shall be used in specific locations as follows: Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.

- C. References

- 1. Test Requirements: ASTM E-814, "Standard Method of Fire Tests of Through Penetration Fire Stops" (July 1997).
- 2. Underwriters Laboratories (UL) of Northbrook, IL runs ASTM E-814 under their designation of UL 1479 and publishes the results in their "FIRE RESISTANCE DIRECTORY" that is updated annually.
- 3. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments
- 4. Test Requirements: ASTM E 84-96, "Surface burning characteristics".
- 5. All major building codes: ICBO, SBCCI, BOCA, and IBC.
- 6. Test Requirements: ASTM E-119, "Fire Test of Building Construction and Materials" (UL 263)

- D. Quality Assurance

- 1. Firestop System installation must meet requirements of ASTM E-119, ASTM E-814, ASTM E-84-96, UL 236, UL 1479 or UL 2079 tested assemblies that provide a fire rating equal to that of construction being penetrated.
- 2. Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.

- E. Submittals

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1. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of UL firestop systems to be used and manufacturer's installation instructions to comply with Section 01 33 00.
2. Submit material safety data sheets provided with product delivered to job-site.

F. Installer Qualifications

1. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacture's products per specified requirements.
2. FM Approved firestop systems shall be installed by FM Approved firestop contractors.

G. Products, General

1. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.
2. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing Owner for the designated fire-resistance-rated systems.
3. Firestopping Materials are either "cast-in-place" (integral with concrete placement) or "post installed." Provide cast-in-place firestop devices prior to concrete placement.

H. Acceptable Manufacturers

1. Subject to compliance with through penetration firestop systems (XHEZ) and joint systems (XHBN) listed in Volume II of the UL Fire Resistance Directory, provide products of the following manufacturers as identified below:
 - a. Hilti, Inc., Tulsa, Oklahoma 800-879-8000
 - b. Nelson Firestop Products.
 - c. Specified Technologies Inc.
 - d. 3M Fire Protection Products Division.

I. Materials

1. Use only firestop products that have been UL 1479, ASTM E-814, or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.
2. Provide a firestop system with a "F" Rating as determined by UL 1479 or ASTM E814 which is equal to the time rating of construction being penetrated.
3. Provide a firestop system with an Assembly Rating as determined by UL 2079 which is equal to the time rating of construction being penetrated.

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J. Preparation

1. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
 - a. Verify penetrations are properly sized and in suitable condition for application of materials.
 - b. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may effect proper adhesion.
 - c. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
 - d. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
 - e. Do not proceed until unsatisfactory conditions have been corrected.

K Coordination

1. Coordinate location and proper selection of cast-in-place Firestop Devices with trade responsible for the work. Ensure device is installed before placement of concrete.
2. Responsible trade to provide adequate spacing of field run pipes to allow for installation of cast-in-place firestop devices without interferences.

L. Installation

1. Regulatory Requirements: Install firestop materials in accordance with UL Fire Resistance Directory.
2. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration and construction joint materials.
 - a. Seal all holes or voids made by penetrations to ensure an air and water resistant seal.
 - b. Consult with project manager, and damper manufacturer prior to installation of UL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
 - c. Protect materials from damage on surfaces subjected to traffic.

M. Field Quality Control

1. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.
2. Keep areas of work accessible until inspection by applicable code authorities.
3. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

N. Adjusting and Cleaning

1. Remove equipment, materials and debris, leaving area in undamaged, clean condition.
2. Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

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3.7 ACCESSIBILITY:

- A. Locate all equipment which must be serviced, operated or maintained in fully accessible positions. Equipment shall include but not be limited to motors, controllers, switchgear, drain points, etc. If required for better accessibility, furnish access doors for this purpose. Access doors shall be selected by the Architect/Engineer to specific area finishes. Minor deviations from drawings may be made to allow for better accessibility, only if approved by the Engineer. Provide fire rated access doors in rated walls, access doors shall be provided in accordance with Section 08 31 16.
- B. In the event that any equipment is not installed to permit convenient servicing, disassemble, removal of parts, etc. the Contractor shall, at his own expense, make all corrections necessary to accomplish this.

3.8 LUBRICATION:

- A. All equipment having moving parts and requiring lubrication which is installed under this Contract, shall be properly lubricated according to manufacturer's recommendations prior to testing and operation.
Any such equipment discovered to have been operated before lubrication is subject to rejection and replacement at no cost to the Owner. Units furnished with sealed bearings are accepted.

3.9 TAGS, CHARTS AND NAMEPLATES:

- A. Each valve, control, switch, electrical panel, motor and any piece of apparatus installed under this section shall be properly identified.
- B. Each sectional shutoff valve shall have a brass tag with identifying number. Tag shall be secured to valve stem with sufficient length of copper coated jack chain to allow tag to be easily read.
- C. All other equipment, including panels and switches, shall be provided with a suitable laminated plastic nameplate fastened with screws or rivets. Small equipment labels may use a pressure sensitive tape.
- D. All nameplates and labels shall identify components by proper nomenclature and numbered according to equipment schedule or as designated.
- E. Charts shall be furnished in duplicate and shall include the valve identification number, location and purpose. One chart shall be mounted in frame with a clear glass front and secured to wall in location directed. Second chart shall be for use throughout building and shall be provided with transparent plastic closure for top and attached 8" bead chain for hanging. Holes to be reinforced with brass grommets. Tags and closures as manufactured by Seton Name Plate Corp., New Haven, Conn., or approved equal in Brady or Kolbi.

3.10 INSTRUCTIONS:

- A. Prepare written instructions frames for the proper maintenance and operation of any special equipment furnished and installed under this Contract.
- B. Personally instruct the Owner's Maintenance Staff or official representative in addition to furnishing all manuals, diagrams, etc. in the proper operation and maintenance of all equipment and piping installed under this Contract.

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- C. Prepare a portfolio with all tags, operating manuals, parts lists, guarantees, etc. that are packed with all equipment furnished under this Contract and submit same to the Architect.

3.11 PIPING/DUCT CODE MARKERS:

- A. All service piping and ducts which are accessible for maintenance operations, shall be identified with vinyl plastic color bands and legends at each branch and riser take-off, at each passage through wall, floor and ceiling, adjacent to each valve and on all duct and pipe runs marked each 20'-0" on center.

Vinyl plastic bands shall not be used in plenum ceilings. Use self-Adhesive aluminum pipe markers or pipe stencils in plenum areas.

- B. Pipe markers to conform to A.S.A. Bulletin A-13. Where pipes are too small for legends, brass identification tags 1-1/2" in diameter with depressed 1/2" high black filled letters shall be fastened with chain. Pipe markers and tags as manufactured by the Seton Name Plate Corp., New Haven, Conn., or equal approved in Brady or Kolbi.

3.12 EQUIPMENT NOT IN CONTACT AND FURNISHED UNDER OTHER SECTIONS:

- A. Furnish all piping sheet metal connections and miscellaneous accessories, and make all closing connections to equipment furnished by other Trade Contractors and Owner; include installation of all special traps, control valves and supplies furnished with such equipment. Refer to section in which outlines equipment requirements and all other specifications sections as may be pertinent to comply with intent of this Article.
- B. Unless otherwise detailed on drawings, roughing of proper size and capacity for equipment indicated on Architectural drawings as "Future" or "NIC" shall be provided and installed in such a manner and location that future final connection can be made with a minimum of work and without cutting or patching walls, partitions, ceilings or floors.
- C. Engineers' drawings are, of necessity, schematic for special equipment as exact roughing and requirements may vary with different manufacturers. Contractor is also referred to Architectural drawings and details.
- D. Contractor shall obtain approved shop drawings of equipment being furnished for extent of final connections and exact roughing required.

3.13 CLEANING PIPING, CONDUITS AND EQUIPMENT:

- A. Thoroughly clean all piping and equipment of all foreign substances inside and out before being placed in operation.
- B. If any part of a system should be stopped or otherwise impacted by any foreign matter after being placed in operation, the system shall be disconnected, cleaned and reconnected wherever necessary to locate and remove obstructions. Any work damaged in the course of removing obstructions shall be repaired or replaced when the system is reconnected at no additional cost to the Owner.
- C. During the course of construction, all pipe and electrical conduits shall be capped in an approved manner to insure adequate protection against the entrance of foreign matter, moisture, etc.

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3.13 CLEANING UP:

- A. After completion of the work, remove all waste, rubbish and other materials left as a result of operations and leave the premises in clean condition.
- B. All fixtures, equipment, etc. installed under the Mechanical and Electrical Sections shall be free of dirt, grease and other foreign material and left in perfectly clean condition and ready to use.

3.14 WARRANTY:

- A. All parts of the work and all equipment shall be guaranteed for a minimum period of 18 months from the date of owner's acceptance of job. The warranty shall include all parts, labor, and associated costs incurred by the manufacturer to provide factory authorized on-site service.
- B. If during that warranty period, any part of the work installed fails, becomes unsatisfactory or does not function properly due to any fault in material or workmanship, whether or not manufactured or job built, each section shall upon notice from the Owner, promptly proceed to repair or replace such faulty material or workmanship without expense to the Owner, including cutting, patching and painting or any other collateral work involved and including repair or restoration of any damaged sections of the premises resulting from such faults.
- C. In the event, that a repetition of any one defect occurs, indicating the probability of further failure, and which can be traced to faulty product design, materials or workmanship, then repairs or replacement shall not continue to be made but, the fault shall be remedied by a complete replacement of the entire defective unit.
- D. In addition to the general warranty, obtain and transmit to the Owner any guarantees or warranties from manufacturers of specialties but only as a supplement to the general warranty which will not be invalidated by same.

3.15 OWNER'S INSTRUCTIONS AND SYSTEM OPERATION:

As specified by Section 017700 and as follows:

- A. At the time of the job's acceptance by the Owner, the Contractor shall furnish one complete set of reproducible approved, certified as-built drawings to the Owner. In addition, Contractor shall furnish maintenance and operating instructions for all equipment including parts list. These instructions shall be written in layman's language and shall be inserted in a vinyl covered three-ring loose leaf binder. All the information contained in the binder shall also be copied on a CD that will accompany the printed information. The information in the binder shall be first sent to be approved by the Architect/Engineer before turning over to the Owner.
- B. Upon completion of all work and of all tests, this Contractor shall furnish the necessary skilled labor and helpers for operating the system and equipment for a period of four (4) days of eight (8) hours,. During this period, instruct the Owner or his representative fully in operation, adjustment and maintenance of all equipment furnished. Give at least forty-eight (48) hours notice to the Owner in advance of this period.
- C. Contractor shall submit Instructions on CD-ROM of on-site video. Refer to Section 01 77 00, paragraph 1.5.G for additional requirements.

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3.16 OWNER'S ACCEPTANCE TEST:

- A. After the various systems are complete as determined by preliminary operating tests, the Contractor shall arrange for the Owner's final acceptance tests.
- B. The Contractor shall have present at each acceptance test, representatives of the several Contractors whose work is directly or indirectly involved, with instruments as necessary to validate proper performance in accordance with the design and to include the following:
 - 1. All equipment installed and operating in accordance with manufacturer's instructions and performance guarantee.
 - 2. All systems operating in accordance with specifications.
 - 3. All distribution systems properly adjusted for distribution to equipment as specified.
 - 4. The various systems properly flushed, cleaned, and free of entrapped air and dirt.
 - 5. All motors installed with proper thermal overload protection and not operating under overload conditions as determined by ammeter readings.
 - 6. All `as built` drawings, valve charts, etc. as specified in various parts of the specifications installed and/or ready for delivery to the Owner.
- C. THE DATE OF THE ISSUANCE OF A FORMAL CERTIFICATE OF SUBSTANTIAL COMPLETION SHALL BE THE START OF THE WARRANTY PERIOD.

3.17 TEST:

- A. Conducting Tests: Conduct all tests called for under the various sections or as required and repair or replace any defects. Perform all tests in the presence of and to the satisfaction of the Engineer and such other parties as may have legal jurisdiction.
- B. Defective Work: The Owner shall have the privilege of stopping any of the work not being properly installed. All such defective work shall be repaired or replaced and the tests shall be repeated.
- C. Repair Damaged Work: Repair all damages resulting from tests and replace damaged materials.

END OF SECTION 230500

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SECTION 230593- TESTING, ADJUSTING AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The General Provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this Section.
- B. The requirements in Section 23 05 00 shall also govern the work under this Section.
- C. Examine all drawings and data and coordinate the work of this Section with all related and adjoining work.

1.2 SCOPE OF WORK:

- A. Provide all labor, materials, equipment and tools required to complete the work described and shown on the contract drawings.
- B. Provide Air-Balance Report per CT High Performance Building Requirements: Documentation indicating that work complies with ASHRAE 62.1, Section 7.2.2 - "Air Balancing."
- C. Provide TAB Report per CT High Performance Building Requirements: Documentation indicating that work complies with ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

PART 2 -PRODUCTS

2.1 PRODUCTS:

- A. None required.

PART 3 - EXECUTION

3.1 GENERAL:

- A. Work shall be performed only by a firm which employs certified testing, adjusting and balancing technicians as listed by the Sheet Metal Industry National Certification Board of TAB Technicians. The work may be performed by a certified Test, Adjusting and Balancing technician who may be assisted by other TAB technicians. This firm shall provide personnel trained and experienced in system balancing. This requirement will not be waived under any condition.
- B. Before submitting system performance data for approval or acceptance, the firm shall perform all necessary tests and make all necessary adjustments as required to obtain the flow and distribution of air as called for on the Contract Documents.
- C. The balance reports shall include the names, signatures and registration numbers of the technicians assigned to the project.

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- D. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems designs that may preclude proper TAB of systems and equipment.
- E. Examine installed systems for balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are applicable for intended purpose and are accessible.
- F. Examine the approved submittals for HVAC systems and equipment.
- G. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- H. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.
- I. Examine equipment performance data including fan and pump curves.
- J. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- K. Examine test reports specified in individual system and equipment Sections.
- L. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, filters are clean, and equipment with functioning controls is ready for operation.
- M. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.
- N. Examine operating safety interlocks and controls on HVAC equipment.
- O. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 ACCEPTABLE FIRMS:

- A. The following listed firms are approved to perform this work:

Environmental Testing and Balancing
James Brennan Company
Technical Associates Group, Inc.
Wing's Testing and Balancing

- B. Request to employ any other balancing and testing firm must be accompanied by a complete brochure of the firm listing previous installations successfully balanced, length of time in business, names and qualifications of employees and list of instruments available for use on the project.

3.3 AIR HANDLING SYSTEMS:

- A. Prior to the start of balancing the firm shall check the rotation of all fans.

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- B. Check to verify that all backdraft dampers are free to open and close. All filters must be checked and, if dirty, they must be replaced before commencing balancing so as not to create excessive resistance to the system. The firm shall make any necessary changes in fan speed to obtain design system conditions and shall realign all belts when necessary.
- C. This Section shall be responsible for identifying any necessary changes in pulleys and belts required to obtain proper air delivery and shall request additional dampers, splinters, turning vanes, turbulence vanes and other devices if necessary to obtain the correct air balance, all as directed by the Owner or his Representative.

This Contractor shall advise the Mechanical Contractor of the required corrections to the air distribution system, so that the system will perform as designed. All corrective work shall be done at no additional cost to the Owner.

- D. The firm shall compile the following data for each air system insofar as they apply and shall include it on the final submittal:

FAN DESCRIPTIVE DATA

System Number
Location Served
Fan Size
Fan Make
Fan Horsepower
Motor Safety Factor
Heater Manufacturer & Size

FAN DESIGN & DELIVERED CONDITIONS

Fan Rpm
Motor Rpm
Total and/or external static pressure
Amperage
Voltage & Phase
Brake Horsepower
Cfm Supply
Cfm Return
Cfm Exhaust
Fresh Air Percent
Return Air Percent

SYSTEM DESIGN & DELIVERED CONDITIONS

Each outlet shall be identified as to location and area
Register or diffuser size
Register or diffuser factor
Register or diffuser free area, core area, or neck area
Design Cfm
Design Rpm
Final Rpm Reading
Final Cfm
Outlet manufacturer and type

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Type of instrument and method used

- E. The firm shall set all dampers of all types for proper air flow. No system causing objectionable air noise will be accepted. All hand volume dampers shall be marked at their final position. Balancing Contractor shall adjust blades on all the supply registers for the deflection indicated on drawings, so that the desired air circulation is achieved.
- F. The firm shall provide all instruments and accessories required to perform the tests and shall make their own provisions for inserting the instruments. This section shall patch/plug all test holes that were made in the ducts/AHU/RTU/ERU to perform the test.
- G. The firm shall notify the Owner's Representative when they will start work. Prior to this time, the firm shall send their supervising engineer to the office of the Owner or his Representative to review the design, desired operation, and method of balancing of the job.
- H. Upon completion of the work, the firm shall certify that all systems are properly balanced and are delivering, returning or exhausting the required quantities. The firm shall deliver to the subcontractor five (5) copies of the test report for transmittal to the Owner's Representative.
- I. Check all safety controls and record control sequences.
- J. Check and record air temperatures.
- K. Check scheduled air control record the operation by simulating complete operating cycle.
- L. After completion of balancing, mark location of all final positions of dampers.
- M. In addition to the above requirements, the final report shall include the following:
 - 1. Static pressure reading across filters, coils, of each air handling system showing design and actual readings.
 - 2. Measured suction, discharge and total static pressure for each fan.
 - 3. Design and actual CFM from each outlet and return/exhaust.
 - 4. Outside air, air on and off heating furnaces, air off cooling coils and terminal air supply temperatures for each air handling system.
 - 5. Rated and actual motor current, in amperes, of every motor at full load conditions.

3.5 INSTALLATION TOLERANCES:

- A. Adjust air handling systems to the following tolerances:
 - 1. Supply systems shall be balanced so that:
 - a. The total quantity to each space is within -5% to +10% of design values.
 - b. If two outlets in space, each outlet is within -10% to +10% of design value.
 - c. If three or more outlets in space, each outlet is within -15% to +15% of design value.
 - 2. Exhaust and return systems shall be balanced so the total quantity from each space is -10% to +10% of design values.

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3.5 FIELD VERIFICATION:

- A. The design Engineer may request verification of data contained in the balancing report. If requested the TAB technician whose initials appear on the data sheets shall take outlet and inlet readings selected at random by the Engineer who will compare these readings to those in the submitted report. If the field verification is not satisfactory, the firm doing the TAB work shall completely rebalance the system and a new report shall be prepared and submitted for approval.

END OF SECTION 230593

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SECTION 230700- HVAC INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The General Provisions of the Contract, including General and Supplementary Conditions and Division 01, General requirements, apply to the work specified in this Section.
- B. The requirements in Section 23 05 00 shall also govern the work under this Section.
- C. Scope of Work: This Section contains details for the insulation of pipe, ductwork and equipment installed under Division 23.

1.2 SUBMITTALS:

- A. In accordance with Section 013300, the following items shall be submitted for approval.

Ductwork insulation
Equipment insulation

- B. Recycled Content: Provide data showing recycled materials content of materials and fabricated items provided for this project, stated as a percentage of the materials included in these items or materials provided as part of the Work of this Section.

1.3 MECHANICAL SYSTEMS INSULATION:

- A. Furnish and install all thermal and protective insulation as specified herein for piping, ductwork and equipment as shown on the drawings.
- B. The following mechanical items shall be insulated:
Fittings - Victaulic couplings, elbows, tees, etc.
Ductwork, supply and outside air
Equipment insulation

1.4 SYSTEM PERFORMANCE

- A. Insulation materials furnished and installed hereunder should meet the minimum thickness requirements of ASHRAE 90.1 (2010), "Energy Efficient Design of New Buildings," of the American Society of Heating, Refrigeration, and Air Conditioning Engineers. However, if other factors such as condensation control or personnel protection are to be considered, the selection of the thickness of insulation should satisfy the controlling factor.
- B. Insulation materials furnished and installed hereunder shall comply with NFPA 255 and shall have a maximum flame spread index of 25 and a maximum smoke developed index of 50 when tested in accordance with the following testing standard:

Underwriters' Laboratories, Inc. UL 723

Adhesives used for applying the sealed jackets shall also conform to these same ratings. The use of wheat paste or any other material not meeting these requirements will not be allowed.

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1.5 QUALITY ASSURANCE

- A. Insulation materials and accessories furnished and installed hereunder shall, where required, be accompanied by manufacturers' current submittal or data sheets showing compliance with applicable specifications.
- B. Insulation materials and accessories shall be installed in a workmanlike manner by skilled and experienced workers who are regularly engaged in commercial insulation work.
- C. All covering and insulating materials shall be manufactured by Johns Manville, Knauf, Owens-Corning or Armstrong.

1.6 DELIVERY AND STORAGE OF MATERIALS

- A. All of the insulation materials and accessories covered by this specification shall be delivered to the job site and stored in a safe, dry place with appropriate labels and/or other product identification.
- B. The contractor shall use whatever means are necessary to protect the insulation materials and accessories (wick material, sealing tape, etc) before, during, and after installation. No insulation material shall be installed that has become damaged in any way. The contractor shall also use all means necessary to protect work and materials installed by other trades.

PART 2 - PRODUCTS

2.1 PIPING:

- A. Insulate all new condensate lines with Owens-Corning Fiberglass ASJ with S.S.L. II, pipe insulation with double self-sealing lap having a factory applied jacket. All horizontal and vertical insulated piping located below 8'-0" AFF level and not protected with enclosures shall be protected with Zeston 2000 P.V.C. 30 Mil jacketing. Outdoor, exposed piping shall be protected with aluminum jacket. Acceptable equals are by SpeedLine or Proto.
- B. All concealed piping shall be covered as follows: Apply insulation to clean dry pipe with side and end joints butted tightly. Seal lap of jacket and butt joint strips with Benjamin Foster 82-07 vapor barrier lap adhesive. Insulate fittings, flanges and valves of piping with mitered pipe insulation, or F/G premolded fittings made smooth with insulating cement and jacket with glass cloth saturated with Benjamin Foster 30-60 lagging adhesive. Vinyl or plastic fitting jackets will be allowed.
- C. Insulate condensate piping the same as for piping above except vapor seal all joints, seams, elbows and fittings.
- D. For all insulated pipes, including refrigerant piping, exposed to weather apply a 16 mil embossed aluminum jacket with 2" overlap at longitudinal and circumferential joints. Secure in place with 3/4" x .015" aluminum band 18" on centers. All seams shall be sealed weather tight.
- E. Foam insulation:
 - 1. Piping and Fittings. MicroLok plain pipe insulation shall be wired or taped in place over clean, dry pipe with all joints butted firmly together. Vapor retarder shall be Micro-Lok AP-T plus.

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- 2. The insulation shall be finished with metal jacketing with a laminated moisture retarder. Metal jacketing shall be overlapped 2 to 3 inches (51 to 76 mm) and held in place with sheet metal screws or metal bands.
 - 3. Elbows and tees shall be finished with matching metal fitting covers. Other fittings in metal-jacketed systems shall be finished with conventional weather-resistant insulating materials with painted aluminum finish.
- F. Insulate all refrigerant lines with Armacell foam insulation with vinyl protective coating. Acceptable substitutions are by Imcolock or Aeroflex.
- G. Provide minimum insulation thickness in accordance with the following table.

Minimum Pipe Insulation

Piping System Types	Conductivity	Mean Rating temp	Fluid Temp. Range	Runout 2 in +	1 in. and less	1-1/4 to 1 1/2	2 to 4 in.	5 and Larger
	BTUin/hsqftF	F	F	in.	in.	in.	in.	in.
Cooling Systems								
Condensate or Refrigerant	.22-.28 .22-.28	100 100	40-60 Below 40	1.0 1.0	1.5 1.5	1.5 1.5	1.5 1.5	1.5 1.5

2.2 FITTING COVERS:

- A. Fitting covers may be used in lieu of insulating cement and jacket. Provide fitting covers in Zeston - 2000 P.V.C. (20 Mil thickness) by Manville. Acceptable alternate manufacturers are by Speed Line or Proto.
- B. General - The matching insert (fiberglass) should either be wrapped completely around the fitting or snugly positioned inside the fitting for proper fit. The insert shall cover the full inner surface area of the fitting cover. The fitting cover is then to be applied over the fitting and insert, and the throat secured by either tack fastening, taping, or banding.
- C. Cold Pipe - Fitting systems below ambient temperature must have a continuous vapor barrier, either with pressure sensitive PVC Tape, or an approved adhesive system. When PVC Tape is used, a 2" downward lap is required. On cold lines in severe ambient temperatures, the fiberglass insert shall be the same thickness as the adjacent pipe insulation. All joints shall then be sealed with PVC Tape.

2.3 DUCTWORK:

- A. Insulate all plenums, intake ducts, air conditioning ducts, and warm air supply ducts in concealed locations with 1" thick R-5, fiberglass faced duct wrap type IV with factory applied flame retardant foil reinforced Kraft (FRK-25 U.L. labeled).

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- B. Insulation shall be wrapped tightly on the ductwork with all circumferential joints butted and longitudinal joints overlapped a minimum 2". Adhere insulation with 4" strips of Benjamin Foster 85-15 bonding adhesive at 8" o.c.

Additionally secure insulation to the bottom of concealed rectangular ductwork over 24" wide with suitable mechanical fasteners at not more than 18" o.c.

- C. On circumferential joints, the 2" flange on the facing shall be stapled with 9/16" flare-door staples on 6" centers and taped with minimum 3" wide foil reinforced Kraft tape. On longitudinal joints, the overlap shall be stapled on 6" centers and taped with minimum 3" wide foil reinforced Kraft tape. All pin penetrations or punctures in facing shall also be taped.
- D. Insulate air conditioning ducts or warm air ducts, all fresh air intake ducts, louver blanks, plenums in finished spaces Mechanical Rooms, Mechanical Mezzanine or Penthouses, with 1" thick, R-5, fiberglass ASJ-25 equipment insulation.
- E. Insulation shall be cut to fit the shape and contour of the equipment. All voids between equipment surface and insulation shall be packed with light density fiberglass. Impale insulation over welded pins on 12" centers and secure in place with speed washers.
- F. The insulation shall be vapor sealed to provide a complete airtight envelope. Vapor barrier shall consist of one layer of Ludlow Foil Barrier Paper smoothly adhered to the insulation or cement surface with Benjamin Foster 82-07 Vapor Barrier Lap Adhesive.

Lap all joints a minimum of 3" and seal with B.F. 82-07.

- G. It is not necessary to cover exhaust ductwork, return duct or ductwork which is called for to be lined. However, exhaust and relief ductwork from motorized damper to exhaust louver shall be covered as called for above, or exhaust and relief ductwork located on cold side of building insulation shall be covered as called for above.
- H. Supply ducts located in vented/unvented attic shall be insulated with duct insulation with min. R-8 value. Return ducts and exhaust ducts associated with energy recovery systems located in vented/unvented attics shall be insulated with R-5 insulation.

2.3 SOUND LINING:

- A. Line ductwork as indicated on drawings for sound attenuation.
- B. Fibrous-Glass Duct Liner shall Comply with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."
Use 1" thick John Manville permacote linacoustic RC-HP flexible duct liner with an R value of 4.3 and NRC value of 0.75.
Liner shall be applied with bonding adhesive and stick clips 16" o.c. Where ducts are lined, covering need not be applied. All raw edges shall be sealed with John Manville super seal.
- C. Acceptable equals are by CertainTeed, Owens Corning or Knauf
- D. Linings in air ducts and equipment shall meet the Erosion Test Method described in Underwriters' Laboratories, Inc., Publication No. 181. These linings, including coatings and adhesives, and insulation on exterior surfaces of pipes and ducts in building spaces used as air supply plenums, shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less as determined by an independent testing laboratory in accordance with ASTM Standard E 84.
Based Liner Adhesive shall comply with NFPA 90A or NFPA 90B and with ASTM C 916.

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Apply Antimicrobial Erosion-Resistant Coating to the surface of the liner that will form the interior surface of the duct to act as a moisture repellent and erosion-resistant coating. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.

- E. Flexible Elastomeric Duct Liner: Preformed, cellular, closed-cell, sheet materials complying with ASTM C 534, Type II, Grade 1; and with NFPA 90A or NFPA 90B. Provide in Armaflex. Acceptable equals are by K-flex or Aeroflex

Surface-Burning Characteristics: Maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

Liner Adhesive: As recommended by insulation manufacturer and complying with NFPA 90A or NFPA 90B.

For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24). Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various

- F. All dimensions shown on insulated ductwork shall be considered clear inside dimensions.

PART 3 – EXECUTION

3.1 SITE INSPECTION

- A. Before starting work under this section, carefully inspect the site and installed work of other trades and verify that such work is complete to the point where installation of materials and accessories under this section can begin.
- B. Verify that all materials and accessories can be installed in accordance with project drawings and specifications and material manufacturer's recommendations.
- C. Verify, by inspecting product labeling, submittal data, and/or certifications which may accompany the shipments, that all materials and accessories to be installed on the project comply with applicable specifications and standards and meet specified thermal and physical properties.

3.2 PREPARATION

- A. Ensure that insulation is clean, dry, and in good mechanical condition and that all factory-applied facings are intact and undamaged. Wet, dirty, or damaged insulation is not acceptable for installation.
- B. Ensure that pressure testing of piping, duct and fittings has been completed prior to installing insulation.

3.3 INSTALLATION

- A. General
 - 1. Install all insulation materials and accessories in accordance with manufacturer's published instructions and recognized industry practices to ensure that it will serve its intended purpose.

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2. Install insulation on piping/duct subsequent to painting, and acceptance tests.
3. Install insulation materials with smooth and even surfaces. Insulate each continuous run of piping with full-length units of insulation, with single cut piece to complete run. Do not use cut pieces or scraps abutting each other. Butt insulation joints firmly to ensure complete, tight fit over all piping surfaces.

B. Fittings

1. Wrap valves, fittings, and similar items in each piping system with wicking material to ensure a continuous path (100% coverage) for the removal of condensation.
2. Seal all fitting joints with contractor supplied VaporWick Sealing Tape. Approved vapor retarder mastic compound may be utilized in lieu of the tape, subject to approval by the Engineer.

C. Penetrations

Extend piping and duct insulation without interruption through walls, floors and similar piping or duct penetrations.

3.4 SEAMS:

- A. On exposed insulation, all longitudinal seams shall be kept at the top and back of the pipe and circumferential joints shall be kept to a minimum. Raw end of insulation shall be concealed by neatly folding the ends of the jackets. Fittings, valve bodies and flanges shall be furnished with the same jacket materials used on adjoining insulation.

3.5 PRIOR TESTING:

- A. Covering shall not be applied until all parts of the work have been tested by the Contractor and reviewed by the Engineer.

3.6 VAPOR BARRIER:

- A. Vapor barrier shall be applied in accordance with the manufacturer's instructions to maintain the integrity of the vapor barrier on cold systems.
- B. An approved vapor retarder mastic compatible with PVC must be applied between pipe insulation and fitting cover, and on fitting cover and throat overlap seam.
- C. For fittings where operating temperature is below 45 deg. F or where pipe insulation thickness is greater than 1 1/2", two or more layers of Hi-Lo temp insulation inserts shall be installed beneath fitting cover.

3.7 METAL SHIELDS:

- A. Metal shields, 16 gauge galvanized, shall be applied between hangers or supports and the pipe insulation. Shields shall be roll formed to fit the insulation and shall extend up to the center line of the pipe and the length specified for the insert. Insulation shall be rigid type for length of shield to prevent crushing.

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3.8 FIELD QUALITY ASSURANCE

- A. Upon completion of all insulation work covered by this specification, visually inspect the work and verify that it has been correctly installed. This may be done while work is in progress, to assure compliance with requirements herein to cover and protect insulation materials during installation.
- B. Replace any ceiling damage caused by condensation due to improper covering and sealing during the guarantee period of this job.

3.9 PROTECTION

- A. Replace damaged, removed or disturbed insulation with appropriate fiberglass insulation.
- B. The insulation contractor shall advise the general and/or the mechanical contractor as to requirements for protection of the insulation work during the remainder of the construction period, to avoid damage and deterioration of the finished insulation work.

3.10 SAFETY PRECAUTIONS

- A. Insulation contractor's employees shall be properly protected during installation of all insulation. Protection shall include proper attire when handling and applying insulation materials, and shall include (but not be limited to) disposable dust respirators, gloves, hard hats, and eye protection.
- B. The insulation contractor shall conduct all job site operations in compliance with applicable provisions of the Occupational Safety and Health Act, as well as with all state and/or local safety and health codes and regulations that may apply to the work.

END OF SECTION 230700

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SECTION 233113- METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The General Provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this Section.
- B. The requirements in Section 23 05 00 shall also govern the work under this Section.
- C. Examine all drawings and data and coordinate the work of this Section with all related and adjoining work.

1.2 SCOPE OF WORK:

- A. Contract includes all labor, material, equipment accessories and test required to furnish and install all air distribution systems as shown on drawings, implied and herein specified, complete and ready to operate.
- B. Contractor is requested to examine all of the Architectural plans and all details of construction and visit the site of the proposed addition and alterations so as to thoroughly acquaint himself with all conditions before submitting his bid.
- C. Work shall include but is not limited to the following:
 - 1. Ductwork
 - 2. Exhaust Fans
- D. Refer to Section 23 05 48 for Seismic Restraints.
- E. Contractor shall be responsible for wiring of all temperature controls.

1.3 SUBMITTALS:

- A. Refer to Section 01 33 00 "Submittal Procedures".
- B. Submit shop drawings, test data and product data for the following :
 - Ductwork
 - Fans
 - Grilles and Diffusers
 - Access Doors

1.4 AIR DISTRIBUTION SYSTEM DESCRIPTION:

- A. Furnish and install all supply, return and exhaust air system as indicated on the drawings. Systems to be complete with fans, motors, controls, starters, unless otherwise specifically omitted, ducts, filter banks, registers, grilles, diffusers, vibration eliminating bases, balancing dampers, fire dampers, automatic dampers, acoustical lining, insulation and other accessories to make the system complete and ready to operate to the full intent of the plans and specifications. The capacities and characteristics of fans, air handling equipment, shall be as indicated on the drawings.

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- B. All ductwork shall be run on warm side of building insulation.
- C. Design is based on equipment as described in the drawing equipment schedules. Any changes in foundations, connections, piping, controls, electrical equipment, wiring and connections and openings required by alternate equipment submitted and approved shall be made at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 DUCTWORK:

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- E. All sheet metal used throughout, except as specifically noted, shall be constructed of galvanized steel sheets as follows:

Rectangular Ducts	Alum.	Copper	
Duct up to 12"	26 ga.	24 ga.	16 oz.
Duct 13" to 30"	24 ga.	22 ga.	24 oz.
Duct 31" to 60"	22 ga.	20 ga.	32 oz.
Duct 60" and beyond	20 ga.		
Casings up to 72"	16 ga.		
Casings beyond 72"	14 ga.		

Bracings for Ducts

- Up to 24" None
- 25" to 40" 1" x 1" x 1/8" 4 ft. from joint
- 41" to 60" 1-1/2" x 1-1/2" x 1/8" 4 ft. from joint
- 61" to 90" 1-1/2" x 1-1/2" x 1/8" diagonal angles
or 1-1/2" x 1-1/2" x 1/8" angles 2 ft. from joint

- F. All fittings, joints, seams and connections shall be made up in accordance with standard recommended practice as described in Air Duct Design, latest ASHRAE Guide and SMACNA

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Low Pressure Standards, using Class B construction with all seams sealed. Snap lock joints will not be permitted.

- G. Carbon-Steel Sheets: Comply with ASTM A 1008/A 1008M, with oiled, matte finish for exposed ducts.
- H. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304 or 316, as indicated in the "Duct Schedule" Article; cold rolled, annealed, sheet. Exposed surface finish shall be No. 2B, No. 2D, No. 3, or No. 4 as indicated in the "Duct Schedule" Article.
- I. Aluminum Sheets: Comply with ASTM B 209 Alloy 3003, H14 temper; with mill finish for concealed ducts, and standard, one-side bright finish for duct surfaces exposed to view. Ducts carrying moist air (Locker Room exhaust, Dryer exhaust and dishwasher exhaust) shall be aluminum. Dryer exhaust ducts shall be riveted (no screws are allowed).

2.2 MEDIUM PRESSURE ROUND DUCT:

- A. All medium pressure and round ductwork shall be manufactured by the same firm to assure tight fit of all ductwork and components. Provide ductwork in United McGill or Semco.
- B. Submit the round duct test data covering leakage rate, bursting strength, collapsing strength, seam strength, and friction loss. Friction loss test data shall cover both the duct and the assembled coupling joints. This friction loss data used in the design of this system, include information on fittings used in system.
- C. Round and oval duct shall be manufactured of galvanized steel meeting ASTM A-525 and A-527-67 by the following methods and in the minimum gauges listed:

Diameter	Minimum Gauge	Method of Manufacture
3" thru 14"	24 Ga.	Longitudinal Seam
15" thru 26"	22 Ga.	Longitudinal Seam
27" thru 36"	20 Ga.	Longitudinal Seam
37" thru 50"	20 Ga.	Longitudinal Seam
51" thru 60"	18 Ga.	Longitudinal Seam
61" and Up	16 Ga.	Longitudinal Seam

Longitudinal seam duct shall have a fusion-welded butt seam.

- D. Fittings and couplings shall be of the following minimum gauges:

Diameter	Gauge
3" thru 36"	20 Gauge
38" thru 50"	18 Gauge
Over 50"	16 Gauge

1. All fittings are to have continuous welds along seams. All divided flow fittings are to be manufactured as separate fittings, not as tap collars welded into spiral duct sections.
2. All 90 degrees tees and 45 degrees laterals (wyes) up to and including 12" diameter tap size shall have a radiused entrance into the tap, produced by machine or press forming. The entrance shall be free of weld buildup, burrs, or irregularities.
3. Elbows in diameters 3" through 8" shall be two section stamped elbows. All other elbows shall be gored construction with all seams continuous/welded.

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4. Where it is necessary to use 2-piece mitered elbows, they shall have turning vanes in accordance with the following schedule.

Diameter	Number of Vanes
3" thru 9"	2
10" thru 14"	3
15" thru 19"	4
20" thru 60"	5
Over 60"	12" Spacing

- E. Registers to be mounted directly to duct shall be provided with boots for mounting to round spiral duct.
- F. Galvanized areas that have been damaged by welding shall be coated with corrosion resistant aluminum paint.
- G. Pipe-to-pipe joints in diameters to 36" shall be by the use of sleeve couplings, reinforced by rolled beads. Use welded angles for 37" diameter and above.

2.3 FLEXIBLE AIR DUCT:

- A. Flexible air ducts shall be used to connect supply ducts with air distribution outlets where shown. Flexible air ducts shall be all metal construction consisting of a bonded two ply laminate mechanically corrugated for strength and air tightness and shall be able to withstand 12" W.G. pressure.

Flexible air duct shall be of semi-rigid construction capable of being easily hand preformed without subsequent sagging or droop. Duct connections to equipment outlet collars shall be made in accordance with the duct manufacturer's recommendations. Insulated flexible duct shall be Clevaflex Type 12 as manufactured by Clevepak Corporation, New York, New York 10022, or approved equal in Metalaire.

- B. Flexible duct shall meet the requirements or NFPA 90A.
- C. All flexible duct shall be preinsulated. The maximum length of flex duct shall not exceed 6'-0".

2.4 JOINT SEALING:

- A. Duct joints shall be assembled and sealed as follows:
- B. Approved sealer is applied to the male end of the couplings and fittings. After the joint is slipped together, sheet metal screws are placed 1/2" from the joint bead for mechanical strength. Sealer is applied to the outside of the joint extending 1" on each side of the joint bead and covering the screw heads. Plastic-backed tape is immediately applied over the wet sealer.
- C. The duct sealer must be specifically formulated for the job of sealing the field joints for high pressure systems. The sealer shall be compatible with plastic-backed duct tape so the two shall cure and bond together. Samples of sealer and tape and the specification data sheets shall be submitted to the engineer for approval.
- D. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

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E. Two-Part Tape Sealing System:

Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.

Tape Width: 4 inches.

Sealant: Modified styrene acrylic.

Water resistant.

Mold and mildew resistant.

Maximum Static-Pressure Class: 10-inch wg, positive and negative.

Service: Indoor and outdoor.

Service Temperature: Minus 40 to plus 200 deg F.

Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.

For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

F. Water-Based Joint and Seam Sealant:

Application Method: Brush on.

Solids Content: Minimum 65 percent.

Shore A Hardness: Minimum 20.

Water resistant.

Mold and mildew resistant.

VOC: Maximum 75 g/L (less water).

Maximum Static-Pressure Class: 10-inch wg, positive and negative.

Service: Indoor or outdoor.

Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

G. Solvent-Based Joint and Seam Sealant:

Application Method: Brush on.

Base: Synthetic rubber resin.

Solvent: Toluene and heptane.

Solids Content: Minimum 60 percent.

Shore A Hardness: Minimum 60.

Water resistant.

Mold and mildew resistant.

For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

VOC: Maximum 395 g/L.

Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

Maximum Static-Pressure Class: 10-inch wg, positive or negative.

Service: Indoor or outdoor.

Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

H. Flanged Joint Sealant: Comply with ASTM C 920.

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General: Single-component, acid-curing, silicone, elastomeric.

Type: S.

Grade: NS.

Class: 25.

Use: O.

For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

I. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

J. Round Duct Joint O-Ring Seals:

Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for 10-inch wg static-pressure class, positive or negative.

EPDM O-ring to seal in concave bead in coupling or fitting spigot.

Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

2.5 ACCESS DOORS IN DUCTWORK:

A. Furnish hinged and reinforced access doors with wire glass observation port in door in sheet metal work for observation or maintenance of all dampers, controls in sheet metal ducts and housings. This applies to fresh air ducts, exhaust ducts, etc. Furnish doors of tight fitting construction. All duct access doors shall be furnished in Ventlok or equal in Air balance, Advanced Air, Inc. or Louvers & Dampers, Inc.

B. For access doors in architectural finishes refer to Section 08 31 16.

2.6 VOLUME DAMPERS:

A. Volume dampers with locking quadrants shall be provided on all supply, exhaust and return ducts, on all branches and at all take-off's to registers and diffusers.

B. Dampers shall be constructed of #20 gauge steel properly stiffened and to have locking quadrants outside covering of ducts. Opposed blade multi-lead dampers shall be used wherever damper blade is larger than 12".

2.7 SPLITTERS AND DUCTURNS:

A. Furnish and install splitter dampers in ductwork made of #20 gauge steel for proper control of air, where ductwork branches off from main supply ducts.

B. Refer to "Access Doors" for type of access doors required for access to ceiling dampers.

C. Install ducturns based on Barber Colman non-adjustable 90 degree double wall type in all square elbows.

D. Provide on all branch duct takeoffs as shown in Barber Colman adjustable airturns.

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2.8 REGISTERS, GRILLES AND DIFFUSERS:

- A. Registers, grilles and ceiling diffusers shall be furnished of size and type as shown on drawings, in Titus and Seiho or equal in Krueger or Price. The cat. no.'s refer to equipment as manufactured by Titus.
- B. All registers and wall grilles furnished in steel shall be furnished in prime coat except where specified herein or shown on drawings to be aluminum construction or factory baked enamel. Color shall be selected by the Architect. Color shall be applied at the factory.
- C. Refer to schedule on drawings for type and finish of each grille.
- D. Provide all wall grilles and registers with all purpose frame.
- E. All registers and diffusers shall be compatible with ceiling specified under Architectural.

2.9 CANVAS JOINTS:

- A. On each side of each centrifugal or centriline fan and at each air handling unit having duct connections, furnish Ventfabric Tape for expansion and elimination of sound travel in ductwork.
- B. Furnish and install Doro-Dyne Insuflex, insulated flexible duct connector at all locations where the duct crosses an expansion joint.

2.10 VIBRATION ISOLATION:

- A. All mechanical equipment shall be mounted on or suspended from approved and specified foundations and supports.
- B. All floor mounted equipment shall be erected on 6" high reinforced concrete house - keeping pads (by Division 3)
- C. All vibration isolation systems shall be guaranteed to have the static deflections required to warrant a 98% isolation efficiency. The vibration isolation system shall be installed in accordance with the manufacturer's instructions.
- D. Refer to Section 23 05 48 Vibration Isolation and Seismic Restraint.

PART 3 - EXECUTION

3.1 GENERAL FOR EQUIPMENT:

- A. Refer to schedule on drawings for size, type, design capacities and characteristics of Fans. Also required accessories shall be indicated in schedule or listed herein.
- B. Provide and install all additional structural supports for fans, not provided for by the General Contractor.
- C. Provide and install vibration eliminators of type and size approved and recommended by the manufacturer for the particular application and arrangement of installation.
- D. Provide and install flexible joints on either side of fan.

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- E. Furnish all combination disconnect switches and starters for fans unless otherwise called for.
- F. All equipment on base drawings has been dimensionally coordinated with the architectural and structural drawings. If this Contractor proposes to substitute any equipment other than which is on the basic bid drawings, for review, he shall first verify that the proposed equipment will fit dimensionally.
This Contractor shall be responsible for any additional costs to changes incurred because of the above substitution even after review by the Engineer.

3.2 DUCT INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.
- B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- C. Install round and flat-oval ducts in maximum practical lengths.
- D. Install ducts with fewest possible joints.
- E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.
- J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.
- K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Section 233300 "Air Duct Accessories" for fire and smoke dampers.
- L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."

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3.3 INSTALLATION OF EXPOSED DUCTWORK

- A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
- B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.
- C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.
- D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.
- E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.4 DUCT SEALING

- A. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":

Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

Outdoor, Supply-Air Ducts: Seal Class A.

Outdoor, Exhaust Ducts: Seal Class C.

Outdoor, Return-Air Ducts: Seal Class C.

Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class B.

Unconditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class A.

Unconditioned Space, Exhaust Ducts: Seal Class C.

Unconditioned Space, Return-Air Ducts: Seal Class B.

Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class C.

Conditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class B.

Conditioned Space, Exhaust Ducts: Seal Class B.

Conditioned Space, Return-Air Ducts: Seal Class C.

3.5 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Leakage Tests:

Comply with SMACNA's "HVAC Air Duct Leakage Test Manual." Submit a test report for each test.

Test the following systems:

- 1 Ducts with a Pressure Class Higher Than 3-Inch wg: Test representative duct sections totaling no less than 25 percent of total installed duct area for each designated pressure class.

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2. Supply Ducts with a Pressure Class of 2-Inch wg or Higher: Test representative duct sections totaling no less than 50 percent of total installed duct area for each designated pressure class.
3. Return Ducts with a Pressure Class of 2-Inch wg or Higher: Test representative duct sections totaling no less than 50 percent of total installed duct area for each designated pressure class.
4. Exhaust Ducts with a Pressure Class of 2-Inch wg or Higher: Test representative duct sections totaling no less than 50 percent of total installed duct area for each designated pressure class.
5. In addition to above, test any VAV system duct of 1" and ½" construction class that is upstream of the VAV box.

Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.

Test for leaks before applying external insulation.

Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure.

Give seven days' advance notice for testing.

C. Duct System Cleanliness Tests:

Visually inspect duct system to ensure that no visible contaminants are present.

3.6 STRUCTURAL SUPPORT:

- A. Main dunnage steel shall be provided under another section; however, this Contractor shall provide all supplementary steel for the complete support of equipment.

3.7 DESCRIPTION OF SUPPLY AND RETURN AIR/EXHAUST SYSTEM:

- A. Furnish and install the complete horizontal and vertical ducts for each system. For all centrifugal fans, furnish flexible joints either side of fan and extend the fan discharge ducts to other openings as indicated.
- B. Friction dampers shall be installed in all branch ducts made accessible for adjustment near registers or grilles. For exact type of grilles or registers, refer to drawings.
- C. Furnish angle frames to suit construction for all registers and grilles complete with plaster stops.
- D. Sizes and approximate locations of all ducts are shown on the drawings. Check carefully with the architectural and structural drawings and drawings showing work of other trades to make sure that there will be no conflict between these trades and the ducts.
- E. Coordinate the installation of setting frames and registers in order that details as shown on drawings are adhered to. Wood rounds shall be furnished and installed as shown on architectural detail.
- F. All ductwork shall be installed as shown on drawings and is to be rigidly braced and supported to prevent vibration and sagging.
- G. All hangers and supports are to be fastened securely to concrete, wood or steel construction. Under no circumstances will hangers be inserted supported on suspended ceilings, conduits or pipe be permitted.

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- H. Refer to Section 01 31 00 for coordination drawings.
- I. Contractor shall provide all labor and materials as required to assist the Balancing Contractor in proper balancing of the air systems. Contractor shall return to the job and shall make the necessary adjustments and corrections to the systems as required by the Balancing Contractor in order to achieve satisfactory system performance in accordance with design parameters.
- J. This Section shall be responsible for any necessary changes in pulleys and belts required to obtain proper air delivery and shall provide additional dampers, splinters, turning vanes, turbulence vanes and other devices if necessary to obtain the correct system performance, all as directed by the Owner's or its Representative.

END OF SECTION 233113

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SECTION 260000 - GENERAL ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The General Provisions of the Contract, including Division 0, Contract Requirements, and Division 1, General Requirements, are a part of this Section and shall be binding on the Contractor and /or Subcontractor who performs this work. Note also all addenda.
- B. The requirements in Section 260000 shall govern the work under all Sections of Divisions 26, 27, and 28.

1.2 SCOPE OF WORK:

- A. Scope of work consists of installation of materials to be furnished under these Specifications and without limiting generality thereof consists of furnishing labor, materials, equipment, hoisting, plant, transportation, rigging, staging, appurtenances, and services necessary and/or incidental to properly complete all electrical work as shown on drawings, as described in the Specifications or as reasonably inferred from either as being required in opinion of the Architect and Engineer.
- B. Work Included: Provide complete electrical services where shown on the drawings, as specified herein and as needed for a complete and proper installation including but not necessarily limited to:
 - 1. Temporary power (see Division 1).
 - 2. Metering service section and panelboards.
 - 3. Complete feeder distribution system to various distribution, lighting, power and computer power panels.
 - 4. Complete branch circuit wiring system for lighting, motors, receptacles, and other noted loads.
 - 5. Lighting fixtures.
 - 6. Occupancy sensor lighting controls.
 - 7. Switches, receptacles, and other similar wiring devices.
 - 8. Raceways and boxes for telephone, data, catv outlets, audio/visual (A/V) outlets, security/access control devices.
 - 9. Call-For-Aid systems.
 - 10. Fire alarm system.
 - 11. Vibration isolation and seismic restraints for electrical equipment.
 - 12. Lightning protection system.
 - 13. Specialized Sound systems.

1.3 SITE CONDITIONS:

- A. Prior to submitting bid, visit the site and identify existing conditions and difficulties that will affect work called for by the Contract Documents.
- B. No compensation will be granted for additional work caused by unfamiliarity with site conditions that are visible or readily construed by experienced observers.
- C. The Contractor shall verify and obtain all necessary dimensions at the site.

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1.4 DEFINITIONS:

- A. Furnish: The word "furnish" is used to mean "supply and deliver the referenced item to the project site, ready for unloading, unpacking, assembly, and installation".
- B. Install: The word "install" is used to describe operations at the project site involving the referenced item including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations".
- C. Normally Occupied: The words "normally occupied" are used to mean "all rooms within a building except for crawlspaces, underground tunnels, attic spaces, mechanical rooms, telephone rooms, data distribution rooms, and electrical rooms".
- D. Or Approved Equal: The words "or approved equal" are used to mean "any product which in the opinion of the Engineer is essentially equal in quality, size, arrangement, appearance, construction, and performance to that product specified or shown on the drawings".
- E. Provide: The word "provide" means "to furnish and install the referenced item, complete and ready for the intended use".
- F. Remove: The word "remove" means "to disconnect from its present position, remove from the project site, and to dispose of in a legal manner".

1.5 QUALITY ASSURANCE:

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of the Contract Documents.
- B. Codes and Regulations:
 - 1. In addition to complying with the specified requirements, comply with all Federal, State and Local Codes wherever applicable including the following: 2018 Connecticut State Building Code, 2015 IBC, 2018 Connecticut Fire Safety Code, 2015 International Fire Code, 2013 NFPA 72 National Fire Alarm Code, 2017 NFPA 70 National Electrical Code, 2015 International Energy Conservation Code, ICC/ANSI A117.1-2009 Accessible and Usable Buildings and Facilities, and ADA.
 - 2. Comply with the requirements of the Local Authority Having Jurisdiction.
 - 3. Materials and equipment shall be UL listed where standard has been established.
 - 4. Perform tests required by specifications, Engineer's instructions, laws, ordinances or public authorities, approvals, and give Owner timely notice. Notify the Owner of dates for inspection by other authorities.
 - 5. In the event of conflict between or among specified requirements and pertinent regulations, the more stringent requirement will govern.
 - 6. Reference made to codes and standards shall be interpreted as minimum requirements. Provide and perform work in excess of codes and standards as indicated by drawings or specifications.

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- C. Prior to bidding, the Contractor shall give written notice to the Engineer of any materials, equipment, or apparatus believed in the opinion of said Contractor, to be inadequate or unsuitable for the installation, or in violation of laws, ordinances, rules, or regulations of authorities having jurisdiction. The Contractor shall also give written notice to the Engineer of any items, materials, equipment, or work believed in the opinion of said Contractor, to be omitted from the Contract Documents. In the absence of such written notice, it is mutually agreed that Contractor has included the cost of all required items in his bid and that he will be responsible for approved satisfactory functioning of systems without further compensation.

1.6 SUBMITTALS:

- A. Comply with the requirements of Division 1 for submittal procedures.
- B. Product data: after the Contractor has received the Owner's Notice to Proceed, submit six copies of the following:
 - 1. Materials list of all items proposed to be provided.
 - 2. Manufacturer's specifications, catalog cuts, performance curves, electrical characteristics, wiring diagrams, equipment dimensions and weights, and other data for each item proposed to be provided as needed to prove compliance with the specified requirements.
 - 3. Shop drawings and other data as required to indicate method of installing and attaching equipment.
- C. Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
 - 1. Include the following information on the label for processing and recording action taken:
 - a. Project name, location, and address
 - b. Date
 - c. Name and address of Architect
 - d. Name and address of Engineer
 - e. Name and address of Contractor
 - f. Name and address of Sub-Contractor
 - g. Name and address of supplier(s)
 - h. Name of manufacturer(s)
 - i. Number and title of appropriate Specification section.
- D. Data sheets and catalog cuts, etc. contained in submittals shall be clearly marked in ink indicating specific service or application for which material or equipment is to be used. Data of a general nature and not clearly defining the service or application for which the proposed item is to be used will not be accepted.
- E. Submit for review complete diagrams of systems prepared by equipment manufacturer showing connections and equipment. Standard wiring diagrams shall be modified where necessary to specific system.
- F. Prior to forwarding submittals and shop drawings for review by the Architect and Engineer, the Contractor shall thoroughly check each submittal, reject those not conforming to the specifications, and indicate by his signature that the submittals in his opinion meet the contract requirements.

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- G. Intent of Shop Drawings and product data review is to check for capacity, rating and certain construction features, ensure that work meets requirements of Contract Documents regarding information that pertains to fabrication processes or means, methods, techniques, sequences and procedures of construction, and for coordination of work between trades.
- H. Submittal review shall not diminish responsibility under this contract for dimensional coordination, quantities, installation, piping, supports, access, service and errors, nor for deviations from requirements of contract documents. Noting errors while overlooking others will not excuse proceeding in error. Requirements of contract documents are not limited, waived, nor superseded by shop drawing review.
- I. Equipment variations: Where no specific make or material, apparatus or appliance is mentioned in the Contract Documents, any first class product made by a reputable manufacturer may be used, providing it conforms to the requirements of these specifications and meets the approval of the Engineer.
- J. Equipment alternates, substitutions, and deviations:
 - 1. Wherever more than one manufacturer is mentioned in the specifications or on the drawings, any of those named shall be considered equally acceptable to that on upon which design was based, and providing all aspects of the specification are met insofar as quality, construction, performance, space requirements, noise levels and special accessories or materials, any of those named may be included in Contractor's bid.
 - 2. Bidders wishing to obtain approval on brands other than those specified by name shall submit their request to the Architect and Engineer not less than ten (10) business days before the date fixed for opening of bids. No substitutions will be entertained after this time. Approval by the Architect and Engineer will be in the form of an Addendum to the specifications issued to all prospective bidders, indicating that the additional brand or brands are approved as equal to those specified so far as the requirements of the project are concerned.
 - 3. Alternate equipment to that specified or shown on the drawings, as proposed to be provided by the contractor, must be essentially equal in quality, size, construction, and performance to that item specified or shown on the drawings.
 - 4. Submittals for alternate equipment shall list all deviations and differences from the specified equipment. Failure to submit this list will result in rejection of the submittal. Any deviations and differences not listed but discovered after installation shall be rectified as directed by the Engineer at the Contractor's cost.
 - 5. Furnish samples of alternate equipment proposed to be provided when so requested by the Architect or Engineer.
 - 6. Where the Contractor proposes to use an item of equipment which differs from that upon which design was based, which requires any redesign of the structure, partitions, foundations, piping, wiring or of any other part of Mechanical, Electrical or Architectural Layout, all such redesign, new drawings or detailing required shall be prepared by Contractor at his own expense for approval of the Architect and Engineer.
 - 7. Where approved substitutions or deviations require a different quantity, size or arrangement of structural supports, wiring, conduit, piping, ductwork, and equipment from that upon which design was based, all additional items required by the systems shall, with the approval of the Architect and Engineer, be furnished by Contractor at no additional cost to the Owner.
- K. Allow sufficient time so that the delivery and installation of equipment will not be delayed as a result of the time required to review, process and transmit submittals, including resubmittals. Failure by the Contractor to transmit submittals to the Architect and Engineer in ample time for review and processing shall not entitle him to an extension of the Contract Time and no claim for an extension of time by reason of such default will be allowed.

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- L. Submittals, shop drawings, and samples will be reviewed with reasonable promptness and will be stamped indicating appropriate action as follows:
 - 1. "No Exceptions Taken" means that fabrication, manufacture, or construction may proceed providing submittal complies with contract documents.
 - 2. "Amend as Noted" means that fabrication, manufacture, or construction may proceed, providing the submittal complies with Engineer's notations and contract documents.
 - 3. "Resubmit" means that submittal, or equipment proposed to be provided, does not comply fully with the contract documents and that fabrication, manufacture, or construction shall not proceed. Resubmit in accordance with the Engineer's notations and contract documents.
 - 4. "Rejected" means that submittal does not comply with contract documents, or that equipment proposed to be provided does not comply with the specified requirements or is not equal or better in quality and performance than that item specified. Fabrication, manufacture, or construction shall not proceed. Resubmit in accordance with the contract documents and specified requirements.
- M. If material or equipment is installed prior to review, or without review, it shall be removed and replaced at no extra charge to the Owner if, in the opinion of the Architect and Engineer, the material or equipment is not in compliance with the Contract Documents.

1.7 AS-BUILT DRAWINGS:

- A. Maintain a clean, undamaged set of black line white-prints of Contract Drawings and Shop Drawings at the job site. Protect as-built drawings from deterioration and loss in a secure location. Provide access to as-built drawings for reference during normal working hours by the Owner, Architect, Engineer, and Authority Having Jurisdiction.
- B. As work progresses mark the As-built drawings to show the actual installation where the installation varies from the work as originally shown, whether resulting from Addenda, Change Order, approved submittals, or changes made due to field conditions. Mark whichever drawing is most appropriate for showing conditions fully and accurately. Where shop drawings are used, record a cross reference at the corresponding location on the Contract Drawings. Give particular attention to items concealed within the structure or buried below grade.
 - 1. Mark as-built drawing sets with colored erasable pencils: using separate colors to distinguish between different systems.
 - 2. Include dimensioned locations of conduit runs buried below floor slabs and buried beyond the building footprint.
 - 3. Note related change order numbers where applicable.
- C. At the completion of work prepare a new set of black line white-print As-built Drawings, of work as actually installed, incorporating addenda, changes made due to approved submittals, change order work, field changes, and added data, all as shown on the marked-up record drawings maintained at the site. Date the set and clearly mark it as "As-built Drawings".
- D. Furnish two sets of the As-built Drawings to the Architect and Engineer.

1.8 OPERATING AND MAINTENANCE MANUALS:

- A. Upon completion of the work of this Contract, deliver to the Architect and Engineer four (4) copies of an Operation and Maintenance (O & M) Manual. Organize operating and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual heavy-duty 2-inch, 3-ring vinyl covered binders, with pocket folders for folded sheet information. Include a

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separate section for each system or sub-system. Sections shall be separated by heavy plastic dividers with tabs that identify the material in each section. Place a permanent label or title block on each binder for identification.

1. Include the following information on the label:
 - a. O & M Manual for: Boys and Girls Club of Hartford – South End
 - b. Date
 - c. Name and address of Architect
 - d. Name and address of Engineer
 - e. Name and address of Contractor
 - f. Name and address of Sub-Contractor

B. Provide the following in each manual:

1. Table of Contents
2. Listing of all service agents with addresses and telephone numbers
3. Description of systems operation
4. Emergency instructions for equipment and/or systems where appropriate
5. Wiring diagrams and piping diagrams specific to systems installed.
6. Manufacturers' operating and maintenance instructions for each piece of equipment installed
7. Inspection procedures
8. Spare parts list
9. Copies of all panelboard circuit indexes.
10. Copies of measurements taken where specified elsewhere in the Contract Documents
11. Copies of all warranties and guarantees.
12. Copies of submittals and shop drawings.

1.9 GUARANTEE AND WARRANTIES:

- A. Obtain in Owner's name written equipment and material warranties offered in manufacturer's published product data without exclusion or limitation.
- B. Guarantee work of this Contract in writing for eighteen (18) months from the date of substantial completion. Repair or replace defective materials, equipment, workmanship and installation that develop within this period, promptly and to Owner's satisfaction and correct damage caused in making necessary repairs and replacements under guarantee within contract price.
- C. Replace material or equipment that requires excessive service during guarantee period, as defined and as directed by the Architect and Engineer.
- D. Submit guarantee to the Owner before final payment.

1.10 LAWS, ORDINANCES, PERMITS, AND FEES:

- A. Give all necessary notices, obtain all permits and pay all taxes, fees and other costs in connection with the work; file all necessary plans, prepare all documents and obtain all necessary approvals of all Regulation Authorities; obtain all required Certificates of Occupancy and/or Inspections required for the work and deliver same to the Owner before requests for acceptance and final payment for the work.
- B. Include in the work, without extra cost to the Owner, all labor, materials, services, apparatus, drawings (in addition to Contract Documents and Drawings) required to comply with all applicable laws, ordinances, rules and regulations.

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1.11 CORRELATION OF DRAWINGS AND SPECIFICATIONS

- A. In general, the Specifications will describe the “quality” of the work and the Drawings the “extent” of the work. The Drawings and Specifications are cooperative and supplementary; however, and each item of the work is not necessarily mentioned in both the Drawings and Specifications. All work necessary to complete the project, so described, is to be included in this contract.
- B. In case of disagreement between Drawings and Specifications, or within either document itself, the better quality or greater quantity of work shall be estimated and the matter drawn to the Architect’s and Engineer's attention for decision and/or adjustment. Any work done by any Contractor without consulting the Architect and Engineer, when the same requires a decision and/or adjustment, shall be done at the Contractor’s risk.
- C. Drawings are diagrammatic and indicate general arrangement of systems and work included in Contract. Information and components shown on diagrams but not on plans, and vice versa, shall apply or shall be provided as though expressly required on both. It is not intended that every fitting or component be specified or shown on drawings; however, Contract Documents require provision of all components and materials necessary for a complete and operational installation, whether or not indicated or specified.
- D. Do not scale Drawings. Scale indicated on Drawings is for establishing reference points only. Actual field conditions shall govern all dimensions. The Contractor shall verify all dimensions at the project site.
- E. In all cases where the Contract Documents refer to equipment or apparatus in singular number, it is intended that such reference include as many such items that are required to complete the work.

1.12 ELECTRICAL VOLTAGES:

- A. The electrical service to the building is 208Y/120V, 3 phase, 4 wire.
- B. All equipment shall be suitable for this electrical supply. It is the responsibility of the Contractor to study the electrical drawings to determine the supply for any particular piece of equipment.
- C. If equipment requires other electrical characteristics (voltage and phase) than that supplied and shown on the electrical drawings, transformers and wiring shall be provided with that equipment at no extra cost to the Owner.

1.13 ROOM NAMES AND NUMBERS – SYSTEMS PROGRAMMING:

- A. This contractor shall include in his bid all costs associated with changing all of the room names and numbers at the end of the job from the names and numbers shown on the construction documents to a new set of room names and numbers, inclusive of all re-programming of all electrical systems, etc. Final room numbers will be provided by the Architect to the trade contractors at or around the date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS AND WORKMANSHIP:

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- A. Provide only materials that are new and of type and quality specified. Where Underwriters' Laboratories, Inc. have established standards for such materials, provide only materials bearing the UL label.
- B. Provide accessories, materials and equipment necessary to make installation complete in every detail, and to conform to manufacturers' latest installation instructions, under this Contract whether or not specifically shown on drawings or specified herein.
- C. All component parts of each item of equipment shall bear the manufacturers' nameplate, giving name of manufacturer, description, size, type, serial or model number, electrical characteristics, etc. in order to facilitate maintenance or replacement. Contractors or Distributors nameplates shall not be fixed to items of equipment and are not an acceptable alternate to the manufacturer's nameplate data.
- D. No materials or equipment used shall be discontinued or about to be discontinued items.
- E. The Architect and Engineer shall have the right to reject any part of the work in case the material or workmanship is not of satisfactory quality. Any work or material deemed unacceptable by the Architect and Engineer shall be removed and replaced with acceptable work and material as defined by the Architect and Engineer, and at no additional expense to the Owner.

2.2 PROTECTION:

- A. Work performed by the Contractor shall include protecting the work and materials of all other Contractors from damage by work or workmen, and shall include making good any and all damage thus caused.
- B. The Contractor shall be responsible for work and equipment until finally inspected, tested and accepted. Protect work against vandalism, theft, weather, injury or damage, and carefully store material and equipment received on site which is not immediately installed. Close open ends of work with approved covers, caps or plugs during construction to exclude dust, dirt, moisture, plaster, mortar, or general construction debris. Note - duct tape is not an acceptable means of protecting open conduit and pipe ends.
- C. Work shall include receiving, unloading, uncrating, storing, protecting, setting in place and completely connecting any motor starters and/or control equipment having mechanical/electrical service connections which are furnished by Owner or furnished by others.
- D. Work shall include exercising special care in handling and protecting equipment and fixtures. Any equipment and fixtures which are missing, lost, stolen, or damaged by reason of the Contractor's failure to provide adequate protection shall be replaced by that Contractor at no additional cost to the Owner.

2.3 TEMPORARY FACILITIES:

- A. Provide temporary power and lighting as specified under Division 1, and as required for the performance of the work of this Contract.
- B. Provide new materials and equipment; if acceptable to the Architect, undamaged previously used materials in serviceable condition may be used. All materials shall be suitable for the service intended.
- C. Maintain temporary services and facilities in a neat and clean manner. Operate in a safe and efficient manner. Do not allow hazardous, dangerous, or unsanitary conditions to develop or persist on site.

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- D. Do not overload temporary facilities, or permit them to interfere with progress of the work.
- E. Scaffolding and other temporary construction shall be rigidly built in accordance with Local, State, and Federal regulations.
- F. Remove each temporary facility when no longer needed, when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete and/or restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged work, clean exposed surfaces, and replace construction that can not be repaired to the satisfaction of the Owner.
- G. Do not allow temporary wiring to become enclosed within the building structure. All temporary wiring and conduit shall be removed from the building. Where temporary wiring or conduit becomes enclosed within walls or ceilings, the Contractor shall disassemble, remove, and replace the walls or ceilings as required to remove the wiring and conduit.

2.4 SCAFFOLDING, RIGGING, HOISTING:

- A. Work shall include all scaffolding, rigging, hoisting and services necessary for delivery and erection of equipment into or onto the site and/or building. Remove all scaffolding, rigging, and hoisting equipment from the site when no longer needed.

2.5 EXCAVATION AND BACKFILLING:

- A. Excavation and backfilling for all electrical work inside and outside of the building shall be performed in accordance with Division 31 of these Specifications.

2.6 CUTTING AND PATCHING:

- A. Cutting and patching for all electrical work shall be performed in accordance with Division 1 of these Specifications.

2.7 SLEEVES AND OPENINGS:

- A. The Electrical Contractor shall provide all necessary sleeves and openings as required to permit the installation of the electrical systems.

2.8 PAINTING:

- A. All painting of electrical work shall be performed in accordance with Division 9 of these Specifications, unless otherwise specified.

2.9 ELECTRICAL MOTOR STARTERS AND VARIABLE FREQUENCY DRIVES:

- A. Motor starters and variable frequency drives (VFD'S) shall be furnished by each respective trade for motor driven equipment provided by them. The Electrical Contractor shall install the starters and VFD'S, and shall provide all power wiring to the starters and VFD'S, and from the starters and VFD'S to the motors they control.
- B. Motor starters and VFD'S shall conform to requirements of NEC, NEMA, UL, CSA, and ANSI and shall be suitable for the required horsepower, duty, voltage, phase, frequency, service, and location. All starters and VFD'S shall be furnished in NEMA enclosures suitable for the environment in which they are to be located.

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- C. All starters shall be of the same manufacture and shall be furnished in Eaton (Cutler-Hammer), Square D, or Allen Bradley.
- D. Thermal Overloads:
 - 1. All motors 1/8 horsepower or larger shall be provided with thermal-overload protection. Thermal overloads shall be melting alloy ambient temperature compensating type.
 - 2. Thermal overloads shall be sized in accordance with NEC requirements for the nameplate data of the motor(s) as actually delivered to the site.
- E. Starters for manual control of single phase motors up to one (1) horsepower furnished without integral thermal overloads shall be combination manual disconnect switch and starters with thermal overload protection for each ungrounded leg. Starters shall be inoperable if a thermal unit is removed. These starters shall be 2-pole and shall be provided with green neon pilot light and handle guard/lock-off.
- F. Starters for three phase motors shall be full voltage, circuit breaker combination magnetic starters. All circuit breaker combination magnetic starters shall include melting alloy type thermal overload protection, low voltage protection, and two (2) sets of auxiliary normally open and normally closed contacts. Thermal overload protection shall be provided in each ungrounded leg. Starters shall be inoperable if a thermal unit is removed. All circuit breaker combination magnetic starters shall be equipped with control power circuits. Provide starters with control power transformers of secondary voltage required for the control power circuitry. Provide control power transformers with primary and secondary fusing. The disconnect handle on circuit breaker combination magnetic starters shall always be in control of the disconnect device with the door opened or closed. The disconnect handle shall be clearly marked as to whether the disconnect device is "on" or "off", and shall include a two-color handle grip, the black side visible in the "off" position, and the red side visible in the "on" position.
 - 1. All circuit breaker combination magnetic starters for manual control of three phase motors shall have start-stop push buttons in the cover and shall be provided with red and green pilot lights.
 - 2. All circuit breaker combination magnetic starters for automatic or interlocking control of three phase motors shall have hand-off-automatic selector switches in the cover and shall be provided with red and green pilot lights.

2.10 BASES AND SUPPORTS:

- A. Provide all necessary supports, rails, framing, bases, and piers required for the installation of equipment provided under this contract.
- B. Unless otherwise shown, all equipment shall be securely attached to the building structure in an acceptable manner. Attachments shall be of a strong and durable nature; any attachments that are insufficient in the opinion of the Architect or Engineer shall be replaced as directed at no additional cost to the Owner.

2.11 SEISMIC RESTRAINTS:

- A. Provide seismic restraints for all electrical system components in accordance with the 2018 Connecticut State Building Code.
- B. Contractor shall have the following responsibilities:
 - 1. Determine seismic restraint sizes and locations required by code.

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2. Provide and install isolation systems and seismic restraints.
2. Provide installation instructions, drawings and field supervision to assure proper installation and performance.

- C. Installations shall be designed to safely accept external forces of one-half "G" load in any direction for all rigidly supported equipment without failure and permanent displacement of the equipment. Life safety equipment shall be capable of safely accepting external forces up to one "G" load in any direction without permanent displacement of the supported equipment.

2.12 SLEEVES, INSERTS AND ANCHOR BOLTS:

- A. The Contractor shall provide and shall be held responsible for the location and position of all sleeves, inserts, and anchor bolts required by his work. Failure to do so, which requires cutting and patching of finished work, shall be done at no additional cost to the Owner.

2.13 FIRE STOPPING:

- A. All sleeves shall be packed with damming material and sealed. Sealant shall allow for movement without cracking and shall be 3M brand Fire Barrier Caulk CP25 or approved equal.
- B. Provide fire stopping at all fire or smoke rated wall or fire rated floor penetrations in order to maintain its original integrity. The materials and methods must be tested and listed or approved by Underwriters Laboratories, Factory Mutual or some other recognized authority. The fire stopping performance must be evaluated in accordance with ASTM-E814 test method. The Contractor shall use 3M Family of Products including, but not limited to the following:

1. CP25 caulk fire barrier compound.
2. CS-195 fire resistive composite panel for large openings.
3. FS-195 wrap/strip to fire stop plastic pipe.
4. PSS-7900 systems for circular, rectangular, and square openings.
5. MPP-4S+ moldable putty pads for electrical outlet boxes.

- C. The above 3M products and systems shall be submitted for review by the Engineer and properly applied in the field in accordance with the Manufacturer's recommended procedures.

2.14 LUBRICATION:

- A. All equipment installed under this contract having moving parts shall and requiring lubrication shall be properly lubricated according to the manufacturer's instructions prior to operation and testing. Any such equipment discovered to have been operated prior to lubrication by the Contractor shall be subject to rejection and replacement at no additional cost to the Owner.

2.15 ACCESS PANELS:

- A. Provide access panels for electrical equipment which is not readily accessible. Such equipment includes items above hung ceilings which are not readily removable and items installed within walls, inside chases, or inside dead cavity spaces.
- B. Access panels shall be of sufficient size to permit easy replacement and servicing of electrical equipment.
- C. Access panels shall bear the same or greater fire rating as the wall or ceiling in which they are installed.

2.16 OTHER MATERIALS:

GENERAL ELECTRICAL

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- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect and Engineer.
- B. Provide miscellaneous hardware and support accessories, including channels, support rods, nuts, bolts, screws, and other such items, with galvanized or cadmium plated finish, or other approved rust inhibiting coatings.

PART 3 - EXECUTION

3.1 GENERAL:

- A. Unless specifically noted or shown otherwise, install all equipment and material specified herein or shown on drawings whether or not specifically itemized herein.
- B. Check equipment and material delivered to the project site and verify that it is in conformance with the approved submittals prior to installation.

3.2 SURFACE CONDITIONS:

- A. Examine the areas and conditions under which work of this Contract will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.3 PREPARATION:

- A. Coordinate:
 - 1. Coordinate as necessary with other trades to assure proper and adequate provisions in the work of those trades for interface with the work of this Contract. Each Contractor shall furnish all information necessary to permit work of other trades to be installed in a satisfactory manner.
 - 2. Coordinate delivery of equipment to project prior to installation. Any equipment stored for an extended period of time prior to installation may be subject to rejection by the Architect or Engineer.
 - 3. Coordinate the installation of items with the schedule for work of other trades to prevent unnecessary delays in the total work.
 - 4. Where electrical equipment is shown in conflict with locations of structural members or other equipment, provide required supports, offsets, bends, or tees as required to clear the encroachment.
 - 5. No conduit, cable(s), boxes, etc., shall be installed until the entire run has been checked for clearances and the work has been coordinated between all the trades. Each tradesman shall be responsible for taking his own field measurements and maintaining proper clearance from the Owner's equipment and the work of other trades, and for coordinating his work with that of other Contractors. Furnish all necessary information, dimensions, templates, etc. in order that a properly coordinated job will result.
 - 6. Prior to roughing, the contractor shall obtain exact electrical equipment, fixture, and device locations from the Architect and Owner. Equipment, fixture, and device locations

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shown on the drawings are to be used for general reference only. Roughing of equipment, fixtures, and devices shall not proceed until the exact locations, heights, and orientations of same have been agreed upon with the Architect and Owner.

7. If due to lack of coordination and foresight by the Contractor, equipment must be relocated or extra work performed, all costs shall be the responsibility of the Contractor and may not be passed through to the Owner.
- B. Unload equipment and materials delivered to the site. Pay cost for rigging, hoisting, lowering and moving electrical equipment on site, in building, or on roof. During construction provide protection against moisture, dust accumulation, and physical damage of equipment. Provide temporary heaters within units as required to evaporate excessive moisture and provide ventilation as required.
 - C. Certain present building clearances are available for handling equipment. All equipment shall be delivered knocked down as required to clear space limitations on site and within the building.
 - D. Unless noted otherwise the Contractor shall set all equipment level, plumb, and secure prior to making connections to other equipment or systems.
 - E. Data indicated on the drawings and in these Specifications are as exact as could be secured, but their absolute accuracy is not warranted. The exact locations, distances, levels and other conditions will be governed by actual construction and the drawings and specifications should be used only for guidance in such regard.
 - F. Verify all measurements at the building. No extra compensation will be allowed because of differences between work shown on the drawings and actual measurements at the site of construction.
 - G. The drawings are diagrammatic, but are required to be followed as closely as actual construction and work of other trades will permit. Where deviations are required to conform to actual construction and the work of other trades, make such deviations without additional cost to the Owner.

3.4 ACCESSIBILITY:

- A. Locate all equipment which must be serviced, operated or maintained, in fully accessible positions including but not limited to: controllers, motor starters, disconnect switches, transformers, panelboards, switchgear, etc. Provide access panels as required for equipment access.
- B. Failure by the Contractor to locate equipment and arrange the installation to allow for adequate access and clearance for maintenance and servicing shall result in rejection of the installation and the disassembly, relocation and re-assembly of the installation shall be done by the Contractor at no additional cost to the Owner.

3.5 CLEANING AND PROTECTING PIPING, CONDUITS AND EQUIPMENT:

- A. Thoroughly clean all piping, conduit, and equipment of all foreign substances inside and out before installation.
- B. Plug open pipe and conduit ends during construction with approved plugs or caps to exclude dust, moisture, plaster or mortar etc. Note - using duct tape to cover conduit and pipe ends is not an acceptable means of excluding construction debris and may result in rejection of the installation with remedial action to be taken by the Contractor at no additional cost.

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- C. If any part of a conduit system should be blocked by any foreign matter after being placed in operation, the system shall be disconnected, cleaned and reconnected wherever necessary in order to locate and remove the obstruction(s). Any work damaged in the course of removing obstructions shall be repaired or replaced at no additional cost to the Owner.

3.6 PROJECT COMPLETION:

- A. Upon completion of the work, remove all waste, rubbish and other materials left as a result of operations and leave the premises in clean condition.
- B. Thoroughly clean all exposed portions of the electrical installation, removing all traces of soil, labels, grease, oil and other foreign material, and using only the type cleaner recommended by the manufacturer of the item being cleaned.
- C. Vacuum all exteriors of equipment and interiors of equipment having accessible interior compartments to remove all dust, dirt, cable clippings, construction debris, etc.
- D. Equipment with damage to painted finish shall be repaired to satisfaction of the Owner. Equipment that cannot be satisfactorily repaired shall be replaced at no cost to the Owner.
- E. Upon completion of all work and of all tests, the Contractor shall furnish the necessary skilled labor and helpers for operating the system and equipment for a period of one (1) day or eight (8) hours, or as otherwise specified. During this period, instruct the Owner or his representative fully in the operation, adjustment and maintenance of all equipment furnished. Provide at least forty-eight (48) hours notice to the Owner in advance of this period.
- F. Thoroughly indoctrinate the Owner's operation and maintenance personnel in the contents of the as-built drawings and the operations and maintenance manual required to be submitted under these Specifications.

3.7 INSTRUCTION PERIOD:

- A. Prepare written instruction frames for the proper maintenance and operation of any special equipment furnished and installed under this Contract.
- B. The contractor shall arrange for on-site instruction of the Owner's representatives by manufacturers of all major items of equipment. The instruction periods shall be consecutive and shall be held after the installations are complete, tested and balanced and the approved documentation is available. The contractor shall be responsible for attendance of the manufacturer's technical representatives and shall coordinate program timing with the Owner.
- C. In addition to normal operation, the Owner's representatives shall be instructed on routine maintenance and trouble-shooting.

END OF SECTION 260000

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SECTION 260500 - BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The General Provisions of the Contract, including Division 0, Contract Requirements, and Division 1, General Requirements, are a part of this Section and shall be binding on the Contractor and /or Subcontractor who performs this work. Note also all addenda.
- B. Section 260000 General Electrical shall also govern the work under this Section.
- C. This Section includes requirements that are binding on other Sections of Divisions 26, 27, and 28.
- D. Examine all drawings, data, and coordinate the work of this Section with all related and adjoining work.

1.2 SCOPE OF WORK:

- A. Scope of work consists of installation of materials to be furnished under this Section, and without limiting generality thereof consists of furnishing labor, materials, equipment, hoisting, plant, transportation, rigging, staging, appurtenances, and services necessary and/or incidental to properly complete all electrical work as shown on the drawings, as described in these specifications or as reasonably inferred from either as being required in opinion of the Architect and Engineer.
- B. Work Included: Provide complete electrical services where shown on the drawings, as specified herein and as needed for a complete and proper installation including but not necessarily limited to:
 - 1. General
 - 2. Conduits, Raceways
 - 3. Equipment Labeling
 - 4. Wire and Cables
 - 5. Devices, Switches and Receptacles
 - 6. Outlet Boxes, Junction Boxes, Pull Boxes, Wireways
 - 7. Cabinets
 - 8. Disconnect Switches
 - 9. Supporting Devices
 - 10. Fuses
 - 11. Grounding
 - 12. Backboards.

1.3 QUALITY ASSURANCE:

- A. Refer to Section 260000.
- B. Comply with the testing and inspection requirements in Specification paragraphs 260500, 3.12, A through H.

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1.4 SUBMITTALS:

- A. Shop Drawings, Product Data, and Certifications that products conform to requirements: Submit for all items provided as part of the Work of this Section, including but not limited to those items listed in Paragraph 1.2, B above.

PART 2 - PRODUCTS

2.1 GENERAL:

- A. Provide only materials that are new and of type and quality specified, or approved equal. Where Underwriters' Laboratories, Inc. have established standards for such materials, provide only materials bearing the UL label.
- B. Provide materials and equipment necessary to make installation complete in every detail, and to conform to manufacturers' latest installation instructions, under this contract whether or not specifically shown on drawings or specified herein.

2.2 TEMPORARY FACILITIES:

- A. Refer to the requirements of Division 1 regarding temporary facilities.
- B. Scaffolding and other temporary construction shall be rigidly built in accordance with Local and State requirements. Remove from premises upon completion of work.
- C. Provide temporary construction required for electrical work as directed by the Architect and Engineer.

2.3 RACEWAYS:

A. Rigid Steel Conduit:

1. Shall be manufactured from high strength strip steel, shall be hot dipped galvanized with threads galvanized after cutting, and shall be chromated to form an additional protective layer. Rigid steel conduits shall be UL listed, shall meet the requirements of ANSI C80.1, and shall be as manufactured by Allied Tube and Conduit, Wheatland, or Calconduit.
2. Shall be used for work in hazardous (classified) locations.
3. Shall be used in outdoor locations where conduit is exposed to physical damage, sunlight or weather.
4. Shall be used for underground work.
5. Shall be used for horizontal and vertical underground sweeps and bends, horizontal and vertical sweeps and bends below concrete slabs, and for penetrations through concrete slabs.
6. Fittings, couplings and connectors shall be threaded and galvanized or cadmium plated.

B. Rigid PVC Conduit:

1. Shall be heavy wall schedule 40 PVC for underground work and extra heavy wall schedule 80 PVC for underground work below vehicular traffic areas. Joints and fittings shall be solvent welded all to ASTM standards for underground installation and in accordance with Article 352 of the National Electric Code.
2. May be used in lieu of rigid steel conduit except as noted in paragraph 2.3, A, 5 above.

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3. The minimum size for running below slabs shall be 1 1/4" for both feeders and branch circuits.
4. Joints shall be made watertight.
5. Shall not be embedded in concrete slabs.
6. Shall not be used above ground.
7. Shall not be used for underground horizontal and vertical sweeps and bends, horizontal and vertical sweeps and bends below concrete slabs, or for penetrations through concrete slabs.
8. Furnish conduit system in Prime Conduit, Cantex, or JM Eagle.
9. Provide Prime Conduit Harvey's #P-12G Heavy Duty Gray PVC Solvent Cement, or comparable product in Cantex or JM Eagle, for conduits up to 12" in diameter and for use in temperatures ranging from 30 degrees F to 90 degrees F. Provide Prime Conduit Harvey's All Temperature All Weather Medium Clear PVC Solvent Cement, or comparable product in Cantex or JM Eagle, for conduits up to 6" in diameter and for use in temperatures ranging from -15 degrees F to 90 degrees F. Provide Harvey's Clear Primer, or comparable product in Cantex or JM Eagle, for removing dirt and oil from the surface of the conduits as well as softening the conduits in preparation for solvent welding.

C. Intermediate Steel Conduit:

1. Shall be manufactured from high strength flat steel that is cold-formed and electrically welded into a uniform tube, shall be hot dipped galvanized with threads galvanized after cutting, and shall be chromated to form an additional protective layer. Intermediate steel conduit shall be UL listed, shall meet the requirements of ANSI C80.6, and shall be as manufactured by Allied Tube and Conduit, Wheatland, or Republic Conduit.
2. Shall be used in interior locations where conduit is exposed to physical damage, or corrosive or wet environments.
3. Fittings, couplings and connectors shall be threaded and galvanized or cadmium plated.

D. Electrical Metallic Tubing:

1. Shall be manufactured from high grade mild strip steel, shall be hot dipped galvanized, and shall be chromated and lacquered to form additional protective layer. EMT conduit shall conform to UL 797 and ANSI C80.3 and shall be as manufactured by Allied Tube and Conduit, Wheatland, or Republic Conduit.
2. Connectors and couplings shall be galvanized steel set screw type. Provide gland compression type couplings and connectors for exposed work in wet locations.
3. Shall be used for all interior feeders except where specified differently or noted differently on the drawings. Provide insulated throat grounding bushings for all feeder conduit connections to the metering service section, panelboards, disconnect switches, wireways, and pull boxes.
4. Shall be used for all interior wiring in masonry partitions, above non-accessible ceilings, and where exposed to view.
5. Shall be used for all branch circuit homeruns and closing connections to panelboards.
6. Shall be used for all branch circuits feeding HVAC equipment and equipment requiring 3-Phase power.
7. Shall not be embedded in concrete slabs.

E. Flexible Steel Conduit:

1. Shall be full wall steel flexible conduit, shall be manufactured from high grade strip steel and shall be hot dipped in a molten zinc bath. The steel strip shall be formed into interlocking convolutions that are continuously joined, metal to metal, assuring continuous

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grounding contact. Flexible steel conduit shall be UL listed and shall be as manufactured by AFC Cable Systems, Greenfield, Anaconda, or Electri-Flex.

2. Flexible steel conduit fittings shall be zinc plated malleable iron squeeze type connectors and zinc plated malleable iron combination couplings
3. May be used in short lengths where EMT cannot be installed due to interferences and obstacles.
4. Provide for final connections to motor driven equipment, recessed light fixtures, chain hung light fixtures, or where subject to vibration.

F. Liquidtight Flexible Steel Conduit:

1. Shall be similar to flexible steel conduit, but with pressure-extruded moisture and oil-proof outer jacket of gray polyvinyl chloride plastic. Liquidtight flexible steel conduit shall be UL listed (UL 360) and shall be as manufactured by AFC Cable Systems, Anaconda, or Electri-Flex.
2. Fittings, couplings, and connectors shall be threaded, zinc plated, malleable iron liquidtight type.
3. Provide where located outdoors or in damp or wet areas for final connections to motor driven equipment, or where subject to vibration.
4. Do not use in environmental air plenum spaces.

G. Sleeves:

1. Provide EMT sleeves for each conduit and cable passing through interior walls, partitions, and floors.
 - a. Set pipe sleeves in place before wall, floor, or partition is finished.
 - b. Support conduit and cable free from sleeves.
 - c. Provide sleeves two pipe sizes larger than the conduit or cable passing through, or provide a minimum of ½" clearance.
2. Provide chrome plated escutcheon plates for each sleeve where exposed to view in finished areas.
3. Provide GPT Industries WSG galvanized steel wall sleeves for each conduit passing through foundation walls. Galvanized steel wall sleeves shall be schedule 40 steel pipe in sizes through 10" diameter and shall have a 0.375" wall thickness for sizes 12" diameter and larger. WSG galvanized steel wall sleeves shall have a 2" collar (water stop) at the mid-point of the sleeve. The 2" collar shall be continuously welded on both sides to the sleeve. Provide GPT Industries Link-Seal modular waterproof seals at all foundation wall sleeves. Where penetrating existing foundation walls provide a core drilled penetration and Link-Seal modular waterproof seal without the galvanized steel wall sleeve.

H. Surface Steel Wireway:

1. Wireways shall be code gauge galvanized steel, manufactured standard sections and fittings, with hinged and/or screw covers, indoors NEMA Type 1/Outdoors NEMA Type 3R, and shall be manufactured by Hoffman, Cooper, Square D, or Wiremold. Wireways shall be sized to code conductor fill requirements and shall be provided as required for job conditions.

2.4 METHODS AND MATERIALS FOR LABELING EQUIPMENT:

- A. Metering Service Section, Panelboards, Safety Switches, Lighting Contactors, Lighting Control Panels:

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1. Non-metallic engraved nameplates shall be used to identify device. Nameplates shall be secured to equipment with two screws or rivets. Adhesive nameplates are not acceptable.
 2. Letters shall be white on black background.
 3. Nameplate letters shall be 1/4" high.
 4. Identification nomenclature shall be in accordance with plans. All name nomenclature shall be submitted for approval.
 5. Nameplates for the metering service section and panelboards shall include panel designation and voltage.
- B. Identify all fused disconnect switches with installed fuse size, i.e: Maximum fuse size = xxx amps. Identification shall be of the same method as specified in paragraph 2.4.A, except white letters on red background.
- C. Identify the covers of all junction boxes, wireways, and pull boxes installed above ceilings and in unfinished spaces with branch circuit or feeder designations. Identification shall be done with black felt tip permanent marker in a neat and readily legible manner.
- D. Provide a typewritten adhesive label with an identification legend at the metering service section and at each panelboard identifying the color coding of the ungrounded conductors being supplied by the switchboard and each panelboard.

2.5 SAFETY SWITCHES:

- A. All safety disconnect switches shall be furnished in heavy duty quick-make, quick-break, interlocking fusible or non-fusible, type as indicated on the drawings. Manufacturer shall be the same as provided for switchgear and panelboards.
- B. Provide enclosures clearly marked for maximum voltage, current and horsepower rating, and:
1. Indoors: NEMA Type 1.
 2. Outdoors or Damp or Wet Locations: NEMA Type 3R.
 3. Hosedown and Splashing Water Locations: NEMA Type 4.
- C. Furnish and install disconnect switches at each motor location except where combination switches and starters are furnished with equipment by others but are mounted by this contractor.
- D. Furnish and install a weatherproof disconnect switch at each exterior located fan, motor, or HVAC unit location.
- E. Disconnect switches shall be of "lock-out" design to prevent opening of switch when in "ON" position.

2.6 MOTOR STARTER/DISCONNECTS AND VFD'S:

- A. Combination motor starter/disconnects and variable frequency drives (VFD's) will be supplied by other trades for motor driven equipment provided by them.
- B. The electrical contractor shall install the starter/disconnects and VFD's, and shall provide all power wiring to the units and from the units to the motors they control.

2.7 CONDUCTORS:

- A. Conductors shall be provided in General Cable manufacture or comparable product in Cerro Wire or Republic Wire.

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- B. All feeder conductors shall be Stabiloy Brand compact stranded aluminum conductor, rated 600 volts, 90 deg. C., dry and wet locations, type XHHW-2, color coded.
 - C. All branch lighting and power conductors shall be copper rated 600 volts, 90 deg. C., dry and wet locations, type THWN for sizes #12 AWG and #10 AWG, and type XHHW-2 for sizes #8 AWG and larger, color coded. Branch lighting and power conductors shall be soft drawn copper with conductivity of not less than 98 percent of ANSI Standard for annealed copper.
 - D. Grounding electrode conductors and bonding conductors shall be soft drawn copper, ASTM B3 solid bare copper for sizes smaller than #8AWG, ASTM B8 stranded bare copper for sizes #8AWG and larger.
 - E. Light fixture connections to be copper, Type SF-1, 200 deg. C.
 - F. Minimum gauge conductors for power and lighting shall be #12 AWG. Increase to #10 AWG for runs exceeding 75'-0", and #8AWG for runs exceeding 150'-0".
 - G. Wire Size #8 AWG and larger shall be stranded. Wire of size smaller than #8 AWG shall be solid.
 - H. Type 'MC' Cable:
 - 1. Shall be a factory assembly of copper type THHN conductors including a green insulated equipment grounding conductor, with a mylar tape overall assembly covering, housed in a continuous interlocking galvanized steel sheath. Provide with optional insulated bushings.
 - 2. May only be used in dry locations for single phase lighting and receptacle branch circuit wiring where concealed from view above accessible ceilings or in stud walls.
 - 3. Shall not be used in damp or wet locations, where exposed to view, in masonry walls, above non-accessible ceilings, for HVAC equipment, for equipment requiring 3-phase power, for branch circuit homeruns, or for closing connections to panelboards.
 - 4. Shall be as manufactured by AFC Cable Systems, Southwire, or CME.
 - 5. Metal clad cable connectors shall be malleable iron set screw type connectors.
- 2.9 OUTLET, JUNCTION AND PULL BOXES:
- A. Provide outlet boxes as required for a complete installation including, but not limited to the following: switches, receptacles, telephone/voice outlets, data outlets, video/CATV outlets, lighting fixtures, special lighting control outlets, fire detection system outlets, special systems outlets, audio/visual (A/V) outlets, CCTV camera outlets, security/access control outlets, etc.
 - B. Outlet boxes for flush (concealed) work shall be code gauge galvanized steel and shall be of shapes and sizes to suit their respective locations and installations, and shall be provided with covers to suite their function and installation. Provide outlet boxes with interior partitions where emergency and normal power devices are ganged together. Outlet boxes shall be equipped with fixture stud or straps where required.
 - C. The minimum box size for all flush wall outlet boxes shall be nominal 4 11/16" square x 2 1/8" deep (2-gang) except where noted differently on the drawings. Provide boxes with single gang or two gang covers as required for the particular application. Provide larger size outlet boxes, or gangable type boxes where required for the installation.

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- D. For lighting outlets, provide standard 4” octagon units with 4” round flat covers. Provide 3/8” malleable iron fixture studs and box hangers where required. For lighting fixtures make final connection with flexible conduit of sufficient length to allow fixtures to be repositioned.
- E. For exposed work, provide drawn-type boxes with galvanized steel crushed corner exposed work covers. Provide cast boxes for work exposed to wet locations and where called for on the drawings.
- E. For above ground pull boxes, provide galvanized code-gauge sheet steel units with screwed on covers, of size and shape required to accommodate wires without crowding, and to suit the location. Provide pull boxes as specified herein, as required for job conditions, and as follows:
 - 1. Indoors: NEMA Type 1.
 - 2. Outdoors or Damp or Wet Locations: NEMA Type 3R.
 - 3. Hosedown and Splashing Water Locations: NEMA Type 4.
- G. Provide polymer concrete in-ground pull boxes where indicated on the drawings. Polymer concrete pull boxes shall be Quazite boxes as manufactured by Hubbell or comparable product in Armorcast or Highline manufacture. Pull boxes shall be constructed of Polymer concrete consisting of sand and aggregate bound together with a Polymer resin and reinforced by a heavy weave fiberglass. Pull box covers shall have a skid resistant finish and shall be secured with stainless steel bolts. Provide in-ground pull boxes of size and shape required to accommodate the service and suit the location.
- H. Provide H-20 rated in-ground pre-cast concrete pull boxes with cast iron frame and cover where indicated on the drawings. Pre-cast boxes shall be provided with adequate provisions for drainage.

2.10 WIRING DEVICES:

- A. All devices shall be furnished in Hubbell or comparable product in Cooper, or Pass & Seymour. Devices specified herein are based on Hubbell unless otherwise noted. Receptacle and switch colors shall be as directed by the Architect and Owner.
- B. Lighting Switches:
 - 1. Toggle Type: Extra Heavy Duty industrial grade, flush mounting, quiet operation AC type with abuse resistant colored nylon toggle operator, heat resistant composition plastic housing, silver cadmium oxide contacts and copper alloy spring contact arm. Rated at 120-277 VAC, capable of full capacity on tungsten, fluorescent, or LED lamp load. Designed for side or back wiring with up to No. 10 wire, and with #8 brass terminal screws.

	20 AMP	30 AMP
Single Pole	#HBL1221	#HBL3031
Two Pole	#HBL1222	#HBL3032
Three way	#HBL1223	#HBL3033
Four way	#HBL1224	-

- 2. Switch with lighted toggle pilot or pilot light toggle: same as toggle type except with clear polycarbonate lighted toggle (light on with load off) or red polycarbonate pilot light toggle (light on with load on).

	20 AMP	30 AMP
Lighted Toggle	#HBL1221ILC	-
Single Pole Pilot Light	#HBL1221PL	#HBL3031PL

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Two Pole Pilot Light	#HBL1222PL	#HBL3032PL
Three Way Pilot Light	#HBL1223PL	-

3. Lock Key Type: Same as toggle type except with key operator.

	20 AMP
Single Pole	#HBL1221L
Two Pole	#HBL1222L
Three Way	#HBL1223L
Four Way	#HBL1224L

4. Dimmer Switches: Provide linear slide type dimmers of types and capacities as required for the loads served. Fluorescent and LED dimmers shall be compatible with the dimming ballasts and LED drivers provided with the light fixtures. Allow 30% overload when sizing dimmers for LED fixtures. Where multiple dimmer switches are shown grouped together set in gangs with a common wall plate. Do not gang dimming and non-dimming switches together. Provide dimmer switches in Lutron, Leviton, or Hunt manufacturer.

C. Receptacles:

1. Single and duplex convenience receptacles shall be extra heavy duty specification grade, 2 pole, 3 wire grounding, NEMA 5-20R, rated 20AMP at 125 Volts AC. Receptacles shall have a one-piece all brass wrap around mounting strap with integral ground contacts and ground tension retaining clips, tandem bypass contact, heat resistant thermoplastic rynite base, and high impact nylon face. Receptacles shall be back and side wired, shall have a back wired green ground terminal, automatic ground clip, and threaded brass square head center rivet assembly.

Single Receptacle #HBL5361

Duplex Receptacle #HBL5362WR

2. Ground Fault Duplex convenience receptacles shall be extra heavy duty specification grade, 2 pole, 3 wire grounding, NEMA 5-20R, rated 20AMP at 125 volts AC. Receptacles shall have a solid brass wrap around mounting strap with pre-tensioned ground contacts, tandem modified bypass contacts, all glass circuit board with conformal coating for superior moisture immunity, 7 noise filtering capacitors, heat resistant thermoplastic base and high impact nylon face. Receptacles shall be side wired and shall have a green ground terminal.

Duplex GFCI Receptacle #GFR5362SG

3. USB charger duplex receptacles shall be specification grade tamper resistant decorator receptacle, 2 pole, 3 wire grounding, NEMA 5-20R, rated 20 AMP at 125 volts AC and shall have two USB ports (one type A and one type C), 5 amp, 5 volt DC.

USB Charger Duplex Receptacle #USB20AC5

4. Specialty receptacles: Provide receptacles of voltage, amperage, and NEMA configuration listed below as shown on the drawings and as required for appliances and equipment furnished by others. Confirm NEMA configurations required with the supplier(s) of appliances and equipment prior to receptacle installation.

Straight Blade Devices

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NEMA#	Type	Amperage/Voltage	Model #
5-15R	2P, 3W, GR	15A, 125V	HBL5235
6-20R	2P, 3W, GR	20A, 250V	HBL5461
5-30R	2P, 3W, GR	30A, 125V	HBL9308
6-30R	2P, 3W, GR	30A, 250V	HBL9330
7-30R	2P, 3W, GR	30A, 277V	HBL9315
5-50R	2P, 3W, GR	50A, 125V	HBL9360
6-50R	2P, 3W, GR	50A, 250V	HBL9367
7-50R	2P, 3W, GR	50A, 277V	HBL9365
14-20R	3P, 4W, GR	20A, 125/250V	HBL8410
15-20R	3P, 4W, GR	20A, 3-PH, 250V	HBL8420
14-30R	3P, 4W, GR	30A, 125/250V	HBL9430A
14-50R	3P, 4W, GR	50A, 125/250V	HBL9450A
14-60R	3P, 4W, GR	60A, 125/250V	HBL9460A
15-30R	3P, 4W, GR	30A, 3-PH, 250V	HBL8430A
15-50R	3P, 4W, GR	50A, 3-PH, 250V	HBL8450A
15-60R	3P, 4W, GR	60A, 3-PH, 250V	HBL8460A

Twist Lock Devices

NEMA#	Type	Amperage/Voltage	Model #
L5-20R	2P, 3W, GR	20A, 125V	HBL2310
L6-20R	2P, 3W, GR	20A, 250V	HBL2320
L7-20R	2P, 3W, GR	20A, 277V	HBL2330
L8-20R	2P, 3W, GR	20A, 480V	HBL2340
L5-30R	2P, 3W, GR	30A, 125V	HBL2610
L6-30R	2P, 3W, GR	30A, 250V	HBL2620
L7-30R	2P, 3W, GR	30A, 277V	HBL2630
L8-30R	2P, 3W, GR	30A, 480V	HBL2640
L14-20R	3P, 4W, GR	20A, 125/250V	HBL2410
L15-20R	3P, 4W, GR	20A, 3-PH, 250V	HBL2420
L16-20R	3P, 4W, GR	20A, 3-PH, 480V	HBL2430
L14-30R	3P, 4W, GR	30A, 125/250V	HBL2710
L15-30R	3P, 4W, GR	30A, 3-PH, 250V	HBL2720
L16-30R	3P, 4W, GR	30A, 3-PH, 480V	HBL2730
L21-20R	4P, 5W, GR	20A, 3-PHY, 120/208V	HBL2510
L22-20R	4P, 5W, GR	20A, 3-PHY, 277/480V	HBL2520
L21-20R	4P, 5W, GR	30A, 3-PHY, 120/208V	HBL2810
L22-30R	4P, 5W, GR	30A, 3-PHY, 277/480V	HBL2820

D. Wall Plates:

1. Wall plates for flush outlets shall be specification grade smooth metal stainless steel type 302/304, satin finish. Where multiple devices are ganged together they shall be mounted under a common wall plate. Provide switch and receptacle combination plates where switches and receptacles are located together. Cover plates shall be furnished in same manufacturer as devices.
2. Weatherproof enclosures for outdoor GFCI receptacles shall be cast aluminum, single gang vertical Hubbell #WP26M or single gang horizontal Hubbell #WP26MH. Enclosures shall include gasket and mounting screws, shall have 1/4" diameter padlock holes, and shall have large cord openings for use with cover closed.

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E. Outlet and Switch Sealers:

1. Provide electrical outlet and switch sealers for all receptacles, switches, and data/telephone/catv outlets installed at exterior walls. Sealers shall be fire resistant plastic foam, 2 ½"W x 4"H, and shall have pre-punched receptacle, switch toggle, and screw openings. Outlet and switch sealers shall be as manufactured by Frost King.

F. Stand-Alone (Non-System) Occupancy Sensors:

1. Provide passive infrared (PIR) and dual technology passive infrared/ultrasonic occupancy sensors in Hubbell manufacture, or comparable product in Lutron or WattStopper. Wall switch occupancy sensor colors shall be as directed by the Architect.
 - a. Line voltage dual technology wall switch sensor: ILC #ILC-SWX-122.
 - b. Low voltage dual technology extended range ceiling mount sensor with isolated relay: ILC #ILC-SWX-222-1-AR.
2. Power Packs:
 - a. Provide ILC #ILC-SWX-900-AX-D2 Power Packs where shown on the drawings for use with the low voltage occupancy sensors. Power Packs shall be plenum rated, shall have universal 100/277VAC input voltage with low voltage output for sensor power, and shall have a 20 amp relay for load switching.

2.11 FUSES:

- A. Provide current limited, non-renewable fuses in Littelfuse manufacture or comparable product in Bussman or Gould. Fuses shall be UL class J up to 600 Amp and Class L over 600 Amp.
- B. Fuses shall be rated 600V or less A.C., UL listed, and have minimum interrupting rating of 200,000 rms amperes with peak let-through current and maximum clearing values within prescribed UL limits. Fuses for motor feeders or motor circuits shall be Class RK-5 of voltage classification rated for motor with minimum interrupting capacity of 200,000 rms amperes and with minimum time delay of ten seconds at 500%.
- C. Provide a spare fuse cabinet and one complete set of three spare fuses for each size and type used. The spare fuse cabinet shall be lockable and shall be of steel construction with gray painted finish, and weather-stripped to reduce the accumulation of dust, dirt and moisture. The cabinet shall measure 30" high x 24" wide x 12" deep. Provide in Littelfuse #LSFC with five spare keys (part #LKEY001), or comparable product. Install the fuse cabinet in the Main Electrical Room.

2.12 GROUND RODS:

- A. Ground rods shall be hardened steel with a minimum 10 mil thick electrolytic copper covering (copper-clad) and shall conform to UL 467. Ground rods shall be ¾" dia. x 10' long. Provide ground rods in Blackburn manufacture or comparable product in Erico or Galvan manufacture.

2.13 TELECOMMUNICATIONS GROUNDING BUSBAR (TGB):

- A. Ground bus shall be 20" long x 4" wide x ¼" thick solid copper with insulated standoff brackets for wall or backboard mounting. Ground bus shall have 27 evenly spaced pre-drilled holes ready for ground lug connections. Ground bus shall be Chatsworth #10622-020 or comparable product in Erico, Homaco, or Panduit manufacture.

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- B. Provide a ground bus adjacent to the data rack.

2.14 EXOTHERMIC WELDS:

- A. All grounding/bonding connections to ground rods and building steel shall be made with exothermic welds. Provide in Cadweld or comparable product in Thermoweld or JMV manufacture.

2.15 BACKBOARDS:

- A. Backboards shall be constructed of fire retardant plywood sheets, 4' x 8' x $\frac{3}{4}$ ".
 1. Paint backboards on all sides with two coats of light gray fire-retardant paint prior to mounting equipment.
 2. Mount backboards on unistrut channel supports.
- B. Provide backboards where indicated on the drawings, for telephone and CATV service entrance locations and for mounting all surface mounted electrical panels, disconnect switches, motor starters, and VFD's.

2.16 ACCESS PANELS:

- A. Provide access panels for electrical equipment and wiring splices which are not readily accessible. This includes electrical equipment and wiring splices installed above hung ceilings which are not readily removable, within walls, inside chases, or inside dead cavity spaces.

2.17 OTHER MATERIALS:

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the contractor subject to the approval of the engineer.
- B. Provide miscellaneous hardware and support accessories, including Unistrut, channels, jack chain, support rods, nuts, bolts, screws, and other such items, with galvanized or cadmium plated finish, or other approved rust inhibiting coatings.

PART 3 - EXECUTION

3.1 GENERAL:

- A. Unless specifically noted or shown otherwise, install all equipment and material specified herein or shown on drawings whether or not specifically itemized herein. PART 3 covers particular installation methods and requirements peculiar to certain items and classes of materials and equipment.
- B. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.
- C. The electrical drawings are diagrammatic, but are required to be followed as closely as actual construction and work of other trades will permit. Where deviations are required to conform with

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actual construction and the work of the other trades, make such deviations without additional cost to the Owner.

- C. Data indicated on the drawings and in these specifications are as exact as could be secured, but their absolute accuracy is not warranted. The exact locations, distances, levels and other conditions will be governed by actual construction and the drawings and specifications should be used only for guidance in such regard.
- D. Verify all measurements at the building. No extra compensation will be allowed because of differences between work shown on the drawings and actual measurements at the site of construction.
- E. Do not scale drawings. Scale indicated on drawings is for establishing reference points only. Actual field conditions shall govern all dimensions.
- F. Coordinate:
 - 1. Coordinate as necessary with other trades to assure proper and adequate provisions in the work of those trades for interface with the work of this Section.
 - 2. Coordinate delivery of electrical equipment to project prior to installation. Equipment stored for an extended period of time prior to installation may be subject to rejection by Architect.
 - 3. Coordinate the installation of electrical items with the schedule for work of other trades to prevent unnecessary delays in the total work.
 - 4. Where electrical items are shown in conflict with locations of structural members and mechanical or other equipment, provide required supports and wiring to clear the encroachment.
 - 5. Prior to roughing, the contractor shall obtain exact fixture and device locations from the Architect and Owner. Outlet and fixture locations shown on the drawings are to be used for general reference only. Roughing of fixtures and outlets shall not proceed until exact locations, heights, and orientations of fixtures and outlets have been agreed upon with the Architect and Owner.
 - 6. Arrange installation to provide access to equipment for easy maintenance and repair.

3.2 INSTALLATION OF RACEWAYS AND FITTINGS:

- A. Install wire and cable in approved raceways as specified and as approved by authorities having jurisdiction.
- B. All conduits shall be concealed from view above ceilings, in chases, and in walls. Conduits may only be installed exposed to view where run overhead in rooms without ceilings and in mechanical and electrical rooms.
- C. Run conduit and cable parallel to or at right angles with lines of the building, to present a neat appearance.
 - 1. Make bends with standard conduit elbows or conduit bent to not less than the same radius.
 - 2. Make bends free from dents and flattening.
- D. Provide code sized conduit unless a larger size is shown on the drawings or specified herein. Minimum conduit size shall be $\frac{3}{4}$ " diameter.

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- E. Securely and rigidly support conduit and MC cable throughout the work with approved conduit clips and hangers all in conformance with code seismic requirements.
 - 1. Do not use mechanics wire for supporting conduit or cable.
 - 2. Do not support conduits on hung ceilings or from mechanical or electrical equipment.
 - 3. Steel supports and racks shall be galvanized steel channel and fittings, Unistrut or approved equal.
 - 4. Provide clamps and support rods as required.
 - 5. Steel support rods or support bolts for conduits shall be 1/8 inch diameter for each inch or fraction thereof of diameter of conduit size, but no rod or bolt shall be less than 1/4" in diameter.
 - 6. Horizontal and vertical conduit supports shall not be more than 10' apart or more than 1' from any fitting.
 - 7. Install conduit and cable so it is not in contact with, or resting on, plumbing, fire protection, or HVAC equipment, piping, or ductwork.
- F. Do not install conduit runs exposed on the building exterior.
- G. Maintain at least 3" clearance between conduits and heating pipes when running parallel to these pipes, and at least 1" clearance when running perpendicular to these pipes.
- H. Provide double locknuts on all conduits terminating in sheet metal enclosures. Provide insulated throat grounding bushings on all feeder conduits.
- I. Provide expansion couplings for rigid metallic and non-metallic conduits where such conduits are subject to thermal expansion and contraction. Provide combination deflection/expansion couplings for rigid metallic and non-metallic conduits where such conduits cross through building expansion joints.
- J. Provide full wall steel flexible conduit for all conduit penetrations through fire walls. Full wall steel flexible conduit shall be 3-hour through penetration fire wall rated.
- K. Install link-seal waterproof seals around all conduit penetrations through basement walls, floors, or foundation walls.
- L. Where conduit is installed underground or is exposed to weather or wet areas make all joints watertight. Seal all site work open conduit ends containing conductors water tight. Cap all site work open conduit ends that do not contain conductors.
- M. Provide necessary sleeves and chases where conduits and cables pass through floors, walls, ceilings, and roofs, and provide other necessary openings and spaces, all arranged for in proper time to prevent unnecessary cutting. Perform cutting and patching in accordance with the provisions for the original work.
- N. Provide offsets prior to entrance into outlet boxes and other electrical equipment for proper adjustment to finished building surfaces. Exercise care when roughing-in conduits which turn up or down to surface mounted panelboards or cabinets, so that conduit extensions to cabinet will be fitted close to wall. Where possible, provide back entry into surface mounted boxes or equipment items.
- O. Install rigid galvanized steel conduit with ends cut square without sharp edges, threaded, and I.D. reamed to remove any burrs. Field made bends shall be of equivalent radius as factory made bends. Exposed threads shall be kept to a minimum.

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- P. Install conduit sealing fittings and conduit seals for work in classified locations in accordance with NEC requirements for Class 1, Division 1 and Class 1, Division 2 locations.
- Q. Feeder, branch circuit, fire alarm, or special systems conduits shall not be run below concrete slabs or in concrete slabs unless specifically indicated so on the drawings, or unless there is no other way to feed the outlet, device, or equipment.
 - 1. Where conduits are run underground below concrete slabs they shall be kept a minimum of 12" below bottom of slab. Provide rigid steel conduit for horizontal and vertical sweeps and bends below concrete floor slabs and for penetrations through concrete floor slabs.
 - 2. Where conduits turn out of concrete slab in open areas, provide threaded couplings flush with floor line for extending exposed conduit to equipment, outlet, fitting or box.
- R. Carefully clean and dry all conduit before installation of conductors. Do not pull wires into conduit system until building roof and walls are weather-tight and all rough plastering is completed. Provide Prime Conduit conduit plugs and end caps to exclude dust, moisture, plaster, or mortar while building is under construction.
- S. Lubricants or cleaning agents which might have deleterious effect on conductor coverings shall not be used for drawing conductors into raceways.
- T. Provide minimum 3/16 inch diameter twisted nylon fish cord in all empty raceways. Provide tag on each end indicating location of other end. Fish cord shall have minimum of 200 pounds tensile strength.
- U. All wiring shall be installed in electrical metallic tubing unless otherwise specified herein or called for on the drawings.
 - 1. Where conduit is installed underground (buried) in non-classified locations, provide PVC conduit.
 - 2. Where conduit is installed underground (buried) or aboveground in classified locations, provide rigid steel conduit.
 - 2. Where conduit is installed embedded in cinder concrete, provide rigid galvanized steel conduit.
 - 3. Provide intermediate steel conduit for exposed conduit installed below 7 feet in mechanical rooms, or where subject to physical abuse.
 - 4. Use flexible conduit for final connections to motor driven equipment, recessed light fixtures, chain hung light fixtures, or where subject to vibration. Where such equipment is located in wet areas or exposed to weather use liquid-tight flexible conduit. Flexible connections shall be minimum of 18 inches and maximum of 6 feet long with grounding conductor. Flexible connections shall be used prior to attachment of conduit to equipment housing.

3.3 SLEEVES:

- A. Provide EMT sleeves for each conduit and cable passing through interior walls, partitions, and floors.
 - 1. Set pipe sleeves in place before wall, floor, or partition is finished.
 - 2. Support conduit and cable free from sleeves.
 - 3. Provide sleeves two pipe sizes larger than the conduit or cable passing through, or provide a minimum of 1/2" clearance.

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- B. Provide chrome plated escutcheon plates for each sleeve where exposed to view in finished areas.
- C. Provide GPT Industries WSG galvanized steel wall sleeves for each conduit passing through basement walls or foundation walls. Galvanized steel wall sleeves shall be schedule 40 steel pipe in sizes through 10" diameter and shall have a 0.375" wall thickness for sizes 12" diameter and larger. WSG galvanized steel wall sleeves shall have a 2" collar (water stop) at the mid-point of the sleeve. The 2" collar shall be continuously welded on both sides to the sleeve. Provide GPT Industries Link-Seal modular waterproof seals at all foundation wall sleeves. Where penetrating existing basement or foundation walls provide a core drilled penetration and Link-Seal modular waterproof seal without the galvanized steel wall sleeve.

3.4 CONDUCTOR INSTALLATION:

A. General:

- 1. The interior of all conduits shall be cleared of burrs, moisture, dirt and obstructions before wires are pulled.
- 1. Lubricant for pulling wires shall be inert to cable and conduit, shall not in any way restrict ease of pulling through conduit with passage of time, and shall be special lubricant designed specifically for cable pulling and shall be chemically compatible with cable.
- 2. Emergency circuit wiring shall be kept entirely independent of all other wiring in accordance with NEC Article 700.10(B).

B. Color Coding:

- 1. Consistent phase identification of all conductors shall be maintained as follows:

	120/208V	277/480V
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Neutral Wire	White	Natural Gray

Provide colored plastic tape of specified color code identification for large size conductors available only in black. Wrap tape three complete turns around conductor, at ends and at connections and splices. Provide same color coding for switch legs as corresponding phase conductor.

C. Minimum Conductor Sizes:

- 1. The minimum branch circuit conductor size shall be #12AWG. Provide #10AWG conductors for branch circuits where the conductor run exceeds 75 feet, and #8AWG conductors where the conductor run exceeds 150 feet.

- D. Provide the number of conductors required for a given branch circuit, or as required for circuitry, whether indicated on the drawings or not.

E. Neutral Conductors:

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1. All branch circuits shall be installed with a separate neutral conductor. Shared neutrals for groups of branch circuits shall not be permitted.
- F. Provide each circuit with a dedicated ground wire back to its respective panel ground bar. Size all ground wires in accordance with NEC requirements. Use #12AWG minimum size.
- G. MC cable may only be used in dry locations for single phase lighting and receptacle circuits where concealed from view above accessible ceilings and in stud walls. Homeruns shall be conductors in conduit. MC cable shall not be used in masonry partitions, above non-accessible ceilings, for branch circuit homeruns, for HVAC equipment, or for equipment requiring 3-phase power.
 1. MC cable shall be supported from the building structure using hangers, clips, and approved plenum rated plastic ties. In lay-in ceiling areas the cable shall not rest on ceiling grid or tiles, and shall not be tied or clipped to the ceiling grid wire hanging system. Do not use mechanics wire for supporting or securing MC cable.
- H. Identify conductors passing through pull boxes, junction boxes, and wireways to indicate circuit designation. Identify pull boxes and junction boxes as specified herein.
- I. Phase conductors shall be connected to phase supply mains in proper rotation to assure balanced condition on panel. Circuit numbers assigned on drawings are for convenience only. Provide typed circuit directories for all panelboards at conclusion of work, representing circuits as actually connected to panelboard. Directories shall note the equipment, devices and rooms served by each branch circuit.
- J. Branch circuit wiring and arrangement of home runs have been designed for maximum economy consistent with adequate sizing for voltage drops, circuit ampacities and other considerations.
 1. Install the wiring with circuits arranged as shown on the drawings, except as otherwise approved in advance by the Architect and Engineer.
 2. Do not make changes and rearrange circuits without prior approval.
 3. If more than 3 current carrying conductors are installed in one conduit they shall be derated in accordance with the National Electric Code. Do not install more than three 30 Amp single phase or four 20 Amp single phase circuits in the same conduit. Do not run emergency and normal power wiring in the same conduit.
- K. All low voltage and signal wiring for fire alarm, intercom, clocks, special systems, and data technology in normally occupied (finished) areas of the building shall be installed concealed from view within the building structure. Wiring may only be exposed to view in mechanical and electrical rooms, and rooms without ceilings (exposed to the structure above). Provide minimum 3/4" conduit for all wiring run within walls and where exposed to view in mechanical and electrical rooms, and rooms without ceilings. All wiring shall be plenum rated. Sizes and types of different wires shall be as specified by manufacturer unless noted differently on the drawings or specified herein. Color code shall be used throughout.
- L. Splices and Connections:
 1. Make splices electrically and mechanically secure with pressure-type connectors.
 - a. For wires size #8AWG and smaller, provide solderless, screw-on connectors, 600V rating, of size and type to manufacturer's recommendation, with temperature ratings equal to the conductor insulation.

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- b. Make splices and terminations to conductors #6AWG and larger with corrosion-resistant, high conductivity, pressure indent, hex screw or bolt clamp connectors, with or without tongues, designed specifically for intended service. Connectors for cables 250 kcmil and larger shall have two clamping elements or compression indents. Terminals for bus connections shall have two bolt holes. Splitbolt connectors in Burndy, IlSCO or Greaves manufacture shall be acceptable for all splices of conductors #6AWG and larger.
2. Insulate splices with a minimum of two layers of all weather, heavy duty, abrasion resistant, 8.5 mil thick, 105 degree C. rated vinyl electrical tape where insulation is required. Tape splices 1 ½ times the thickness of the conductor insulation.
3. Provide high conductivity copper alloy bolt-on lugs with pressure plate and socket set screw or hex head screw to attach wire and cable to disconnect switches and other electrical equipment as required.
4. Provide cable reducing adaptor plugs where required for terminating oversize cable to standard size equipment lugs. Conductor strands shall not be cut in order to fit equipment lugs.
5. Provide antioxidant joint compound for all conductor connections.

3.5 OUTLET BOXES:

- A. Obtain exact locations of outlets and fixtures from Architect prior to roughing. Make reasonable changes, as defined by Architect in location of outlets and equipment prior to roughing, at no additional cost. Give particular attention to outlets installed in and around casework.
- B. All outlet boxes in finished areas shall be concealed from view above hung ceilings or recessed (flush) in walls and floors. Outlet boxes may only be exposed to view or surface mount type for feeding items overhead in rooms without ceilings and in mechanical and electrical rooms.
- C. Install outlet boxes at uniform heights and straight and true with reference to walls, floors, ceilings and casework.
- D. Provide knockout plugs in boxes with unused openings.
- E. Secure all outlet boxes to building structure with metal straps, rods, or bolts independently of entering conduits or cables.
- F. Provide bar hanger outlets in hollow framed partitions with bar hanger secured to partition studs with self-threading screws, or drill through hangers with Caddy or equal clips.
- G. Provide horizontal separation for outlet boxes mounted on opposite sides of common wall. Back to back or thru-wall boxes will not be permitted.

3.6 PULL BOXES AND JUNCTION BOXES:

- A. Provide pull boxes and junction boxes where shown on the plans and where required to facilitate proper pulling of wires and cables. Install pull boxes no less than one every 100 ft. of straight horizontal conduit run, or three 90 degree bends, unless otherwise noted.

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- B. For site work provide pull boxes no less than one every 400 feet of straight run or two 90 degree bends, unless shown or noted differently.

3.7 WIRING DEVICES:

- A. Wherever possible install switches directly adjacent to the strike side of door. Check architectural drawings for door swing.

- B. Device mounting heights indicated below are general. Refer to drawings for special cases.

Receptacles	1'-6" AFF to bottom of device.
Switches	4'-0" AFF to top of device.
Fire Alarm-Pull Stations	4'-0" AFF to top of device.
Fire Alarm Strobes	7'-6" AFF to centerline of device.
Fire Alarm Speaker/Strobes	7'-6" AFF to centerline of device.
Data/Voice Outlets	1'-6" AFF to bottom of device.
Wall Telephone Outlets	4'-0" AFF to top of device.

- C. Where receptacles and outlets are shown over counters, refer to architectural drawings for mounting heights.
- D. Install receptacles vertically with grounding posts at top of device, except locate grounding post to left for horizontal mounting.

3.8 WIRING DEVICE PLATES:

- A. Set plates so that all edges are in contact with mounting surface. Provide common device plate for multi-device locations.
- B. Provide electric outlet and switch sealers for all receptacles, switches and technology outlets installed at exterior walls.
- C. Align all wall plate screws with screw slots aligned in the vertical position.

3.9 MOTOR POWER AND CONTROL WIRING:

- A. Contractor shall provide and be responsible for the complete power wiring of all motors and motorized equipment.
- B. Furnish proper overload and short circuit protection for all new motors. Provide a combination thermal overload and disconnect switch for all equipment using fractional horsepower motors.
- C. Check electrical connections and sizing of motor circuit protection and prevent damage to motor and equipment from incorrect direction of rotation.
- D. Provide mounting for motor and equipment disconnect switches adjacent to motor and supported independent of motor.
- D. Motor starters and disconnects, where grouped, shall be mounted on ¾" thick fire retardant plywood mounting boards painted with light gray fire resistant paint.
- E. Provide interlock wiring where required for motors and controllers, whether shown on the drawings or not.

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- F. Connections to miscellaneous building equipment:
 - 1. Wire to and connect to, all items of building equipment not specifically described in this Section but to which electrical power is required.
 - 2. Coordinate as necessary with other trades and suppliers to verify types, numbers and locations of equipment.

3.10 GROUNDING SYSTEM:

- A. Provide a complete grounding system which will thoroughly ground the non-current carrying metal parts of every piece of installed equipment, as described herein and as indicated on the drawings.
- B. System shall be mechanically and electrically connected to provide an independent return path to the grounding sources.
- C. Each grounding conductor shall have a minimum capacity of 25 percent of the rated capacity of the equipment it grounds, unless otherwise indicated.
- D. The minimum size of grounding conductors shall be No. 12 AWG copper. Insulation color of grounding conductors shall be green.
- E. Provide insulated throat grounding bushings at all feeder conduit connections to metering service section, panelboards, disconnect switches, wireways, and pull boxes. Connect grounding bushings within each enclosure, backbox, or pull box by #4 AWG bare copper bonding conductor connected to a grounding lug welded to the enclosure, backbox, wireway, or pull box.
- F. Provide a separate green ground conductor for each feeder and branch circuit.
- G. Grounding of Motors: Motors shall be grounded by connecting a green covered conductor from a grounding bushing in the starter to the motor frame. Conductor shall be installed in the conduit with the circuit conductors and terminated in the motor connection box, providing the terminal is mechanically connected to the frame. If this is not feasible, grounding conductor from the starter shall be extended through an insulated bushed opening in the connection box and connected to motor base.
- H. Provide the external building ground ring complete with ground rods, ground wells, and connections to building steel columns all as specified herein and as called for on the drawings.
- I. Provide exothermic weld ground connections as specified herein and as called for on the drawings.
- J. Provide the Telecommunications Grounding Busbar (TGB) as specified herein and as called for on the drawings.
- K. Tests: Entire system shall be thoroughly tested on completion for ground continuity and capacity. Provide not more than 10 ohms resistance between main ground system and equipment frame system neutral and/or derived neutral point.

3.11 SPECIAL REQUIREMENTS:

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- A. Wiring shall be bundle tied where passing through pull boxes, wireways, and panelboards in neat and orderly manner with plastic cable ties. Cable ties shall be Ty-Raps as manufactured by Thomas & Betts, or comparable product in 3M or Leco Plastics manufacture.
- B. Plenum rated cable shall be bundle tied above ceilings with plenum rated plastic cable ties in a neat and orderly manner. Cables shall be bundle tied by system to form individual cable groups for each system. Maximum distance between cable ties shall be 4 feet. Provide additional cable ties as required to prevent sagging and maintain neatness. Support cable bundles for each system separate from each other with strap hangers.

Maximum distance between strap hangers shall be 8 feet. Provide additional hangers as required to prevent sagging of cable bundles. Identify cable bundles by system with bundle tags spaced at intervals not exceeding 16 feet. Identify individual cables with numbered wire markers at termination points and at intervals not exceeding 32 feet.

- C. Turn branch circuit and auxiliary system wiring out of wiring gutters at 90 degrees to circuit breakers and terminal lugs.
- D. Provide two spare 1 1/2 inch conduits for flush panels. Conduits shall extend from top of each panel to one foot above hung ceilings, turn out from wall toward panel access side and terminate with nylon bushing.
- E. Architectural reflected ceiling plans shall take precedence over locations of lighting fixtures shown on electrical drawings. Locate lighting switches to conform to door swings shown on architectural drawings.
- F. The location of light fixtures, switches or outlets may vary due to structural considerations or due to minor changes in millwork or architectural layout. Adjustments to height or reasonable adjustments to locations of switches, outlets, lights, etc. as shown on the drawings shall be done at no additional charge.
- G. Provide miscellaneous hardware and support accessories, including channels, Unistrut, jack chain, support rods, nuts, bolts, screws, and other such items, with galvanized or cadmium plated finish, or other approved rust inhibiting coatings.
- H. Unload electrical equipment and materials delivered to site. Pay cost for rigging, hoisting, lowering and moving electrical equipment on site, in building or on roof. During construction, provide additional protection against moisture, dust accumulation and physical damage of electrical equipment. Provide temporary heaters within units, as approved to evaporate excessive moisture and provide ventilation as required.

3.12 TESTING AND INSPECTION:

- A. Provide personnel and equipment, make required tests, and secure required approvals from the Architect and governmental agencies having jurisdiction.
- B. When material and/or workmanship is found to not comply with the specified requirements, within three days after receipt of notice of such non-compliance remove the non-complying items from the job site and replace them with items complying with the specified requirements, all at no additional cost to the Owner.

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- C. Perform all required adjustments and settings. Verify and correct deficiencies as necessary including voltages, tap settings, trip settings and phasing of equipment from distribution system to point of use.
- D. Provide all necessary testing equipment.
- E. Test wiring, buswork, and connections for continuity and ground by “megger” test. Minimum insulation resistance between conductors and ground shall be as follows:
 - 1. For circuits of #14 or #12 AWG wire: 1,000,000 ohms.
 - 2. Conductor current carrying capacities from 25 to 50 amperes, inclusive: 250,000 ohms.
 - 3. Conductor current carrying capacities from 51 to 100 amperes, inclusive: 100,000 ohms.
 - 4. Conductor current carrying capacities from 101 to 200 amperes, inclusive: 50,000 ohms.
 - 5. Conductor current carrying capacities from 201 to 400 amperes, inclusive: 25,000 ohms.
 - 6. Conductor current carrying capacities from 401 to 800 amperes, inclusive: 12,000 ohms.
 - 7. Conductor current carrying capacities over 800 amperes: 5,000 ohms.
Submit “megger” test results to the Engineer for review.
- F. Main ground electrode system shall not exceed 10 ohms unless specified otherwise.
 - 1. Verify ground resistance by ground continuity test between main ground system and equipment frame system neutral and/or derived neutral point.
 - 2. Perform ground continuity test by passing minimum of ten Amps DC between ground reference system and ground point. Calculate resistance by voltage drop method.
- G. In the Engineer’s presence:
 - 1. Test all parts of the electrical system and prove that all such items provided under this Section function electrically in the required manner.
- H. Balance all panels as follows:
 - 1. Turn on all lighting and equipment served by a panel and measure the current in each branch circuit phase and neutral conductor and in each phase and neutral bus-bar. Log all measurements taken and then correct imbalance by substituting branch circuits from phase to phase until optimum balance is achieved. Log all final current measurements and submit for the Engineer’s review.
 - 2. Also measure and log voltages between each phase bus-bar and between each phase bus-bar and neutral bus-bar and submit measurements for the Engineer’s review.

3.13 PROJECT COMPLETION:

- A. Upon completion of the work of this Section, thoroughly clean all exposed portions of the electrical installation, removing all traces of soil, labels, grease, oil and other foreign material, and using only the type cleaner recommended by the manufacturer of the item being cleaned.
- B. Vacuum all exteriors and interiors of switchboards, panelboards, safety switches, and equipment racks to remove all dust, dirt, cable clippings, etc.

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- C. Equipment with damage to painted finish shall be repaired to satisfaction of the Architect.
- D. On the first day the facility is in operation, for at least eight hours, at a time directed by the Architect, provide a qualified foreman and crew to perform such electrical work as may be required by the Architect.
- E. Thoroughly instruct the Owner's operation and maintenance personnel in the contents of the operations and maintenance manual required to be submitted under these Specifications.

END OF SECTION 260500

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SECTION 265000 - LIGHTING

PART I - GENERAL

1.1 RELATED DOCUMENTS:

- A. The General Provisions of the Contract, including Division 0, Contract Requirements, and Division 1, General Requirements, are a part of this Section and shall be binding on the Contractor and /or Subcontractor who performs this work. Note also all addenda.
- B. Section 260000, General Electrical, shall also govern the work under this Section.
- C. Section 260500, Basic Electrical Materials & Methods, includes requirements that are binding on this Section.
- D. Examine all drawings, data, and coordinate the work of this Section with all related and adjoining work.

1.2 SCOPE OF WORK:

- A. Scope of work consists of installation of materials to be furnished under these Specifications and without limiting generality thereof consists of furnishing labor, materials, equipment, hoisting, plant, transportation, rigging, staging, appurtenances, and services necessary and/or incidental to properly complete all electrical work as shown on drawings, as described in the Specifications or as reasonably inferred from either as being required in opinion of the Architect and Engineer.
- B. Work Included: Provide complete electrical services where shown on the drawings, as specified herein and as needed for a complete and proper installation including but not necessarily limited to:
 - 1. Lighting Fixtures

1.3 QUALITY ASSURANCE:

- A. Refer to Section 260000.
- B. All lighting fixtures shall be U.L. labeled.

1.4 WARRANTY:

- A. LED Fixture Warranties: Warrant complete LED systems, including LED's, drivers, and all other system components for a period of five (5) years from the date of substantial completion, against failure, variation in color temperature beyond plus/minus 200 degrees Kelvin, and depreciation of output below 70%.

1.5 SUBMITTALS:

- A. Shop Drawings: Submit for all items listed in Paragraph 1.2.B.
- B. Submit manufacturers catalog cuts, specifications, and lighting distribution curve for each fixture.
- C. Provide fully operating samples of light fixtures for review when requested by the Engineer.

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- D. Submit point by point lighting calculations for each of the following areas: site, Game Room 101, Homeroom 106, Gymnasium 110, Performing Arts 111, and Administration 126.

PART 2 - PRODUCTS

2.1 LAMPS:

A. Solid State Lighting/Light Emitting Diodes (LED's)

1. All individual LED's used within a luminaire must be manufactured by a reputable LED manufacturer such as Cree, Osram Sylvania, Nichia, Philips, or comparable product. LED modules shall be manufactured by Bridgelux, Philips (Fortimo), Xicato, or Cree.
2. Testing: All products shall be tested by a Nationally Recognized Testing Laboratory (NRTL) in accordance with IES LM-79 testing methods and shall carry a UL, ETL, or CSA label. Fixture manufacturer shall confirm in writing that the LED's within the fixture will not exceed the maximum temperature to which the LED die was tested using IES LM-80 testing methods.
3. Drive Current, Thermal Management, and LED Rated Life: Drivers must not overdrive the LED's beyond the LED manufacturer's recommendations and shall adhere to device manufacturer's recommendations, certification programs, and test procedures for thermal management of LED's within their fixtures. Drive current and luminaire thermal design must ensure minimum 50,000 hour rated life for the LED's.
4. Color Consistency: All LED's from the same manufacturer, both within each luminaire and from luminaire to luminaire, must be batch sorted for visual color and brightness consistency. All luminaires of the same type shall be supplied at the same time and shall come from the same batch. Spare luminaires, when required, shall be provided from the same batch.
5. Dimming: Luminaire manufacturer must provide specific data on the means of dimming for coordination of the proper control device (specified elsewhere). Acceptable methods include electronic low voltage dimming and 0-10V 4-wire dimming protocol. Dimming must provide uniform, smooth, flicker free, full range dimming. LED's must maintain consistent brightness and color throughout the dimming range.
6. Maintenance: Luminaires must be designed, except where noted differently, so that the LED components may be removed from the fixture housing and replaced if required due to component failure.
7. Technology Upgrades: Supply the newest LED technologies that are available for the specified products when the orders are released, as long as there are no increases in input watts or cost.

2.2 LED DRIVERS:

- A. Provide line voltage LED product, where available, to eliminate the need for drivers. If the LED product is not available as line voltage, then the LED drivers shall meet the following requirements:
1. Drivers shall have a minimum efficiency of 85%.
 2. Starting Temperature: -40 degrees Celsius.
 3. Input Voltage: capable of 120 to 277 volts (+/-10%), or as required by the site.
 4. Power supplies can be Class 1 or Class 2 output.
 5. Surge Protection: The system must survive 250 repetitive strikes of "C Low" (6kV/1.2 x

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50ms, 10kA/8 x 20ms) waveforms at 1 minute intervals with less than 10% degradation in clamping voltage. "C Low" waveforms are as defined in IEEE/ANSI C62.41.2-2002, Scenario 1 Location Category C.

6. Drivers shall have a Power Factor (PF) equal to or greater than 0.90.
7. Drivers shall have a Total Harmonic Distortion (THD) equal to or less than 20%.
8. Drivers shall comply with FCC 47 cfr part 18 non-consumer RFI/EMI standards.
9. Drivers shall be Reduction of Hazardous Substances (RoHS) compliant.
10. Drivers external to luminaires shall be plenum rated for use in environmental air plenums.

2.3 ACCEPTABLE LIST OF LIGHTING FIXTURE MANUFACTURERS:

- A. The light fixture schedule on the drawings is intended to indicate style, quality and performance for each fixture type listed. For each light fixture type, provide the basis of design fixture, comparable product #1, or comparable product #2 as scheduled in the Light Fixture Schedule on the drawings.
- B. Lighting fixture submittals shall include dimensioned diagrams, photometric data, photographs or illustration of fixture, and written specifications for each fixture type. Submittals shall include point-by-point calculations for certain areas as specified herein and where required by the Engineer. Incomplete submittals will not be reviewed by the Engineer. At the engineer's request, the contractor shall provide table top samples of comparable product fixtures for comparison to the basis of design fixture. Failure to provide samples in a timely manner shall result in rejection of the submittal.

2.4 LIGHT FIXTURE SCHEDULE:

- A. Refer to the Drawings.
- B. Provide frame kits as required for fixtures recessed in sheet rock ceilings. Frame kits have not been scheduled on the drawings, but are to be provided by the Contractor as required for the installation. Refer to the architectural reflected ceiling plans for ceiling types.

2.5 EXIT SIGNS:

- A. Units shall be LED light source, single or double face capability.
- B. Units shall be suitable for top, end, or wall mounting.
- C. Directional indicators (arrows) shall be provided where scheduled or indicated on the drawings, and shall be identifiable from a distance of 100'. Size and location of directional indicators (arrows) shall be in accordance with the Connecticut Fire Safety Code.

2.6 ATTIC STOCK:

- A. The Contractor shall furnish to the owner a stock of spare light fixtures as follows:
 1. One (1) spare light fixture of each type.

PART 3 - EXECUTION

1.1 INSTALLATION:

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- A. Each fixture shall be furnished with all necessary trims, brackets, fittings, and any other required accessories to properly install fixture.
- B. Interior fixtures, exterior fixtures, and site lighting standards shall be installed plumb.
- C. Lay-in grid type fixtures shall be securely fastened to the framing members of the grid system in accordance with N.E.C. Article 410.
 - 1. Fixtures shall be independently supported from the building structure at all four corners with safety wire supports. Use minimum 16 gauge galvanized steel wire.
- D. Suspended fixtures shall be hung from unistrut supports which shall be secured to structural steel.
- E. Refer to the Architectural Reflected Ceiling Plans for final location of all ceiling mounted light fixtures.

END OF SECTION 265000

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SECTION 276000 - SPECIAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The General Provisions of the Contract, including Division 0, Contract Requirements, and Division 1, General Requirements, are a part of this Section and shall be binding on the Contractor and /or Subcontractor who performs this work. Note also all addenda.
- B. Section 26 00 00, General Electrical, shall also govern the work under this Section.
- C. Section 26 05 00, Basic Electrical Materials & Methods, includes requirements that are binding on this Section.
- D. Examine all drawings, data, and coordinate the work of this Section with all related and adjoining work.

1.2 SCOPE OF WORK:

- A. Scope of work consists of installation of materials to be furnished under this Section, and without limiting generality thereof consists of furnishing labor, materials, equipment, hoisting, plant, transportation, rigging, staging, appurtenances, and services necessary and/or incidental to properly complete all electrical work as shown on the drawings, as described in these specifications or as reasonably inferred from either as being required in opinion of the Architect and Engineer.
- B. Work Included: Provide complete electrical services where shown on the drawings, as specified herein and as needed for a complete and proper installation including but not necessarily limited to:
 - 1. Call for Aid Systems.

1.3 QUALITY ASSURANCE:

- A. Refer to Section 26 00 00.
- B. The system supplier/installer shall be able to demonstrate at least five years of experience doing similar installations to the one described in this section.

1.4 SUBMITTALS:

- A. The Contractor's submission shall contain engineering drawings of the system(s) with specification sheets covering all component parts of each system. The system and equipment as shown in the engineering drawings and specification sheets shall meet all parts of this specification.
- B. After completion of the work under this contract, the Contractor shall furnish one (1) complete set of operating instructions including circuit diagrams and other information necessary for proper operation, and maintenance of system components.
- C. Submit schematic diagram of each system showing interconnection of all system components.

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1.5 U.L. LISTING:

- A. All basic electronic equipment shall be listed by Underwriter's Laboratories, Inc.

1.6 PREPARATORY WORK:

- A. The Contractor shall furnish all necessary equipment, labor and installation materials whether specified or not to provide complete systems.
- B. The following work related to the installation under this section shall be performed by the Electrical Contractor in accordance with Section 260500.
 - 1. Preparatory work required to accommodate the installation of each system, i.e., conduit, junction and pull boxes, outlet boxes, wiring, cutting and patching.

PART 2 - PRODUCTS

2.1 EQUIPMENT MANUFACTURER:

- A. Refer to schematic diagrams and equipment schedules on the Drawings.
- B. The catalog numbers shall serve as the standard of reference for quality, performance, style, and appearance by which any proposed alternate equipment will be judged.

PART 3 - EXECUTION

3.1 INSTALLATION PRACTICES

- A. All equipment shall be installed in a neat and workmanlike manner and to the satisfaction of the Engineer.
- B. All equipment power wiring and grounding shall conform to the National Electrical Code and applicable local codes.
- C. Cable shall be installed in separate raceway and boxes. Provide connectors specifically designed for the type cable in use shall be installed.

END OF SECTION 276000

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SECTION 283100- FIRE ALARM

PART 1.0 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Bidding Requirements, Contract Forms and Conditions of the Contract, including General and Supplementary Conditions, and Division 1 - General Requirements, apply to the work specified in this Section.
- B. Section 26 00 00 – General Electrical, shall also govern the work under this Section.
- C. Section 26 05 00, Basic Electrical Materials and Methods, includes requirements that are binding on this Section.
- D. Examine all drawings, specifications, and data, and coordinate the work of this Section with all related and adjoining work.

1.2 SCOPE OF WORK

- A. This Section covers fire alarm systems, including initiating devices, notification appliances, controls, and supervisory devices.
- B. Scope of work consists of installation of materials to be furnished under this Section, and without limiting generality thereof consists of furnishing labor, materials, equipment, hoisting, plant, transportation, rigging, staging, appurtenances, and services necessary and/or incidental to properly complete all fire alarm system work as shown on the drawings, as described in these specifications, or as reasonably inferred from either as being required in opinion of the Architect and Engineer.
- C. Work Included: Provide complete electrical services where shown on the drawings, as specified herein and as needed for a complete and proper installation including but not necessarily limited to:
 - 1. General.
 - 2. Conduits, Raceways, and Back Boxes.
 - 3. Wiring.
 - 4. Fire Alarm Control Panel with Integral Voice Evacuation System.
 - 5. Remote Annunciators.
 - 6. Remote Microphones.
 - 7. Initiation Devices.
 - 8. Notification Devices.
 - 9. Monitor and Control Devices.
 - 10. Equipment Labeling.
 - 11. Programming.
 - 12. Testing.

1.3 SPECIFIED EQUIPMENT

- A. Basis of design manufacturer: Notifier. Provide basis of design products, as specified herein, or comparable products in Siemens or Edwards (EST) manufacture.

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- B. The equipment and service provider shall be a nationally recognized company specializing in fire alarm and detection systems. This provider shall employ factory trained and NICET (minimum Level III Fire Alarm Technology) certified technicians on site to guide the installation, programming, and final systems check-out to ensure the systems integrity. The equipment and service provider shall maintain a service organization within 50 miles of this project location and shall have a minimum of 10 years experience in the fire protective signaling systems industry.

1.4 SUBMITTALS

- A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.
 - 1. Product data sheets for all system components highlighted to indicate the specific products, features, or functions required to meet this specification.
 - 2. Standard wiring diagrams from manufacturer.
 - 3. Shop drawings in AutoCAD format showing system details including location of FACP, remote annunciators, remote microphones, all devices, and circuiting.
 - 4. Complete system riser diagram showing all equipment and devices and wiring requirements for the entire system.
 - 5. System power and battery charts with performance graphs, voltage drop calculations, and battery calculations to assure that the system will operate in accordance with the prescribed backup time periods and under all voltage conditions per UL and NFPA standards.
 - 6. System operation description including method of operation and supervision of each type of circuit and sequence of operations for all manually and automatically initiated system inputs and outputs. A list of all input and output points in the system shall be provided with a label indicating location or use of IDC, SLC, NAC, relay, sensor, and auxiliary control circuits.
 - 7. Operating instructions for FACP.
 - 8. Operation and maintenance data for inclusion in Operating and Maintenance Manual. Include data for each type product, including all features and operating sequences, both automatic and manual. Provide the names, addresses, and telephone numbers of service organizations.
 - 9. Product certification signed by the manufacturer of the fire alarm system components certifying that their products comply with indicated requirements.
- B. Submission to Authority Having Jurisdiction: In addition to submission of the above material, make an identical submission to the authority having jurisdiction. Include copies of shop drawings as required to depict component locations to facilitate review. Upon receipt of comments from the Authority, make resubmissions, if required, to make clarifications or revisions to obtain approval.

1.5 WARRANTY

- A. All work performed and all material and equipment furnished under this contract shall be free from defects and shall remain so for the warranty period of 18 months from the date of substantial completion. The full cost of travel, maintenance, labor, and materials required to correct any defect(s) during this period shall be included in the submittal bid.

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1.6 MAINTENANCE SERVICE

- A. Maintenance Service Contract: Provide maintenance of fire alarm systems and equipment for a period of 18 months, using factory-authorized service representatives. Maintenance shall be in accordance with NFPA-72 and NFPA-720.
- B. Basic Services: Systematic, routine maintenance visits on a quarterly basis at times scheduled with the Owner. In addition, respond to service calls within 24 hours of notification of system trouble. Adjust and replace defective parts and components with original manufacturer's replacement parts, components, and supplies.
- C. Additional Services: Perform services within the above 18-month period not classified as routine maintenance or as warranty work when authorized in writing. Compensation for additional services must be agreed upon in writing prior to performing services.
- D. Renewal of Maintenance Service Contract: No later than 60 days prior to the expiration of the maintenance services contract, deliver to the Owner a proposal to provide contract maintenance and repair services for an additional one-year term. Owner will be under no obligation to accept maintenance service contract renewal proposal.

1.7 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of the Contract Documents. A factory authorized installer is to perform the work of this section.
- B. Each and every item of the Fire Alarm System shall be listed under the appropriate category by Underwriters Laboratories, Inc. (UL), and shall bear the "UL" label.
- C. The fire alarm manufacturer shall be of the highest caliber and insist on the highest quality. The system shall be manufactured by an ISO 9001 certified company and meet the requirements of BS EN9001: ANSI/ASQC Q9001-1994.
- D. Prior to bidding, the Contractor shall give written notice to the Engineer of any materials, equipment, or apparatus believed in the opinion of said Contractor, to be inadequate or unsuitable for the installation, or in violation of laws, ordinances, rules, or regulations of authorities having jurisdiction. The Contractor shall also give written notice to the Engineer of any items, materials, equipment, or work believed in the opinion of said Contractor, to be omitted from the Contract Documents. In the absence of such written notice, it is mutually agreed that the Contractor has included the cost of all required items in his bid and that he will be responsible for approved satisfactory functioning of systems without further compensation.

1.8 GENERAL

- A. This section of the specification includes the installation, connection and testing of microprocessor controlled, intelligent reporting fire alarm equipment and shall be required to form a complete, operative, coordinated system. It shall include, but not be limited to, alarm initiating devices, alarm notification appliances, fire alarm remote control panels, auxiliary control devices, transponders, annunciators, and wiring as shown on the drawings and specified herein.
- B. The fire alarm system shall comply with requirements of NFPA Standard 72 for Protected Premises Signaling Systems except as modified and supplemented by this specification. The system shall be electrically supervised and monitor the integrity of all conductors.

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C. The FACP and peripheral devices shall be manufactured 100% by a single U.S. manufacturer (or division thereof).

D. Basic Performance:

1. Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded on NFPA Style 4 (Class B) Signaling Line Circuits (SLC).
2. Initiation Device Circuits (IDC) shall be wired Class B (NFPA Style B) as part of an addressable device connected by the SLC Circuit.
3. Notification Appliance Circuits (NAC) shall be wired Class B (NFPA Style Y) as part of an addressable device connected by the SLC Circuit.
4. Digitized electronic signals shall employ check digits or multiple polling.
5. A single ground or open on the system signaling line circuit shall not cause system malfunction, loss of operating power or the ability to report an alarm.
6. Alarm signals arriving at the main FACP shall not be lost following a primary power failure (or outage) until the alarm signal is processed and recorded.
7. NAC speaker circuits shall be arranged such that there is a minimum of one speaker circuit per floor of the building or smoke zone whichever is greater.
8. Audio amplifiers and tone generating equipment shall be electrically supervised for normal and abnormal conditions.
9. NAC speaker circuits and control equipment shall be arranged such that loss of any one (1) speaker circuit will not cause the loss of any other speaker circuit in the system.

E. Basic system functional operation:

When a fire alarm condition is detected and reported by one of the system initiating devices, the following functions shall immediately occur:

1. The system alarm LED on the FACP shall flash.
2. A local piezo electric signal in the control panel shall sound.
3. A backlit 80 character LCD display on the FACP shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.
4. Printing on the FACP and history storage equipment shall log the information associated each new fire alarm control panel condition, along with time and date of occurrence.
5. All system output programs assigned via control-by-event interlock programming to be activated by the particular point in alarm shall be executed, and the associated system outputs (alarm notification appliances and/or relays) shall be activated.

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F. Software Modifications:

1. Provide the services of a factory trained and authorized technician to perform all system software modifications, upgrades or changes. Response time of the technician to the site shall not exceed 4 hours.
2. Provide all hardware, software, programming tools and documentation necessary to modify the fire alarm system on site. Modification includes addition and deletion of devices, circuits, zones and changes to system operation and custom label changes for devices or zones. The system structure and software shall place no limit on the type or extent of software modifications on-site. Modification of software shall not require power-down of the system or loss of system fire protection while modifications are being made.

G. Certifications:

1. Together with the shop drawing submittal, submit a certification from the major equipment manufacturer indicating that the proposed supervisor of the installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include names and addresses in the certification.

1.9 APPLICABLE CODES AND STANDARDS

The codes and standards listed below form a part of this specification.

A. National Fire Protection Association (NFPA) - USA:

No. 12	CO2 Extinguishing Systems
No. 12A & 12B	Halon Extinguishing Systems
No. 15	Water Spray Systems
No. 16	Foam/Water Deluge and Spray Systems
No. 72	National Fire Alarm Code
No. 101	Life Safety Code
NO. 720	Standard for the Installation of Carbon Monoxide Detection and Warning Equipment

B. Underwriters Laboratories Inc. (UL) - USA:

No. 268	Smoke Detectors for Fire Protective Signaling Systems
No. 864	Control Units for Fire Protective Signaling Systems
No. 268A	Smoke Detectors for Duct Applications
No. 521	Heat Detectors for Fire Protective
No. 464	Audible Signaling Appliances
No. 38	Manually Actuated Signaling Boxes
No. 346	Waterflow Indicators for Fire Protective Signaling Systems
No. 1076	Control Units for Burglar Alarm Proprietary Protective Signaling Systems
No. 1971	Visual Notification Appliances
No. 2034	Standard for Carbon Monoxide Alarms
NO. 2075	Standard for Gas and Vapor Detectors and Sensors

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- C. Local and State Building Codes.
 - D. All requirements of the Authority Having Jurisdiction (AHJ).
 - E. Distributor of fire alarm to be an approved UUIS certified company.
- 1.10 EXTRA MATERIALS
- A. General: Furnish extra materials, packaged with protective covering for storage, and identified with labels clearly describing contents as follows:
 - 1. Break Rods for Manual Stations: Furnish quantity equal to 15 percent of the number of manual stations installed; minimum of 6 rods.
 - 2. Notification Appliances: Furnish quantity equal to 10 percent of each type and number of units installed, but not less than one of each type.
 - 3. Smoke Detectors or Sensors, Fire Detectors, and Flame Detectors: Furnish quantity equal to 10 percent of each type and number of units installed but not less than one of each type.
 - 4. Detector or Sensor Bases: Furnish quantity equal to 2 percent of each type and number of units installed but not less than one of each type.

PART 2.0 PRODUCTS

2.1 EQUIPMENT AND MATERIAL, GENERAL

- A. All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protective signaling system, meeting the National Fire Alarm Code.
- B. All equipment and components shall be installed in strict compliance with manufacturers' recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation.
- C. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.

2.2 RACEWAYS AND WIRING

- A. Conduit:
 - 1. Conduit shall be in accordance with The National Electrical Code (NEC), and local and state requirements. Conduit shall be EMT with galvanized steel set screw type connectors and couplings. Conduits shall be $\frac{3}{4}$ inch diameter minimum.
 - 2. All wiring in normally occupied (finished) areas of the building shall be installed concealed from view within the building structure. Wiring may only be installed exposed to view in Mechanical and Electrical Rooms, and rooms without ceilings (exposed to structure above). Provide MC Cable listed for use in fire alarm systems

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for wiring run above accessible ceilings. Provide EMT conduit for wiring run within walls, above non-accessible ceilings, or where exposed to view.

B. Wire:

1. All fire alarm system wiring shall be type FPL where run in conduit or raceway and type FPLP Fire Alarm Cable where run without conduit or MC cable. All wiring run above accessible ceilings shall be provided in type FPLP Fire Alarm Cable. Provide EMT conduit for wiring run within walls, above non-accessible ceilings, or where exposed to view.
2. Wiring shall be in accordance with local, state and national codes and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer.
3. Cable must be separated from any open conductors of power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, per NEC Article 760-29.
4. Wiring for 24 volt DC control, alarm notification, emergency communication and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.
5. Wiring used for the SLC multiplex communication loop shall be twisted and shielded and support a minimum wiring distance of 10,000 feet. In certain applications, the system shall support up to SLC loops with up to 1,000 feet of untwisted, unshielded wire. The system shall permit use of IDC and NAC wiring in the same conduit with the SLC communication loop.
6. All field wiring shall be completely supervised.
7. The fire alarm control panel shall be capable of t-tapping Class B (NFPA Style 4) Signaling Line Circuits (SLCs). Systems which do not allow or have restrictions in, for example, the amount of t-taps, length of t-taps etc., are not acceptable.

C. Device Boxes, Junction Boxes and Cabinets:

1. All boxes and cabinets shall be UL listed for their use and purpose.
2. All junction box covers shall be painted fire alarm red.

D. Initiating circuits shall be arranged to serve like categories (manual, smoke, waterflow). Mixed category circuitry shall not be permitted except on signaling line circuits connected to intelligent reporting devices.

E. The fire alarm control panel shall be connected to a separate dedicated branch circuit, maximum 20 amperes. This circuit shall be labeled at the main power distribution panel as FIRE ALARM. Fire alarm control panel primary power wiring shall be 12 AWG. The control panel cabinet shall be grounded securely to either a cold water pipe or grounding rod.

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2.3 MAIN FIRE ALARM CONTROL PANEL

- A. The specification is based on a Notifier Model NFS2-620. The system shall contain a microprocessor based Central Processing Unit (CPU). The CPU shall communicate with and control the following types of equipment used to make up the system: intelligent addressable smoke and thermal (heat) detectors, addressable modules, printer, annunciators, and other system controlled devices.
- B. Operator Control:
1. Acknowledge Switch:
 - a. Activation of the control panel acknowledge switch in response to new alarms and/or troubles shall silence the local panel piezo electric signal and change the alarm and trouble LEDs from flashing mode to steady-ON mode. If multiple alarm or trouble conditions exist, depression of this switch shall advance the 80-character LCD display to the next alarm or trouble condition.
 - b. Depression of the Acknowledge switch shall also silence all remote annunciator piezo sounders.
 2. Alarm Silence Switch:
 - a. Activation of the alarm silence switch shall cause all programmed alarm notification appliances and relays to return to the normal condition after an alarm condition. The selection of notification circuits and relays that are silence able by this switch shall be fully field programmable within the confines of all applicable standards. The FACP software shall include silence inhibit and auto-silence timers.
 3. Alarm Activate (Drill) Switch:
 - a. The Alarm Activate switch shall activate all notification appliance circuits. The drill function shall latch until the panel is silenced or reset.
 4. System Reset Switch:
 - a. Activation of the System Reset switch shall cause all electronically-latched initiating devices, appliances or software zones, as well as all associated output devices and circuits, to return to their normal condition.
 5. Lamp Test:
 - a. The Lamp Test switch shall activate all system LEDs and light each segment of the liquid crystal display.
- C. System Capacity and General Operation:
1. The control panel shall provide, or be capable of expansion to 636 intelligent/addressable devices.

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2. The system shall include Form-C alarm, trouble, supervisory, and security relays rated at a minimum of 3.0 amps @ 30 VDC. It shall also include four Class B (NFPA Style Y) or Class A (NFPA Style Z) programmable notification appliance circuits.
3. The system shall support up to 8 additional output modules (signal, speaker, telephone, or relay), each with 8 circuits for an additional 64 circuits. These circuits shall be either Class A (NFPA Style D) or Class B (NFPA Style Y) per the project drawings.
4. The fire alarm control panel shall include a full featured operator interface control and annunciation panel that shall include a backlit Liquid Crystal Display (LCD), individual color coded system status LEDs, and an alphanumeric keypad for the field programming and control of the fire alarm system.
5. All programming or editing of the existing program in the system shall be achieved without special equipment and without interrupting the alarm monitoring functions of the fire alarm control panel. The system shall be fully programmable, configurable, and expandable in the field without the need for special tools, PROM programmers or PC based programmers. It shall not require replacement of memory ICs to facilitate programming changes.
6. The system shall allow the programming of any input to activate any output or group of outputs. Systems which have limited programming (such as general alarm), have complicated programming (such as a diode matrix), or require a laptop personal computer are not considered suitable substitutes.
7. The FACP shall provide the following features:
 - a. Drift compensation to extend detector accuracy over life. Drift compensation shall also include a smoothing feature, allowing transient noise signals to be filtered out.
 - b. Detector sensitivity test, meeting requirements of NFPA 72, Chapter 7.
 - c. Maintenance alert, with two levels (maintenance alert/maintenance urgent), to warn of excessive smoke detector dirt or dust accumulation.
 - d. Nine sensitivity levels for alarm, selected by detector. The system shall also include up to nine levels of pre-alarm, selected as a percentage of the alarm level, in steps from 90% down to 50%.
 - e. System status reports to display or printer.
 - f. Alarm verification, with verification counters.
 - g. PAS pre-signal, meeting NFPA 72 3-8.3 requirements.
 - h. Rapid manual station reporting (under 3 seconds).
 - i. Non-alarm points for general (non-fire) control.
 - j. Periodic detector test, conducted automatically by the software.

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- k. Self optimizing pre-alarm for advanced fire warning, which allows each detector to learn its particular environment and set its pre-alarm level to just above normal peaks.
 - l. Cross zoning with the capability of counting: two detectors in alarm, two software zones in alarm, or one smoke detector and one thermal detector.
 - m. Walk test, with a check for two detectors set to same address.
 - n. Control-by-time for non-fire operations, with holiday schedules.
 - o. Day/night automatic adjustment of detector sensitivity.
 - p. Device blink control for sleeping areas.
 - q. UL-1076 security monitor points.
- D. The FACP shall be capable of coding notification circuits in march time (120 PPM), temporal (NFPA 72 A-2-2.2.2), and California code.
- E. Central Microprocessor
- 1. The microprocessor shall be a state-of-the-art, high speed, 16 bit RISC device and it shall communicate with, monitor and control all external interfaces. It shall include an EPROM for system program storage, non-volatile memory for building-specific program storage, and a "watch dog" timer circuit to detect and report microprocessor failure.
 - 2. The microprocessor shall contain and execute all control-by-event programs for specific action to be taken if an alarm condition is detected by the system. Control-by-event equations shall be held in non-volatile programmable memory, and shall not be lost even if system primary and secondary power failure occurs.
 - 3. The microprocessor shall also provide a real-time clock for time annotation of system displays, printer, and history file. The time-of-day and date shall not be lost if system primary and secondary power supplies fail. The real time clock may also be used to control non-fire functions at programmed time-of-day, day-of-week, and day-of-year.
 - 4. A special program check function shall be provided to detect common operator errors.
 - 5. An auto-program (self-learn) function shall be provided to quickly install initial functions and make the system operational.
 - 6. For flexibility and to ensure program validity, an optional Windows(TM) based program utility shall be available. This program shall be used to off-line program the system with batch upload/download. This program shall also have a verification utility which scans the program files, identifying possible errors. It shall also have the ability to compare old program files to new ones, identifying differences in the two files to allow complete testing of any system operating changes. This shall be in compliance with the NFPA 72 requirements for testing after system modification.

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E. Display

1. The display shall provide all the controls and indicators used by the system operator and may also be used to program all system operational parameters.
2. The display shall include status information and custom alphanumeric labels for all intelligent detectors, addressable modules, internal panel circuits, and software zones.
3. The display shall include an 80-character back-lit alphanumeric Liquid Crystal Display (LCD). It shall also provide a minimum of 8 Light-Emitting-Diodes (LEDs) that indicate the status of the following system parameters: AC POWER, FIRE ALARM, PREALARM WARNING, SECURITY ALARM, SUPERVISORY SIGNAL, SYSTEM TROUBLE, DISABLED POINTS, and ALARM SILENCED.
4. The display keypad shall be an easy to use QWERTY type keypad, similar to a PC keyboard. This shall be part of the standard system and have the capability to command all system functions, entry of any alphabetic or numeric information, and field programming. Two different password levels shall be provided to prevent unauthorized system control or programming.
5. The display shall include the following operator control switches: ACKNOWLEDGE, ALARM SILENCE, ALARM ACTIVATE (drill), SYSTEM RESET, and LAMP TEST.

F. Signaling Line Circuits (SLC)

1. The system shall include one SLC circuit (expandable to 2). Each SLC interface shall provide power to and communicate with up to 159 intelligent detectors (ionization, photoelectric or thermal) and 159 intelligent modules (monitor or control) for a system capacity of 636 devices. Each SLC loop shall be capable of NFPA 72 Style 4, Style 6, or Style 7 (Class A or B) wiring.
2. The Loop Interface Board (LIB) shall receive analog information from all intelligent detectors to be processed to determine whether normal, alarm, pre-alarm, or trouble conditions exist for each detector. The software shall automatically maintain the detector's desired sensitivity level by adjusting for the effects of environmental factors, including the accumulation of dust in each detector. The analog information shall also be used for automatic detector testing and for the automatic determination of detector maintenance requirements.
3. The detector software shall meet NFPA 72, Chapter 7 requirements and be certified by UL as a calibrated sensitivity test instrument.
4. The detector software shall allow manual or automatic sensitivity adjustment.

G. Serial Interfaces

1. The system shall include two serial EIA-232 interfaces. Each interface shall be a means of connecting UL Listed Electronic Data Processing (EDP) peripherals.
2. One EIA-232 interface shall be used to connect an UL-Listed 40 or 80 column printer. Printers which are not UL-Listed are not considered acceptable substitutes.

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3. The system shall include an EIA-485 port for the serial connection of optional annunciators and remote LCD displays.
4. The EIA-485 interface may be used for network connection to a proprietary receiving unit.

H. Notification Appliance Circuit (NAC) Module – XP6C

1. The notification appliance circuit module shall provide six fully supervised Class A or B (NFPA Style Z or Y) notification circuits. An expansion circuit board shall allow expansion to eight circuits per module.
2. The notification circuit capacity shall be 3.0 amperes maximum per circuit and 6.0 amperes maximum per module.
3. The module shall not affect other module circuits in any way during a short circuit condition.

I. Control Relay Module – FRM-1

1. The control relay transponder module shall provide four Form-C auxiliary relay circuits rated at 5 amperes, 28 VDC. An expansion circuit board shall allow expansion to eight Form-C relays per module.
2. Each relay circuit shall be capable of being activated (change in state) by any initiating device or from any combination of initiating devices.

J. Digital Voice Control Module

1. The voice control (speaker circuit) module shall provide fully supervised Class B (NFPA Style Y) or Class A (NFPA Style Z) speaker circuits.
2. Each speaker circuit shall be capable of switching up to 30 watts maximum per circuit.
3. If a short-circuit trouble occurs on one of the circuits, that circuit will not activate on either manual or automatic command.
4. Each speaker circuit module may be programmed to activate on activation of the All-Call switch and to deactivate upon pressing the signal silence switch.

K. Enclosures:

1. The control panel shall be housed in a UL-listed cabinet suitable for surface or semi-flush mounting. The cabinet and front shall be corrosion protected, given a rust-resistant prime coat, and manufacturer's standard finish.
2. The back box and door shall be constructed of .060 steel with provisions for electrical conduit connections into the sides and top.

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3. The door shall provide a key lock and shall include a glass or other transparent opening for viewing of all indicators. For convenience, the door may be selected for either right or left hand hinging.

L. Digital Voice Command Center (DVCC)

1. The Digital Voice Command Center (DVCC) shall contain equipment required for all audio control, telephone system control, signaling and supervisory functions. This shall include amplifiers, tone generators, digital voice units, a microphone and a main telephone handset. The voice command center shall be an integral part of the fire alarm system. Systems which require separate, non-integrated voice systems are not considered suitable substitutes.
2. Function: The voice command center equipment shall perform the following functions:
 - a. Operate as a supervised single channel or dual channel emergency voice communication system.
 - b. Provide automatic custom digital recorded voice message and tone generation.
 - c. Provide a hand held microphone with priority push-to-talk switch.
 - d. Provide an all-call switch and indicator to quickly activate all speaker circuits.

M. Power Supply: MPS-24

1. The main addressable-intelligent power supply for the fire alarm control panel shall provide 6.0 amps of available power for the control panel and peripheral devices.
2. Provisions will be made to allow the audio-visual power to be increased as required by adding modular expansion audio-visual power supplies.
3. Positive-Temperature-Coefficient (PTC) thermistors, circuit breakers, or other over-current protection shall be provided on all power outputs. The power supply shall provide an integral battery charger for use with batteries up to 55 AH or may be used with an external battery and charger systems. Battery arrangement may be configured in the field.
4. The main power supply shall continuously monitor all field wires for earth ground conditions, and shall have the following LED indicators:
 - a. Ground Fault LED
 - b. Battery Fail LED
 - c. AC Power Fail LED
5. The main power supply shall operate on 120 VAC, 60 Hz, and shall provide all necessary power for the FACP.
6. The main power supply shall provide a battery charger for 24 hours of standby using dual-rate charging techniques for fast battery recharge.

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7. The main power supply shall provide a very low frequency sweep earth detect circuit, capable of detecting earth faults on sensitive addressable modules.
 8. The main power supply shall provide meters to indicate battery voltage and charging current.
 9. All circuits shall be power-limited, per 1995 UL864 requirements.
- N. Audio Amplifiers (Size amplifiers with a minimum spare capacity of 20% and provide a minimum of one backup amplifier.)
1. The audio amplifiers will provide audio power (@ 25 Volts RMS) for distribution to the speaker circuits.
 2. Multiple audio amplifiers may be mounted in the fire alarm control panel using additional cabinets if necessary.
 3. The audio amplifiers shall include an integral power supply, and shall provide the following controls and indicators:
 - a. Normal Audio Level LED
 - b. Incorrect Audio Level LED
 - c. Brownout LED
 - d. Battery Trouble LED
 - e. Amplifier Trouble LED
 - f. Audio Amplifier Gain Adjust
 4. Adjustment of the correct audio level for the amplifier shall not require any special tools or test equipment.
 5. All terminal blocks for the connection of field wiring shall have a removable plug-in and be hardwired to allow for ease of field wire installation in a cabinet or at a remote location.
 6. The amplifier shall include audio input and amplified output supervision, back-up input, and automatic switch-over to back up (if primary amplifier should fail).
 7. Amplifiers shall be backed up in groups (one amplifier backs up several).
- O. Prerecorded Voice - Audio Message Generator
1. The voice communication system shall be capable of transmitting a prerecorded voice message to all speakers in the building, or to any programmed group of speakers.
 2. Actuation of any alarm initiating device shall cause a pre-recorded message to sound over the speakers. The message shall be repeated four times.
 3. A built-in microphone shall be provided to allow paging through speaker circuits and shall have priority over the alarm message.
 4. The message generator shall provide an interface to allow paging through telephone circuits.

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5. The audio message generator shall have the following controls and indicators to allow for proper operator understanding and control.
 - a. Audio Level Normal LED
 - b. All Call LED
 - c. On-Line LED
 - d. Amplifier Trouble LED
 - e. Speaker Trouble LED
 - f. All Call Switch
 - g. Local Speaker Volume Control
6. The prerecorded message shall be stored on a non-volatile read only memory chip. The message shall be up to 24 seconds in length. An optional random access chip shall be available for a field programmable message. This message shall be programmed through the system's microphone or downloaded via a cassette recorder. Systems which utilize prerecorded memory storage other than on ROM type memory chips are not suitable substitutes.

P. Specific System Operations

1. Smoke Detector Sensitivity Adjust: A means shall be provided for adjusting the sensitivity of any or all addressable intelligent detectors in the system from the system keypad. Sensitivity range shall be within the allowed UL window and have a minimum of 9 levels.
2. Alarm Verification: Each of the intelligent addressable smoke detectors in the system may be independently selected and enabled to be an alarm verified detector. The alarm verification delay shall be programmable from 5 to 30 seconds and each detector shall be able to be selected for verification. The FACP shall keep a count of the number of times that each detector has entered the verification cycle. These counters may be displayed and reset by the proper operator commands.
3. Point Disable: Any addressable device or conventional circuit in the system may be enabled or disabled through the system keypad.
4. Point Read: The system shall be able to display or print the following point status diagnostic functions:
 - a. Device status
 - b. Device type
 - c. Custom device label
 - d. View analog detector values
 - e. Device zone assignments
 - f. All program parameters
5. System Status Reports: Upon command from an operator of the system, a status report will be generated and printed, listing all system status.
6. System History Recording and Reporting: The fire alarm control panel shall contain a history buffer that will be capable of storing up to 1000 events. 200 events shall be dedicated to alarm and the remaining events are general purpose. Each of these activations will be stored and time and date stamped with the actual time of the

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activation. The contents of the history buffer may be manually reviewed, one event at a time, or printed in its entirety.

- a. The history buffer shall use non-volatile memory. Systems that use volatile memory for history storage are not acceptable substitutes.
7. Automatic Detector Maintenance Alert: The fire alarm control panel shall automatically interrogate each intelligent detector and shall analyze the detector responses over a period of time. If any intelligent detector in the system responds with a reading that is above or below normal limits, then the system will enter the trouble mode, and the particular detector will be annunciated on the system display, and printed on the optional printer. This feature shall in no way inhibit the receipt of alarm conditions in the system, nor shall it require any special hardware, special tools or computer expertise to perform.
 8. Pre-Alarm Function: The system shall provide two levels of pre-alarm warning to give advance notice of a possible fire situation. Both pre-alarm levels shall be fully field adjustable. The first level shall give an audible indication at the panel. The second level shall give an audible indication and may also activate control relays. The system shall also have the ability to activate local detector sounder bases at the pre-alarm level, to assist in avoiding nuisance alarms.
 9. Software Zones: The FACP shall provide 99 software zones and 10 additional special function zones.
 10. The fire alarm control panel shall include a walk test feature. It shall include the ability to test initiating device circuits and notification appliance circuits from the field without returning to the panel to reset the system. Operation shall be as follows:
 - a. Alarming an initiating device shall activate programmed outputs, which are selected to participate in walk test, for 3 seconds.
 - b. Introducing a trouble into the initiating device shall activate the programmed outputs for 8 seconds.
 - c. Walk test shall be selectable on a per device/circuit basis. All devices and circuits which are not selected for walk test shall continue to provide fire protection and if an alarm is detected, will exit walk test and activate all programmed alarm functions.
 - d. All devices tested in walk test shall be recorded in the history buffer.
 11. Waterflow Operation (Provide one FMM-1 for each)
 - a. An alarm from a waterflow detection device shall activate the appropriate alarm message on the 80 character display, turn on all programmed notification appliance circuits and shall not be affected by the signal silence switch.

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12. Supervisory Operation (Provide one FMM-1 for each)
 - a. An alarm from a supervisory device shall cause the appropriate indication on the 80 character display, light a common supervisory LED, but will not cause the system to enter the trouble mode.
13. Signal Silence Operation
 - a. The FACP shall have the ability to program each output circuit (notification, relay, speaker etc.) to deactivate upon depression of the signal silence switch.
14. Non-Alarm Input Operation
 - a. Any addressable initiating device in the system may be used as a non-alarm input to monitor normally-open contact type devices. Non-alarm functions are a lower priority than fire alarm initiating devices.

2.4 SYSTEM COMPONENTS

- A. Speakers (Speaker/Strobes “SPSR” Notifier are to meet requirements of both paragraphs A and B)
 1. All speakers shall operate on 25 VRMS or with field selectable output taps from 0.5 to 2.0 Watts.
 2. Speakers in corridors and public spaces shall produce a nominal sound output of 84 dBA at 10 feet (3m).
 3. Frequency response shall be a minimum of 400 HZ to 4000 HZ.
 4. The back of each speaker shall be sealed to protect the speaker cone from damage and dust.
- B. Strobe lights shall meet the requirements of the ADA, UL Standard 1971, NFPA and shall meet the following criteria:
 1. The pulse duration shall be between minimum of one second and maximum of two seconds.
 2. Strobe intensity shall meet the requirements of UL 1971, NFPA and ADA.
 3. All visual units shall be synchronized to meet ADA requirements using sync modules.
- C. Alphanumeric LCD Type Annunciator
 1. The alphanumeric display annunciator shall be a supervised, remotely located back-lit LCD display containing a minimum of one hundred-sixty (160) characters for alarm annunciation in clear English text.
 2. The LCD annunciator shall display all alarm and trouble conditions in the system.
 3. An audible indication of alarm shall be integral to the alphanumeric display.

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4. The display shall be UL listed for fire alarm application.
 5. It shall be possible to connect up to 32 LCD displays and be capable of wiring distances up to 6000 feet from the control panel.
 6. The annunciator shall connect to a separate, dedicated "terminal mode" EIA-485 interface. This is a two-wire connection and shall be capable of distances to 6,000 feet. Each terminal mode LCD display shall mimic the main control panel.
 7. The system shall allow a minimum of 32 terminal mode LCD annunciators. Up to 10 LCD annunciators shall be capable of the following system functions: Acknowledge, Signal Silence and Reset which shall be protected from unauthorized use by a key switch or password.
 8. Provide annunciator key switch to enable or disable operation of annunciator membrane control switches.
- D. All interfaces and associated equipment are to be protected so that they will not be affected by voltage surges or line transients consistent with UL standard 864.
- E. Field Wiring Terminal Blocks
1. For ease of service all panel I/O wiring terminal blocks shall be removable, plug-in types and have sufficient capacity for 18 to 12 AWG wire. Terminal blocks which are permanently fixed are not acceptable.

2.5 SYSTEM COMPONENTS - ADDRESSABLE DEVICES

A. Addressable Devices - General

1. Addressable devices shall use simple to install and maintain decade (numbered 1 to 16) type address switches.
2. Addressable devices which use a binary address setting method, such as a Dip switch, are difficult to install and subject to installation error. This type of device is not an allowable substitute.
3. Detectors shall be intelligent (analog) and addressable, and shall connect with two wires to the fire alarm control panel signaling line circuits.
4. Addressable smoke and thermal detectors shall provide dual alarm and power/polling LEDs. Both LEDs shall flash under normal conditions, indicating that the detector is operational and in regular communication with the control panel, and both LEDs shall be placed into steady illumination by the control panel, indicating that an alarm condition has been detected. If required, the LED flash shall have the ability to be removed from the system program. An output connection shall also be provided in the base to connect an external remote alarm LED.
5. Smoke detector sensitivity shall be set in the fire alarm control panel and shall be adjustable in the field through the field programming of the system. Sensitivity may be automatically adjusted by the panel on a time-of-day basis.

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6. Using software in the FACP, detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72, Chapter 7.
7. The detectors shall be ceiling-mount and shall include a separate twist-lock base with tamper proof feature. Base shall include a sounder base with a built-in (local) sounder rated at 85 DBA minimum, a relay base and an isolator base designed for Style 7 applications.
8. The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel.
9. Detectors shall also store an internal identifying type code that the control panel shall use to identify the type of device (ION, PHOTO, THERMAL).
10. Detectors will operate in an analog fashion, where the detector simply measures its designed environment variable and transmits an analog value to the FACP based on real-time measured values. The FACP software, not the detector, shall make the alarm/normal decision, thereby allowing the sensitivity of each detector to be set in the FACP program and allowing the system operator to view the current analog value of each detector.
11. Detectors shall provide address-setting means using decimal switches and shall also store an internal identifying code that the control panel shall use to identify the type of device. LEDs shall be provided that shall flash under normal conditions, indicating that the device is operational and is in regular communication with the control panel.
12. A magnetic test switch shall be provided to test each detector for 100% obscuration, reported to the FACP.
13. Addressable devices shall provide address-setting means using decimal switches and shall also store an internal identifying code that the control panel shall use to identify the type of device. LED(s) shall be provided that shall flash under normal conditions, indicating that the device is operational and is in regular communication with the control panel.
14. A magnetic test switch shall be provided to test detectors and modules. Detectors shall report an indication of an analog value reaching 100% of the alarm threshold.

B. Addressable Manual Pull Box (NBG12LX)

1. Addressable pull boxes shall, on command from the control panel, send data to the panel representing the state of the manual switch and the addressable communication module status. They shall use a key operated test-reset lock, and shall be designed so that after actual emergency operation, they cannot be restored to normal use except by the use of a key.
2. All operated stations shall have a positive, visual indication of operation and utilize a key type reset.

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3. Manual stations shall be constructed of Lexan with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters, 1.75 inches or larger.
4. Stations shall be suitable for surface mounting or semi-flush mounting as shown on the plans, and shall be installed not less than 42 inches, nor more than 48 inches above the finished floor.
5. Provide STI Stopper II Lexan guards with integral buzzer for all manual pull stations.

C. Intelligent Photoelectric Smoke Detector - FSP-851 W/B710LP Base

1. The detectors shall use the photoelectric (light-scattering) principal to measure smoke density and shall, on command from the control panel, send data to the panel representing the analog level of smoke density.

D. Intelligent Thermal Detectors - FST-851 W/B710LP Base

1. Thermal detectors shall be intelligent addressable devices rated at 135 degrees Fahrenheit (58 degrees Celsius) and have a rate-of-rise element rated at 15 degrees F (9.4 degrees C) per minute. It shall connect via two wires to the fire alarm control panel signaling line circuit. Up to 159 intelligent heat detectors may connect to one SLC loop.

E. Intelligent Duct Smoke Detector DNR Housing with FSP-851R head, tube, and FMR-1 addressable relay module

1. The in-duct smoke detector housing shall accommodate either an intelligent ionization detector or an intelligent photoelectric detector, of that provides continuous analog monitoring and alarm verification from the panel.
2. When sufficient smoke is sensed, an alarm signal is initiated at the FACP, and appropriate action taken to change over air handling systems to help prevent the rapid distribution of toxic smoke and fire gases throughout the areas served by the duct system.
3. Each duct smoke detector shall be furnished with a remote test station and status light.

F. Addressable Dry Contact Monitor Module - FMM-1

1. Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional alarm initiating devices (any N.O. dry contact device) to one of the fire alarm control panel SLC loops.
2. The monitor module shall mount in a 4-inch square, 2-1/8 inch deep electrical box.
3. The IDC zone may be wired for Style D or Style B operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.
4. For difficult to reach areas, the monitor module shall be available in a miniature package and shall be no larger than 2-3/4 inch x 1-1/4 inch x 1/2 inch. This version need not include Style D or an LED. (FMM-101)

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G. Addressable Control Module - FCM-1

1. Addressable control modules shall be provided to supervise and control the operation of one conventional NACs of compatible, 24 VDC powered, polarized audio/visual notification appliances. For fan shutdown and other auxiliary control functions, the control module may be set to operate as a dry contact relay.
2. The control module shall mount in a standard 4-inch square, 2-1/8 inch deep electrical box, or to a surface mounted backbox.
3. The control module NAC may be wired for Style Z or Style Y (Class A/B) with up to 1 amp of inductive A/V signal, or 2 amps of resistive A/V signal operation, or as a dry contact (Form-C) relay. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to insure that 100% of all auxiliary relay or NACs may be energized at the same time on the same pair of wires.
4. Audio/visual power shall be provided by a separate supervised power loop from the main fire alarm control panel or from a supervised, UL listed remote power supply.
5. The control module shall be suitable for pilot duty applications and rated for a minimum of .6 amps at 30 VDC.

H. Intelligent smoke detector / CO detector (FCO-851)

1. The intelligent smoke detector / CO detector shall provide separate and distinct audible tones and shall activate a supervisory signal on the fire alarm panel and LCD annunciators when in alarm. CO detectors shall not initiate a general building alarm when activated.
2. Intelligent smoke detector/CO detector installation shall be in accordance with NFPA-720.

2.6 BATTERIES

- A. The batteries shall be 55 amp-hour, 12 volt nominal.
- B. The batteries shall have sufficient capacity to power the fire alarm system for not less than twenty-four hours plus 5 minutes of alarm upon a normal AC power failure.
- C. The batteries are to be completely maintenance free. No liquids are required. Fluid level checks for refilling, spills, and leakage shall not be required.
- D. If necessary to meet standby requirements, external battery cabinet and charger systems may be used.

2.7 UDACT

- A. Provide a universal digital alarm communicator/transmitter capable of annunciating all addressable devices to a centralized monitoring station.
- B. The communicator shall annunciate all devices on an individual point basis. Communicator shall be UL listed for fire and include dual telephone line connections.

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2.8 REMOTE MICROPHONE - RM-1SA with CAB-RM

- A. Provide a remote microphone and locate adjacent to the annunciator panel. The microphone shall be compatible with the digital voice command center.

2.9 MAGNETIC DOOR HOLDERS

- A. Magnetic door holders shall be furnished under Specification Section 08 71 00 "Door Hardware" and shall be installed as a part of the work of this Section. Installation shall be coordinated with Door Hardware Installer. Magnetic door holders shall be 120 VAC.

2.10 WIRE GUARDS

- A. Provide STI wire guards for all speaker/strobes and strobes located in the Gymnasium.

PART 3.0 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Install system components and all associated devices in accordance with applicable NFPA Standards and manufacturer's recommendations.
- B. Installation personnel shall be supervised by persons who are qualified and experienced in the installation, inspection, and testing of fire alarm systems.
- C. All conduit, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage.
- D. All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.

3.2 EQUIPMENT INSTALLATION

- A. Furnish and install a complete Fire Alarm System as described herein and as shown on the plans. Include sufficient control unit(s), annunciator(s), manual stations, automatic fire detectors, smoke detectors, audible and visible notification appliances, wiring, terminations, electrical boxes, and all other necessary material for a complete operating system.
- B. Water-Flow and Valve Supervisory Switches: Connect for each sprinkler valve required to be supervised.
- C. Device Location-Indicating Lights: Locate in the public space immediately adjacent to the device they monitor.
- D. Install manual station with operating handle 48 inches (1.22 m) above floor. Install wall mounted audible and visual notification appliances not less than 80 inches (2.03 m) above floor to bottom of lens and not greater than 96 inches (2.44 m) above floor to top of lens.
- E. Mount outlet box for electric door holder to withstand 80 pounds pulling force.
- F. Make conduit and wiring connections to door release devices, sprinkler flow switches, sprinkler valve tamper switches, and duct smoke detectors.

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- G. Automatic Detector Installation: Conform to NFPA 72.

3.3 PREPARATION

- A. Coordinate work of this Section with other affected work and construction schedule.

3.4 WIRING INSTALLATION

- A. System Wiring: Wire and cable shall be a type listed for its intended use by an approval agency acceptable to the Authority Having Jurisdiction and shall be installed in accordance with the appropriate articles from the current approved edition of NFPA 70: National Electric Code (NEC).
- B. Contractor shall obtain from the Fire Alarm System Manufacturer written instruction regarding the appropriate wire/cable to be used for this installation. No deviation from the written instruction shall be made by the Contractor without the prior written approval of the Fire Alarm System Manufacturer.
- C. Color Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color code for alarm initiating device circuits wiring and a different color code for supervisory circuits. Color-code notification appliance circuits differently from alarm-initiating circuits. Paint fire alarm system junction boxes and covers red.

3.5 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Provide services of a factory-authorized service representative to supervise the field assembly and connection of components and the pre-testing, testing, and adjustment of the system.
- B. Service personnel shall be qualified and experienced in the inspection, testing, and maintenance of fire alarm systems.
- C. Pre-testing: Determine, through pre-testing, the conformance of the system to the requirements of the Drawings and Specifications. Correct deficiencies observed in pre-testing. Replace any malfunctioning equipment, devices, or wiring.
- D. Inspection:
 - 1. Inspect equipment installation, interconnection with system devices, mounting locations, and mounting methods.
 - 2. Verify that units and controls are properly installed, connected, and labeled and that interconnecting wires and terminals are identified.
- E. Programming:
 - 1. System device addresses shall be based on the owners chosen room numbering system. The contractor shall obtain the final room numbers from the architect and owner prior to system programming. All system devices shall be labeled by the contractor with the device address using a Dymo labeling machine. Labels shall be black numerals (3/32" numeral height) on clear background.
 - 2. Provide all system programming as required to meet the specified operation. In addition, include in the bid for 3 additional system-wide software programming changes to meet the requirements of the Owner, Engineer, or local Fire Department.
- F. Acceptance Operational Tests:
 - 1. Perform operational system tests to verify conformance with specifications: Each alarm initiating device installed shall be operationally tested. Each device shall be tested for alarm and trouble conditions. Contractor shall submit a written certification

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that the Fire Alarm System installation is complete including all punch-list items. Test battery operated emergency power supply.

Test emergency power supply to minimum durations specified. Test Supervising Station Signal Transmitter. Coordinate testing with Supervising Station monitoring firm/entity. Test each Notification Appliance installed for proper operation. Submit written report indicating sound pressure levels at specified distances.

Test Fire Alarm Control Panel and Remote Annunciators.

2. Provide minimum 10 days notice of acceptance test performance schedule to Owner, and local Authority Having Jurisdiction.
- G. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets the Specifications and complies with applicable standards.
- H. Report of Tests and Inspections: Provide a written record of inspections, tests, and detailed test results in the form of a test log. Use NFPA 72 Forms for documentation. Comply with NFPA-720 for CO detectors.
- I. Final Test, Record of Completion, and Certificate of Occupancy:
 1. Test the system as required by the Authority Having Jurisdiction in order to obtain a certificate of occupancy. Provide completed NFPA 72 Record of Completion form to Owner and AHJ.

3.6 CLEANING AND ADJUSTING

- A. Cleaning: Remove paint splatters and other spots, dirt, and debris. Clean units internally using methods and materials recommended by manufacturer.
- B. Occupancy Adjustments: When requested within one year of date of Substantial Completion, provide on-site assistance in adjusting sound pressure levels and adjusting controls and sensitivities to suit actual occupied conditions. Provide up to three visits to the site for this purpose.

3.7 TRAINING

- A. Provide the services of a factory-authorized service representative to demonstrate the system and train Owner's maintenance personnel as specified below.
 1. Train Owner's maintenance personnel in the procedures and schedules involved in operating, troubleshooting, servicing, and preventive maintaining of the system. Provide a minimum of two (2) separate 4 hour training sessions.
 2. Schedule training with the Owner at least seven days in advance.

END OF SECTION 283100

DRAWING LIST

Sheet No.	Sheet Title
A0.01	GENERAL INFORMATION
A0.05	SITE LOGISTICS PLAN
D1.01	FIRST FLOOR DEMOLITION PLAN
A1.11	FIRST FLOOR PLAN & REFLECTED CEILING PLAN
A1.12	INTERIOR ELEVATIONS & PARTITION TYPES/NOTES
FP-101	FIRST FLOOR FIRE PROTECTION PLAN
P-000	PLUMBING GENERAL NOTES, SYMBOLS, ABBREVIATIONS, SCHEDULES and DETAILS
P-101	PLUMBING FLOOR PLANS
P-301	PLUMBING RISER DIAGRAM
H-000	MECHANICAL GENERAL NOTES, SYMBOLS, and ABBREVIATIONS
H-101	HVAC DEMO AND NEW WORK FLOOR PLAN
ED-101	ELECTRICAL DEMOLITION PLAN
E-101	ELECTRICAL FLOOR PLANS
E-201	ELECTRICAL TEMPORARY RESTROOM PLAN

END OF DRAWING LIST