

EXPLANATION

On behalf of the Division of Public Works (DPW), the Bureau of Purchase and Property (BoPP), issued request for bid (RFB) 2945-25 on August 27, 2024, for Circuit Courts Boiler Removal and Installation Services at the Dover and Portsmouth Circuit Courthouses, with responses due on September 27, 2024. This bid reached eighty-seven (87) vendors through the NIGP registry with an additional seven (7) directly sourced. Four (4) vendors responded. During the review process, we determined it was in the best financial interests of the state to cancel the Portsmouth Circuit Courthouse location and proceed with just the Dover Circuit Courthouse. The two courthouses are separate projects and the pricing was more favorable for the one courthouse. It took time to evaluate the pricing and the bids, make sure it was legally appropriate to separate out the bid, and get agreement from all the entities and branches of government involved. Portsmouth will be rebid at a later date. Merrimack Valley Corp providing the lowest-cost, compliant bid response for the Dover Circuit Courthouse and was \$115,942 below the targeted budget.

The amount of time spend before awarding the bid is quite a few weeks beyond normal because of the effort made to take advantage of the potential cost savings. In addition, because the low bidder, Merrimack Valley Corp, is a new vendor with the State of New Hampshire, additional steps had to be undertaken. This is not uncommon for the first project awarded to a new construction company to the State. For example, the Division of Public Works requested final confirmation of materials to be used on January 13, 2025 which added two weeks to the process. Final contract drafts and requests for the statutorily required additional documents were sent to Merrimack Valley Corp on February 6, 2025 but for reasons which are not at all unusual for a new vendor, we received the final contract and all paperwork seven weeks later.

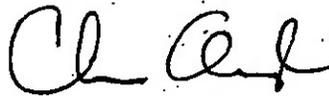
Because of the delays post-bidding, BoPP confirmed with Merrimack Valley Corp that there has been no impact to the pricing submitted and product availability as work is scheduled post heating season. This timeline is important because the work being completed requires the removal of the existing boiler system leaving the facility without operable heating equipment during the winter months.

Upon approval this contract shall facilitate the required removal and upgraded installation of critical heating infrastructures at the Dover Circuit Courthouse in Dover, NH. This contract will allow for the removal of the building's current boiler system and ancillary components, and provide for the installation of an updated, high-efficiency gas fired boiler system and all required ancillary piping and electronics. Based on manufacturer specifications, heating efficiency would increase to an average of 97.48% and the system would utilize natural gas as a fuel source. Utilizing natural gas as a heating fuel source allows for a cleaner and more eco-friendly alternative energy and provides the State increased cost savings, as opposed to more traditional energy sources such as heating fuel oil. The full scope of this project represents a requested price limitation up to and not to exceed \$114,695.00 to perform boiler removal and installation services as defined by the scope of work under the oversight of the DPW. The price limitation includes a vendor allowance amount of \$12,000.00 for any unforeseen issues. The vendor has submitted all required and certified payment and performance bond paperwork. The payment and performance bond is certified at \$114,695.00 or 100% of the project cost. The total cost, including DPW and architecture fees, is \$134,695.00 against a project estimate of \$250,637.00. This represents a significant cost savings to the State of \$115,942.00, or 46.26%, as compared to the original budgeted figure.

Contract financials	
Vendor project bid amount	\$102,695.00
Vendor project allowance	\$12,000.00
Requested project price limitation	\$114,695.00
Total project fees	\$20,000.00
Project total (vendor bid, allowance, and all fees)	\$134,695.00
Project estimate cost	\$250,637.00
Cost savings	\$115,942.00

Based on the foregoing, I am respectfully recommending approval of the contract with Merrimack Valley Corp.

Respectfully submitted,



Charles M. Arlinghaus
Commissioner



Division of Procurement Support Services
Bureau of Purchase Property

Gary S. Lunetta
Director
(603) 271-2201

RFB Bid Summary

Bid Description	Circuit Courts Boiler Removal and Installation Services	Agency	Department of Administrative Services, Courts Facilities
RFB#	2945-25	Requisition#	N/A
Agent Name	Ryan Fuller	Bid Closing	September 27, 2024 10:00AM EST

Indicates Award:

Qty	UOM	Product Description	Merrimack Valley Corp. Unit Cost	Alliance Mechanical Unit Cost	RTH Mechanical Unit Cost	Glover Plumbing & Heating Unit Cost
1	EA	Portsmouth Circuit Courthouse Base Bid	BID ITEM CANCELLED			
1	EA	Dover Circuit Courthouse Base Bid	\$102,695.00	\$110,550.50	\$195,000.00	\$232,000.00
1	EA	Dover Circuit Courthouse Project Allowance	\$12,000.00	\$12,000.00	\$12,000.00	\$12,000.00
Project Bid Amount			\$114,695.00	\$122,550.50	\$207,000.00	\$244,000.00

Recommendation Summary	
Price Limitation	\$114,695.00
Number of Solicitations Received	4
Number of Sourced bidders	7
Number of NIGP Vendors Sourced	87
Number of non-responsive bidders	90
P-37 Checklist Complete	Yes
D&B Report Attached	No
Method of Payment (P-card/ACH)	ACH
FOB Delivered	Yes

Special Notes: At the request of the Department of Administrative Services (DAS) Courts and the Department of Public Works (DPW), the Department of Administrative Services (DAS), through the Bureau of Purchase and Property (BoPP), issued request for bid (RFB) 2945-25 on August 27, 2024, 2024, for Circuit Courts Boiler Removal and Installation Services at the Dover and Portsmouth Circuit Courts, with responses due on September 27, 2024. This bid reached eighty-seven (87) vendors through the NIGP registry with an additional seven (7) directly sourced. Four vendors responded, with Merrimack Valley Corp providing the lowest-cost, compliant bid response for the Dover District Circuit Courthouse site in Dover, NH. During the review process, due to financial and administrative concerns, it was determined that it is not in the State's best interest to move forward with awarding the Portsmouth Circuit Courthouse site in Portsmouth, NH, at the current time. This portion of the bid will be cancelled and subsequently rebid at a future date.

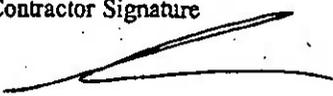
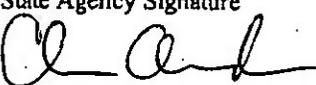
Notice: This agreement and all of its attachments shall become public upon submission to Governor and Executive Council for approval. Any information that is private, confidential or proprietary must be clearly identified to the agency and agreed to in writing prior to signing the contract.

AGREEMENT

The State of New Hampshire and the Contractor hereby mutually agree as follows:

GENERAL PROVISIONS

1. IDENTIFICATION.

1.1 State Agency Name Department of Administrative Services Bureau of Purchase and Property		1.2 State Agency Address 25 Capitol Street Concord, NH 03301	
1.3 Contractor Name Merrimack Valley Corp		1.4 Contractor Address 15 Aegean Drive, Suite 3 Methuen, MA 01844	
1.5 Contractor Phone Number 978-689-8312	1.6 Account Unit and Class 030-014-92680000-034-500161	1.7 Completion Date September 30, 2025	1.8 Price Limitation \$114,695.00
1.9 Contracting Officer for State Agency Ryan Fuller		1.10 State Agency Telephone Number 603-271-2201	
1.11 Contractor Signature  Date: 2/11/2025		1.12 Name and Title of Contractor Signatory Leonard J. Thomas III	
1.13 State Agency Signature  Date: 4/3/25		1.14 Name and Title of State Agency Signatory Charles M. Arlinghaus, Commissioner	
1.15 Approval by the N.H. Department of Administration, Division of Personnel (if applicable) By: _____ Director, On: _____			
1.16 Approval by the Attorney General (Form, Substance and Execution) (if applicable) By: <i>Christen Lavers</i> On: 4/15/25			
1.17 Approval by the Governor and Executive Council (if applicable) G&C Item number: _____ G&C Meeting Date: _____			

2. SERVICES TO BE PERFORMED. The State of New Hampshire, acting through the agency identified in block 1.1 ("State"), engages contractor identified in block 1.3 ("Contractor") to perform, and the Contractor shall perform, the work or sale of goods, or both, identified and more particularly described in the attached EXHIBIT B which is incorporated herein by reference ("Services").

3. EFFECTIVE DATE/COMPLETION OF SERVICES.

3.1 Notwithstanding any provision of this Agreement to the contrary, and subject to the approval of the Governor and Executive Council of the State of New Hampshire, if applicable, this Agreement, and all obligations of the parties hereunder, shall become effective on the date the Governor and Executive Council approve this Agreement, unless no such approval is required, in which case the Agreement shall become effective on the date the Agreement is signed by the State Agency as shown in block 1.13 ("Effective Date").

3.2 If the Contractor commences the Services prior to the Effective Date, all Services performed by the Contractor prior to the Effective Date shall be performed at the sole risk of the Contractor, and in the event that this Agreement does not become effective, the State shall have no liability to the Contractor, including without limitation, any obligation to pay the Contractor for any costs incurred or Services performed.

3.3 Contractor must complete all Services by the Completion Date specified in block 1.7.

4. CONDITIONAL NATURE OF AGREEMENT.

Notwithstanding any provision of this Agreement to the contrary, all obligations of the State hereunder, including, without limitation, the continuance of payments hereunder, are contingent upon the availability and continued appropriation of funds. In no event shall the State be liable for any payments hereunder in excess of such available appropriated funds. In the event of a reduction or termination of appropriated funds by any state or federal legislative or executive action that reduces, eliminates or otherwise modifies the appropriation or availability of funding for this Agreement and the Scope for Services provided in EXHIBIT B, in whole or in part, the State shall have the right to withhold payment until such funds become available, if ever, and shall have the right to reduce or terminate the Services under this Agreement immediately upon giving the Contractor notice of such reduction or termination. The State shall not be required to transfer funds from any other account or source to the Account identified in block 1.6 in the event funds in that Account are reduced or unavailable.

5. CONTRACT PRICE/PRICE LIMITATION/ PAYMENT.

5.1 The contract price, method of payment, and terms of payment are identified and more particularly described in EXHIBIT C which is incorporated herein by reference.

5.2 Notwithstanding any provision in this Agreement to the contrary, and notwithstanding unexpected circumstances, in no event shall the total of all payments authorized, or actually made hereunder, exceed the Price Limitation set forth in block 1.8. The payment by the State of the contract price shall be the only and the complete reimbursement to the Contractor for all expenses, of

whatever nature incurred by the Contractor in the performance hereof and shall be the only and the complete compensation to the Contractor for the Services.

5.3 The State reserves the right to offset from any amounts otherwise payable to the Contractor under this Agreement those liquidated amounts required or permitted by N.H. RSA 80:7 through RSA 80:7-c or any other provision of law.

5.4 The State's liability under this Agreement shall be limited to monetary damages not to exceed the total fees paid. The Contractor agrees that it has an adequate remedy at law for any breach of this Agreement by the State and hereby waives any right to specific performance or other equitable remedies against the State.

6. COMPLIANCE BY CONTRACTOR WITH LAWS AND REGULATIONS/EQUAL EMPLOYMENT OPPORTUNITY.

6.1 In connection with the performance of the Services, the Contractor shall comply with all applicable statutes, laws, regulations, and orders of federal, state, county or municipal authorities which impose any obligation or duty upon the Contractor, including, but not limited to, civil rights and equal employment opportunity laws and the Governor's order on Respect and Civility in the Workplace, Executive order 2020-01. In addition, if this Agreement is funded in any part by monies of the United States, the Contractor shall comply with all federal executive orders, rules, regulations and statutes, and with any rules, regulations and guidelines as the State or the United States issue to implement these regulations. The Contractor shall also comply with all applicable intellectual property laws.

6.2 During the term of this Agreement, the Contractor shall not discriminate against employees or applicants for employment because of age, sex, sexual orientation, race, color, marital status, physical or mental disability, religious creed, national origin, gender identity, or gender expression, and will take affirmative action to prevent such discrimination, unless exempt by state or federal law. The Contractor shall ensure any subcontractors comply with these nondiscrimination requirements.

6.3 No payments or transfers of value by Contractor or its representatives in connection with this Agreement have or shall be made which have the purpose or effect of public or commercial bribery, or acceptance of or acquiescence in extortion, kickbacks, or other unlawful or improper means of obtaining business.

6.4 The Contractor agrees to permit the State or United States access to any of the Contractor's books, records and accounts for the purpose of ascertaining compliance with this Agreement and all rules, regulations and orders pertaining to the covenants, terms and conditions of this Agreement.

7. PERSONNEL.

7.1 The Contractor shall at its own expense provide all personnel necessary to perform the Services. The Contractor warrants that all personnel engaged in the Services shall be qualified to perform the Services and shall be properly licensed and otherwise authorized to do so under all applicable laws.

7.2 The Contracting Officer specified in block 1.9, or any successor, shall be the State's point of contact pertaining to this Agreement.

8. EVENT OF DEFAULT/REMEDIES.

8.1 Any one or more of the following acts or omissions of the Contractor shall constitute an event of default hereunder ("Event of Default"):

- 8.1.1 failure to perform the Services satisfactorily or on schedule;
- 8.1.2 failure to submit any report required hereunder; and/or
- 8.1.3 failure to perform any other covenant, term or condition of this Agreement.

8.2 Upon the occurrence of any Event of Default, the State may take any one, or more, or all, of the following actions:

8.2.1 give the Contractor a written notice specifying the Event of Default and requiring it to be remedied within, in the absence of a greater or lesser specification of time, thirty (30) calendar days from the date of the notice; and if the Event of Default is not timely cured, terminate this Agreement, effective two (2) calendar days after giving the Contractor notice of termination;

8.2.2 give the Contractor a written notice specifying the Event of Default and suspending all payments to be made under this Agreement and ordering that the portion of the contract price which would otherwise accrue to the Contractor during the period from the date of such notice until such time as the State determines that the Contractor has cured the Event of Default shall never be paid to the Contractor;

8.2.3 give the Contractor a written notice specifying the Event of Default and set off against any other obligations the State may owe to the Contractor any damages the State suffers by reason of any Event of Default; and/or

8.2.4 give the Contractor a written notice specifying the Event of Default, treat the Agreement as breached, terminate the Agreement and pursue any of its remedies at law or in equity, or both.

9. TERMINATION.

9.1 Notwithstanding paragraph 8, the State may, at its sole discretion, terminate the Agreement for any reason, in whole or in part, by thirty (30) calendar days written notice to the Contractor that the State is exercising its option to terminate the Agreement.

9.2 In the event of an early termination of this Agreement for any reason other than the completion of the Services, the Contractor shall, at the State's discretion, deliver to the Contracting Officer, not later than fifteen (15) calendar days after the date of termination, a report ("Termination Report") describing in detail all Services performed, and the contract price earned, to and including the date of termination. In addition, at the State's discretion, the Contractor shall, within fifteen (15) calendar days of notice of early termination, develop and submit to the State a transition plan for Services under the Agreement.

10. PROPERTY OWNERSHIP/DISCLOSURE.

10.1 As used in this Agreement, the word "Property" shall mean all data, information and things developed or obtained during the performance of, or acquired or developed by reason of, this Agreement, including, but not limited to, all studies, reports, files, formulae, surveys, maps, charts, sound recordings, video recordings, pictorial reproductions, drawings, analyses, graphic representations, computer programs, computer printouts, notes, letters, memoranda, papers, and documents, all whether finished or unfinished.

10.2 All data and any Property which has been received from the State, or purchased with funds provided for that purpose under this Agreement, shall be the property of the State, and shall be returned to the State upon demand or upon termination of this Agreement for any reason.

10.3 Disclosure of data, information and other records shall be governed by N.H. RSA chapter 91-A and/or other applicable law. Disclosure requires prior written approval of the State.

11. **CONTRACTOR'S RELATION TO THE STATE.** In the performance of this Agreement the Contractor is in all respects an independent contractor, and is neither an agent nor an employee of the State. Neither the Contractor nor any of its officers, employees, agents or members shall have authority to bind the State or receive any benefits, workers' compensation or other emoluments provided by the State to its employees.

12. ASSIGNMENT/DELEGATION/SUBCONTRACTS.

12.1 Contractor shall provide the State written notice at least fifteen (15) calendar days before any proposed assignment, delegation, or other transfer of any interest in this Agreement. No such assignment, delegation, or other transfer shall be effective without the written consent of the State.

12.2 For purposes of paragraph 12, a Change of Control shall constitute assignment. "Change of Control" means (a) merger, consolidation, or a transaction or series of related transactions in which a third party, together with its affiliates, becomes the direct or indirect owner of fifty percent (50%) or more of the voting shares or similar equity interests, or combined voting power of the Contractor, or (b) the sale of all or substantially all of the assets of the Contractor.

12.3 None of the Services shall be subcontracted by the Contractor without prior written notice and consent of the State.

12.4 The State is entitled to copies of all subcontracts and assignment agreements and shall not be bound by any provisions contained in a subcontract or an assignment agreement to which it is not a party.

13. **INDEMNIFICATION.** The Contractor shall indemnify, defend, and hold harmless the State, its officers, and employees from and against all actions, claims, damages, demands, judgments, fines, liabilities, losses, and other expenses, including, without limitation, reasonable attorneys' fees, arising out of or relating to this Agreement directly or indirectly arising from death, personal injury, property damage, intellectual property infringement, or other claims asserted against the State, its officers, or employees caused by the acts or omissions of negligence, reckless or willful misconduct, or fraud by the Contractor, its employees, agents, or subcontractors. The State shall not be liable for any costs incurred by the Contractor arising under this paragraph 13. Notwithstanding the foregoing, nothing herein contained shall be deemed to constitute a waiver of the State's sovereign immunity, which immunity is hereby reserved to the State. This covenant in paragraph 13 shall survive the termination of this Agreement.

14. INSURANCE.

14.1 The Contractor shall, at its sole expense, obtain and continuously maintain in force, and shall require any subcontractor or assignee to obtain and maintain in force, the following insurance:

14.1.1 commercial general liability insurance against all claims of bodily injury, death or property damage, in amounts of not less than \$1,000,000 per occurrence and \$2,000,000 aggregate or excess; and

14.1.2 special cause of loss coverage form covering all Property subject to subparagraph 10.2 herein, in an amount not less than 80% of the whole replacement value of the Property.

14.2 The policies described in subparagraph 14.1 herein shall be on policy forms and endorsements approved for use in the State of New Hampshire by the N.H. Department of Insurance, and issued by insurers licensed in the State of New Hampshire.

14.3 The Contractor shall furnish to the Contracting Officer identified in block 1.9, or any successor, a certificate(s) of insurance for all insurance required under this Agreement. At the request of the Contracting Officer, or any successor, the Contractor shall provide certificate(s) of insurance for all renewal(s) of insurance required under this Agreement. The certificate(s) of insurance and any renewals thereof shall be attached and are incorporated herein by reference.

15. WORKERS' COMPENSATION.

15.1 By signing this agreement, the Contractor agrees, certifies and warrants that the Contractor is in compliance with or exempt from, the requirements of N.H. RSA chapter 281-A ("*Workers' Compensation*").

15.2 To the extent the Contractor is subject to the requirements of N.H. RSA chapter 281-A, Contractor shall maintain, and require any subcontractor or assignee to secure and maintain, payment of Workers' Compensation in connection with activities which the person proposes to undertake pursuant to this Agreement. The Contractor shall furnish the Contracting Officer identified in block 1.9, or any successor, proof of Workers' Compensation in the manner described in N.H. RSA chapter 281-A and any applicable renewal(s) thereof, which shall be attached and are incorporated herein by reference. The State shall not be responsible for payment of any Workers' Compensation premiums or for any other claim or benefit for Contractor, or any subcontractor or employee of Contractor, which might arise under applicable State of New Hampshire Workers' Compensation laws in connection with the performance of the Services under this Agreement.

16. **WAIVER OF BREACH.** A State's failure to enforce its rights with respect to any single or continuing breach of this Agreement shall not act as a waiver of the right of the State to later enforce any such rights or to enforce any other or any subsequent breach.

17. **NOTICE.** Any notice by a party hereto to the other party shall be deemed to have been duly delivered or given at the time of mailing by certified mail, postage prepaid, in a United States Post Office addressed to the parties at the addresses given in blocks 1.2 and 1.4, herein.

18. **AMENDMENT.** This Agreement may be amended, waived or discharged only by an instrument in writing signed by the parties hereto and only after approval of such amendment, waiver or discharge by the Governor and Executive Council of the State of New Hampshire unless no such approval is required under the circumstances pursuant to State law, rule or policy.

19. CHOICE OF LAW AND FORUM.

19.1 This Agreement shall be governed, interpreted and construed in accordance with the laws of the State of New Hampshire except where the Federal supremacy clause requires otherwise. The wording used in this Agreement is the wording chosen by the parties to express their mutual intent, and no rule of construction shall be applied against or in favor of any party.

19.2 Any actions arising out of this Agreement, including the breach or alleged breach thereof, may not be submitted to binding arbitration, but must, instead, be brought and maintained in the Merrimack County Superior Court of New Hampshire which shall have exclusive jurisdiction thereof.

20. **CONFLICTING TERMS.** In the event of a conflict between the terms of this P-37 form (as modified in EXHIBIT A) and any other portion of this Agreement including any attachments thereto, the terms of the P-37 (as modified in EXHIBIT A) shall control.

21. **THIRD PARTIES.** This Agreement is being entered into for the sole benefit of the parties hereto, and nothing herein, express or implied, is intended to or will confer any legal or equitable right, benefit, or remedy of any nature upon any other person.

22. **HEADINGS.** The headings throughout the Agreement are for reference purposes only, and the words contained therein shall in no way be held to explain, modify, amplify or aid in the interpretation, construction or meaning of the provisions of this Agreement.

23. **SPECIAL PROVISIONS.** Additional or modifying provisions set forth in the attached EXHIBIT A are incorporated herein by reference.

24. **FURTHER ASSURANCES.** The Contractor, along with its agents and affiliates, shall, at its own cost and expense, execute any additional documents and take such further actions as may be reasonably required to carry out the provisions of this Agreement and give effect to the transactions contemplated hereby.

25. **SEVERABILITY.** In the event any of the provisions of this Agreement are held by a court of competent jurisdiction to be contrary to any state or federal law, the remaining provisions of this Agreement will remain in full force and effect.

26. **ENTIRE AGREEMENT.** This Agreement, which may be executed in a number of counterparts, each of which shall be deemed an original, constitutes the entire agreement and understanding between the parties, and supersedes all prior agreements and understandings with respect to the subject matter hereof.

EXHIBIT A - SPECIAL PROVISIONS

There are no special provisions of this contract.

Contractor Initials LT

Date 2/14/25

EXHIBIT B - SCOPE OF SERVICES

1. INTRODUCTION:

1.1. Merrimack Valley Corp (hereinafter referred to as the "Contractor") hereby agrees to provide the State of New Hampshire (hereinafter referred to as the "State"), Department of Administrative Services, with Boiler Removal and Installation Services at the Dover New Hampshire Circuit Courthouse in accordance with the bid submission in response to State Request for Bid #2945-25 and as described herein.

2. CONTRACT DOCUMENTS:

2.1. This Contract consists of the following documents ("Contract Documents"):

- State of New Hampshire Terms and Conditions, General Provisions Form P-37
- EXHIBIT A Special Provisions
- EXHIBIT B Scope of Services
- EXHIBIT C Method of Payment

2.2. In the event of any conflict among the terms or provisions of the documents listed above, the following order of priority shall indicate which documents control: (1), Form Number P-37 as modified by EXHIBIT A "Special Provisions", (2) EXHIBIT B "Scope of Services", (3) EXHIBIT C "Method of Payment".

3. TERM OF CONTRACT:

3.1. The term of the contract shall commence upon execution by Governor & Executive Council (the "effective date") and issue of a Notice to Proceed (NTP) by the Department of Public Works (DPW) and shall continue thereafter until the DPW provides documentation of successful completion. The term of the contract shall be through September 30, 2025, a period of approximately seven (7) months.

3.2. The contract may be extended under the same terms, conditions, and pricing structure at the sole discretion of the State and approval of the Governor & Executive Council for up to an additional three (3) months.

4. SCOPE OF WORK:

4.1. General

4.1.1. Contractor shall perform boiler removal and installation services, at the Dover New Hampshire Circuit Courthouse. This includes, but is not limited to, removal of current boiler and ancillary heating systems, and installation of new, high efficiency, gas-fired boilers and required ancillary piping, plumbing, and electrical systems. New heating boiler systems shall consist of the following:

4.1.1.1. Lochinvar Corporation – FTX Series

4.1.1.2. Efficiency model is dictated by the product specifications listed in Appendix A.

4.1.2. Examine all other sections of the specifications for requirements, which affect the work of this Section, whether or no such requirements are particularly mentioned herein.

4.1.3. Coordinate the work of this section with the related work of other trades, if applicable, and coordinate with such trades to assure the steady progress of all work of this Contract.

4.1.4. Where construction and trades codes appear in this specification, it shall be interpreted to mean the latest edition.

4.2. Summary

4.2.1. The work covered by this Section consists of furnishing all labor, materials, equipment, supplies, devices, plumbing, gauges/meters, etc., the installation of the materials and equipment and the performance of all operations necessary to perform boiler heating system repair services at:

Dover Circuit Courthouse

25 Thomas Street

Dover, NH 03820

as indicated on the Contract Drawings and/or as described within the Contract Specifications. See Appendices A and B for additional information.

- 4.2.2. This work shall include all costs involved in providing removal of current, and installation and/or modification of new boiler heating systems as indicated, and any costs involved with any other special controls for the project. Without limiting the work required under this specification section, the following is included as noted:
- 4.2.2.1. Provide all plumbing and materials to remove current and install and/or modify new boiler heating system services.
 - 4.2.2.2. Any and all work required to leave the facility as a fully operable project per the Contract.
 - 4.2.2.3. Obtain and pay for all required permits, inspections, etc.
 - 4.2.2.4. Provide any testing and commissioning for the project.

4.3. Appendices

- 4.3.1. Specific project requirements are incorporated into Appendix A as part of Exhibit B.
- 4.3.1.1. Appendix A incorporates the following project requirements into this document:
 - 4.3.1.1.1. Special Requirements
 - 4.3.1.1.2. General Conditions
 - 4.3.1.1.3. Summary
 - 4.3.1.1.4. Price and Payment Procedures
 - 4.3.1.1.5. Administrative Requirements
 - 4.3.1.1.5.1.1. MyGOV Portal Instructions
 - 4.3.1.1.5.1.2. DOS Fire Safety State Building Permit Application
 - 4.3.1.1.5.1.3. DAS Commissioner Approval Letter
 - 4.3.1.1.5.1.4. Substantial Completion Application
 - 4.3.1.1.6. Submittal Procedures
 - 4.3.1.1.7. Quality Requirements
 - 4.3.1.1.8. Temporary Facilities and Controls
 - 4.3.1.1.9. Construction Waste Management and Disposal
 - 4.3.1.1.10. Product Requirements
 - 4.3.1.1.11. Execution Requirements
 - 4.3.1.1.11.1. Selective Demolition
 - 4.3.1.1.11.2. Penetration Firestopping
 - 4.3.1.1.11.3. Joint Sealants
 - 4.3.1.1.11.4. Access Panels
 - 4.3.1.1.11.5. Gypsum Board Suspended Ceiling System
 - 4.3.1.1.11.6. Painting
 - 4.3.1.1.11.7. Plumbing
 - 4.3.1.1.11.8. Heating, Ventilation, and Air Conditioning
 - 4.3.1.1.11.9. Electrical
 - 4.3.1.1.11.10. Fire Alarm – Addressable Modification
 - 4.3.2. All project drawings are incorporated into Appendix B as part of Exhibit B.
 - 4.3.3. The Contractor and any/all subcontractors shall abide by all project requirements and drawings set forth in Appendices A and B.

5. COMMERCIAL REQUIREMENTS:

- 5.1. The State of New Hampshire reserves the right to add or delete locations/equipment throughout the term of the contract. For the addition of a new location or new equipment, a requesting agency through the Division of Procurement and Support Services shall submit a request for quote (RFQ) including a detailed scope of work to

the contractor. Quotes shall be in accordance with pricing and service requirements contained herein and no service shall be performed until documented acceptance by the State is received. The Contract may be amended, by agreement of the parties, effective upon approval of the commissioner of the Department of Administrative Services, without further approval needed by the Governor and Executive Council as long as the price limitation is unchanged or decreased as a result of the new or deleted locations/equipment.

- 5.2. Except as otherwise provided in this Scope of Services, all services performed under this Contract shall be performed between the hours of 7:00 A.M. and 4:00 P.M. unless other arrangements are made in advance with the State. Any deviation in work hours shall be pre-approved by the Contracting Officer. The State requires ten-day advance knowledge of said work schedules to provide security and access to respective work areas.
 - 5.3. The Contractor shall not commence work until a conference is held with each State agency intending to utilize the Contractor's services, at which representatives of the Contractor and the State are present. The conference will be arranged by the State agency.
 - 5.4. The State shall require correction of any defective work and the repair of any damages to any part of a building or its appurtenances caused by the Contractor or its employees, subcontractors, equipment or supplies. The Contractor shall correct, repair, or replace all defective work, as needed, to complete said work in satisfactory condition, and damages so caused in order to restore the building and its appurtenances to their previous condition. Upon failure of the Contractor to proceed promptly with the necessary corrections or repairs, the State may withhold any amount necessary to correct all defective work or repair all damages from payments to the Contractor.
 - 5.5. The work staff shall consist of qualified persons completely familiar with the products and equipment that they will use. The Contracting Officer may require the Contractor to dismiss from the work such employees as the Contracting Officer deems incompetent, careless, insubordinate, or otherwise objectionable, or whose continued employment on the work is deemed to be contrary to the public interest or inconsistent with the best interest of security and the State.
 - 5.6. Neither the Contractor nor its employees or subcontractors shall represent themselves as employees or agents of the State.
 - 5.7. While on State property the Contractor, its employees, and its sub-contractors shall be subject to the authority and control of the State, but under no circumstances shall such persons be deemed to be employees of the State.
 - 5.8. All personnel shall observe all regulations or special restrictions in effect at any State agency location at which services are to be provided.
 - 5.9. The Contractor's personnel shall be allowed only in areas where services are to be provided. The use of State telephones by the Contractor, its employees, or its sub-contractors is prohibited.
 - 5.10. If sub-contractors are to be utilized, Contractor shall provide information regarding the proposed sub-contractors including the name of the company, their address, contact person and three references for clients they are currently servicing. Approval by the State must be received prior to a sub-contractor starting any work.
6. **OBLIGATIONS AND LIABILITY OF THE CONTRACTOR:**
- 6.1. The Contractor shall provide all removal and disposal of existing and installation of new boiler heating system services, strictly pursuant to, and in conformity with, the specifications described in State RFB 2945-25, as described herein, and under the terms of this Contract.
 - 6.2. It is the responsibility of the Contractor to maintain this contract and New Hampshire Vendor Registration with up to date contact information.
 - 6.3. Contract specific contact information (Sales contact, Contractor contract manager, etc.) shall be sent to the State's Contracting Office listed in Box 1.9 of Form P-37.
 - 6.4. Additionally, all updates i.e., telephone numbers, contact names, email addresses, W9, tax identification numbers are required to be current through a formal electronic submission to the Bureau of Purchase and Property at: [https://das.nh.gov/purchasing/vendorregistration/\(S\(q0fzc.v55qhaeqs45jpyq5i45\)\)/welcome.aspx](https://das.nh.gov/purchasing/vendorregistration/(S(q0fzc.v55qhaeqs45jpyq5i45))/welcome.aspx).
 - 6.5. The Contractor shall agree to hold the State of NH harmless from liability arising out of injuries or damage caused while performing this work. The Contractor shall agree that any damage to building(s), materials,

equipment, or other property during the performance of the service shall be repaired at its own expense, to the State's satisfaction.

6.6. Successful Vendor shall not be allowed to require any other type of order, nor shall the successful Vendor be allowed to require the filling out or signing of any other document by State of New Hampshire personnel.

7. **DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION LOWER TIER COVERED TRANSACTIONS:**

7.1. The Contractor certifies, by signature of this contract, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal Department or Agency.

8. **CONFIDENTIALITY & CRIMINAL RECORD:**

8.1. If requested by the using agency, the Contractor and its employees, and Sub-Contractors (if any), shall be required to sign and submit a Confidential Nature of Department Records Form and a Criminal Authorization Records Form. These forms shall be submitted to the individual using agency prior to the start of any work.

8.2. The Department of Administrative Services, Courts Facilities, will complete required background checks for all personnel, including subcontractors, that will be working on the site premises prior to beginning the project.

8.3. Instructions for completing background checks and blank copies for the State of New Hampshire are located at Criminal History Record Requests | NH State Police.

8.4. All completed forms and additional questions can be sent to Brian Young at brian.g.young@das.nh.gov.

EXHIBIT C - METHOD OF PAYMENT

9. CONTRACT PRICE:

- 9.1. The Contractor hereby agrees to provide boiler removal and installation services in strict compliance with the terms and conditions specified in Exhibit B for an amount up to and not to exceed a price of \$114,695.00; this figure shall not be considered a guaranteed or minimum figure; however, it shall be considered a maximum figure from the effective date through the expiration date as indicated in Form P-37 Block 1.7.
- 9.2. The Contractor shall provide the requested boiler removal and installation services under a fixed-fee, percentage-based payment arrangement as defined herein.

10. PRICING STRUCTURE:

10.1. Project pricing structure is as follows:

CONTRACT 8003629 CIRCUIT COURTS BOILER REMOVAL AND INSTALLATION SERVICES	
DOVER CIRCUIT COURTHOUSE	\$102,695.00
VENDOR BASE BID	
PROJECT ALLOWANCE	\$12,000.00

10.2. The Project Allowance is to be used at the State's discretion for any unforeseen issues or changes during construction work. This is not a guaranteed amount and contractors shall not consider this as part of final payments. Utilizing the Project Allowance is subject to all change order provisions and procedures as listed in Appendix A.

11. CONTRACT BOND:

11.1. The Contractor, at the time of the execution of this Contract shall submit a Payment and Performance Bond in the sum equal to one hundred percent (100%) of the amount of the Contract as required by RSA 447:16. The Payment and Performance Bond must be written by a company licensed to do business in New Hampshire at the time the policy is issued. In addition, the company issuing the payment and performance bond shall be listed on the current list of "Surety Companies Acceptable on Federal Bonds" as published by the U.S. Department of the Treasury, Financial Management Services, Circular Number 570. See Surety Bonds - Circular 570 (treasury.gov).

11.2. Release of Claims and Final Payment:

- 11.2.1. The final payment shall not become due until the Contractor delivers a complete release of all claims arising under and by virtue of this Contract, including claims for all subcontractors and suppliers of either materials or labor, plus a release of the Contract Bond and a statement that all subcontractors and suppliers have been paid.
- 11.2.2. Application for Final Payment received from the Contractor will be processed for payment after project acceptance and final completion unless accompanied by a release of the Contract Bond. This payment shall be the amount of the Contract, less previous payments. All prior partial payments shall be subject to correction in the final estimate and payment.

11.3. Acceptance of Final Payment Constitutes Release:

11.3.1. The acceptance of the Final Payment by the Contractor shall be and shall operate as a release to the Contractor of all claims and of all liability to the State for all things done or furnished in connection with this work. No payment, however, final or otherwise, shall operate to release the Contractor and its Sureties from any obligations under this Contract or the Contract Bond. Acceptance of Final Payment shall not impact any warranties provided by the Contractor with respect to this project.

12. INVOICE:

12.1. Invoices shall be submitted on a monthly basis to the State Project Manager based on the percentage of work completed. The Contractor shall submit invoices on AIA forms subject to review and approval by the State Project Manager. The percentage of work completed shall be determined by the State Project Manager.

Contractor Initials LT

Date 2/14/15

12.2. Payment requisition forms, change order forms, and invoicing questions can be sent to Dina Pinnell at dina.m.pinnell@das.nh.gov.

13. PAYMENT:

13.1. Specifications for all payment provisions and procedures are found in Appendix A, General Conditions.

13.2. Payments shall be made on a monthly basis based on the percentage of work completed. Payments shall be made within thirty (30) days after receipt of the invoice and acceptance of the corresponding goods and/or services to the State's satisfaction.

13.3. A 5% retainage shall be withheld from each Progress Payment until issuance of a Certificate of Substantial Completion. The balance remaining after the specified percentage has been retained, less all previous payments, will be certified for payment on each partial estimate.

13.4. Payments may be made via ACH or P-Card. Use the following link to enroll with the State Treasury for ACH payments: <https://www.nh.gov/treasury>.

13.5. Contractor shall be paid within 30 days after receipt of properly documented invoice and acceptance of the work to the State's satisfaction.

SECTION 00250

SPECIAL REQUIREMENTS – NHDAS-DPW

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. COVID-19 Response
- B. Security.

1.2 COVID-19 RESPONSE

- A. The Contractor shall comply with all applicable NH Governor Emergency Orders related to the COVID-19 pandemic. The Contractor is encouraged to adhere to all current State and Federal guidelines related to the prevention of the spread of coronavirus.

1.3 SECURITY

A. Security Check:

- 1. After Award of Bid and prior to the start of construction the Contractor shall submit a list of all contractors' employees, all subcontractors' employees, and other related personnel who will be physically required to work at the project site per the Press Release Form.
- 2. Anyone with a criminal history, other than traffic violations that have not been annulled will not be allowed to work at the project site. No exceptions will be allowed.
- 3. The Contractor will pay the \$25.00 fee.

B. Entry Control:

- 1. Restrict entrance of persons and vehicles into Project site.
- 2. Allow entrance only to authorized persons with proper identification.
- 3. Maintain log of workers and visitors, make available to Owner on request.

C. Personnel Identification:

- 1. A drivers license or other acceptable positive identification will be required.
- 2. Contractor shall provide a badge; badge to include: Personal photograph, name and assigned number and employer.
- 3. Contractor shall maintain list of accredited persons; submit copy to Owner on request.
- 4. Require return of badges at expiration of their employment on the Work.

D. Restrictions:

- 1. Do not allow cameras on site or photographs taken except by written approval of Owner.

END OF SECTION

DOCUMENT 00708

GENERAL CONDITIONS – DPW
Issued 2-05-2004; Revised as noted

PART	ITEM
1	DEFINITIONS
2	CONTRACT DOCUMENTS
3	NOTICE
4	ACCESS TO THE WORK
5	ACCIDENT PROTECTION
6	HAZARDOUS MATERIALS
7	SUBCONTRACTS
8	RESPONSIBILITY OF CONTRACTOR TO ACT IN EMERGENCY
9	MUTUAL RESPONSIBILITY OF CONTRACTORS
10	PAYMENTS TO CONTRACTOR
11	CONTRACTOR'S TITLE TO MATERIALS
12	CHANGES IN WORK
13	PATENTS
14	ASSIGNMENTS
15	SUPERINTENDENCE BY CONTRACTOR
16	FAILURE TO COMPLETE WORK ON TIME
17	SUBSTANTIAL COMPLETION AND FINAL INSPECTION
18	DEFAULT AND TERMINATION OF CONTRACT
19	TERMINATION OF CONTRACT WITHOUT FAULT
20	ASSIGNMENT PROVISION

PART I DEFINITIONS

- A. **Addendum.** Written and/or graphic information issued before opening *Proposals* that modifies or interprets the *Bidding Documents* by additions, deletions, clarifications or corrections.
- B. **Advertisement.** A public announcement in the form of an *Invitation to Bid*, inviting *Bids* for *Work* to be performed and/or *Materials* to be furnished.
- C. **Alteration Order.** A written agreement between the *Contractor* and the *Department* that amends the *Contract* and identifies *Work* that affects either the *Contract Sum*, *Completion Date*, *Credit*, or any combination thereof.
- D. **Alternate.** A proposed change in the *Work* described in the *Contract Documents* providing the *State* with an option to select between alternative materials, products or systems, or to add or delete portions of *Work*.
- E. **Architect.** As defined in RSA 310-A:28, a person who, by reason of having acquired through professional education and practical experience an advanced training in building construction and architectural design and an extensive knowledge of building standards created to safeguard the public from hazards such as fire, panic, structural failure, and unsanitary conditions, is technically and legally qualified to practice architecture and who is licensed by the State of New Hampshire Board of Licensure for Architects to engage in the practice of architecture. The Architect has no contractual agreement with the *Contractor* and therefore shall not directly interact with the *Contractor*.
- F. **Award.** The acceptance of a *Bid* prior to execution of *Contract*.
- G. **Bid.** A complete and properly signed *Proposal*, submitted in accordance with the *Bidding Requirements*, to perform the *Work* for the amount or amounts stipulated therein.
- H. **Bid Bond.** A form of a *Proposal Guaranty* executed by the *Bidder* and a *Surety* to guarantee that the *Bidder* will enter into a *Contract* within a specified time.
- I. **Bid Opening Officer.** An authorized representative of the Department, who is responsible for opening and reading of *Bids*.
- J. **Bidder.** A *Corporation*, *Partnership*, or *Proprietorship* submitting a *Proposal*, subsequent to meeting the Department's *Bidding Requirements*.
- K. **Bidding Documents.** Collectively, the *Invitation to Bid*, *Bidding Requirements*, *Specifications*, *Drawings*, and *Addendum*.
- L. **Bidding Requirements.** The documents that contain information regarding bidding procedures with which a *Bidder* must conform and a *Proposal* that a *Bidder* shall use to submit a *Bid*.
- M. **Builders Risk Insurance.** A specialized form of property insurance that provides coverage for loss or damage during the course of construction.

- N. **Calendar Day.** A day shown on the calendar.
- O. **Certificate of Occupancy.** A document issued by the Office of the State Fire Marshal or its authorized representative certifying that all of, or a designated portion of a building, is approved for its designated use.
- P. **Certificate of Full or Partial Substantial Completion.** A document prepared by the *Department* when the *Project* reaches *Substantial Completion* and only issued after review and acceptance of the *Contractor's Request for Certificate of Full or Partial Substantial Completion*.
- Q. **Change Order.** A written agreement between the *Contractor* and the *Department* that identifies *Work* to be completed as part of an Allowance Item. Any change that affects either the *Contract Sum*, *Contract Time* or *Credit* shall be processed as an *Alteration Order*.
- R. **Clerk of the Works.** An authorized representative identified by the *Department*, responsible for observing construction on the State's behalf for conformance with the *Contract Documents*.
- S. **Commercial General Liability Insurance.** A broad form of liability insurance covering claims for bodily injury and property damage which combines under one policy coverage for business liability exposures, except those specifically excluded.
- T. **Commissioner.** The Commissioner of the State of New Hampshire Department of Administrative Services.
- U. **Completion Date.** The last day of the time allotted or the specific date established as identified in the *Contract Documents* for *Substantial Completion* of the *Work*, including any authorized extensions.
- V. **Consultant.** The *Architect*, *Engineer*, and/or professional engaged to develop/provide *Drawings*, *Specifications* and/or other services for the *Project*. The Consultant has no contractual agreement with the *Contractor* and therefore all interaction between any Consultant and the *Contractor* shall be done thru the *Contract Administrator*.
- W. **Contract.** The written agreement between the *Department* and the *Contractor* setting forth the obligations of the parties as outlined in the *Contract Documents*.
- X. **Contract Administrator.** The *Department's* Division of Public Works Project Manager or other appointed representative having specific authority per RSA 228:5 to act on the *Department's* behalf and shall be responsible for general supervision, control, and direction over all matters pertaining to design, construction, maintenance standards, preservation, and administration of the *Contract*.
- Y. **Contract Bond.** The approved form of security in compliance with RSA 447:16 executed by the *Contractor* and their *Surety* or *Sureties*, guaranteeing complete execution of the contract and all supplemental agreements pertaining thereto including the payment of all legal debts pertaining to the construction of the *Project*.

- Z. Contract Documents.** Collectively, the *Invitation To Bid, Bidding Requirements, Contract Bond, Specifications, Drawings, Addendum*, and other documents included in the *Contract*, and modifications, clarifications, authorized *Alteration Orders* and *Change Orders* issued after the execution of the *Contract*, to complete the *Project*. All documents shall be written in English.
- AA. Contract Sum.** The amount stated in the *Contract*. This sum shall be derived from the *Lump Sum Base Bid, Lump Sum Grand Total, or Negotiated Price*; modified to reflect the acceptance of any *Alternates*. The *Notice to Proceed* shall state the amount that the *State* is obligated to pay the *Contractor*.
- BB. Contractor.** The *Corporation, Partnership, or Proprietorship*, or any combination thereof, contracting with the *State* for performance of prescribed work.
- CC. Contractor's Request for Certificate of Full or Partial Substantial Completion.** A document prepared by the *Contractor* when the *Project* reaches *Substantial Completion*.
- DD. Contractual Liability.** Liability assumed by the *Contractor* under a *Contract*.
- EE. Corporation.** A legal entity organized under the laws of a particular jurisdiction who is legally authorized to do business in the *State*.
- FF. Credit.** Any Change that results in a reduction in the *Contract Sum* or *Lump Sum Grand Total* Items. All credits shall be processed by an *Alteration Order* and may include modifications to *Lump Sum Grand Total* Items.
- GG. Day.** Unless designated as a *Working Day*, or unless otherwise indicated, this term will mean a *Calendar Day*.
- HH. Department.** The *State of New Hampshire Department of Administrative Services*.
- II. Drawings (Plans).** The graphic and pictorial documents or reproductions thereof, which show the location, character, dimensions, and details of the prescribed work.
- JJ. Final Completion.** Term denoting that the *Work* has been completed in accordance with the terms and conditions of the *Contract Documents* and all *Punch List* items have been completed.
- KK. Final Payment.** Payment made by the *State* to the *Contractor*, upon *Final Completion*.
- LL. General Conditions.** The part of the *Contract Documents* establishing the rights, responsibilities and relationships of the parties.
- MM. Hazardous Material.** Shall include any material regulated by federal or state law and shall include but not limited to asbestos, toxic or hazardous waste, PCBs, combustible gases and materials, petroleum or radioactive material, or any other substances under any conditions and in such quantities as would pose a substantial danger to persons or property exposed to such substances.

- NN. **Indemnification.** A contractual obligation by which one person or entity agrees to reimburse others for loss or damage arising from specified liabilities.
- OO. **Invitation to Bid.** A portion of the *Bidding Documents*; the *Advertisement for Proposals for Work or Materials* on which *Bids* are requested. The *Advertisement* will indicate the time and place of the opening of *Proposals*, the type and location of *Work* to be performed, the character and quantity of the *Material* to be furnished and provide information on how to obtain *Drawings, Specifications and Proposal*.
- PP. **Liability Insurance.** A contract under which an insurance company agrees to protect a person or entity against claims arising from a real or alleged failure to fulfill an obligation or duty to a third party who is a named or an incidental beneficiary.
- QQ. **Lump Sum Base Bid.** One type of *Proposal* where the *Bid* is established by a single item price to perform all *Work* excluding any *Alternates* that may or may not become part of the *Contract*.
- RR. **Lump Sum Grand Total.** One type of *Proposal* where the *Bid* is established as a total of various items to perform all *Work* excluding any *Alternates* that may or may not become part of the *Contract*.
- SS. **Low Bid.** The *Bid* stating the lowest price proposed for performance of the *Work*, conforming to the *Bidding Documents*.
- TT. **Lowest Responsible Bidder.** The *Bidder* who submits the lowest bona fide *Bid* and is considered by the Department to be fully responsible and qualified to perform the *Work* for which the *Bid* is submitted.
- UU. **Material(s).** Any substance and/or product specified for use in the construction of the *Project* and its appurtenances.
- VV. **Negotiated Price.** A *Proposal* modified by the *Lowest Responsible Bidder* thru communication with the Department and *Using Agency(ies)* in which changes are made to the *Proposal* and/or *Completion Date* as required to meet budget, funding or scheduling requirements.
- WW. **Notice to Proceed.** A written notice to the *Contractor* to proceed with a portion of or all of the *Contract Work*; including the beginning of *Contract* time when applicable. The *Notice to Proceed* shall act as the final step in awarding the *Contract* or portion thereof.
- XX. **Occurrence Policy.** An insurance policy that covers acts or omissions occurring during the policy term, regardless of when a claim against the insured is first asserted, even if the policy is no longer in existence.
- YY. **Owner's Protective Liability Coverage.** Third-party legal liability insurance coverage protecting the *State* from claims arising from the construction process.
- ZZ. **Partnership.** An association of two or more persons or entities to conduct a business that shares profits and losses at a certain proportion.

- AAA. **Professional Engineer.** Referred to as *Engineer*. As defined in RSA 310-A:2, a person who by reason of advanced knowledge of mathematics and the physical sciences, acquired by professional education and practical experience, is technically and legally qualified to practice engineering, and who is licensed by or otherwise authorized by State of New Hampshire Professional Engineers Board to engage in the practice of engineering. The *Engineer* has no contractual agreement with the *Contractor* and therefore shall not directly interact with the *Contractor*.
- BBB. **Project.** The total construction of the *Work* to be performed.
- CCC. **Proposal.** A *Bidder's* offer, on *Department* prescribed forms, to perform stated work at the quoted price(s).
- DDD. **Proposal Guaranty.** The security furnished with a *Proposal*, which shall be a *Bid Bond*, provides that the *Bidder* if awarded the *Contract* will execute such *Contract* in accordance with the requirements of the *Bidding Documents*.
- EEE. **Proprietorship (Individual).** A form of business organization that is owned entirely by one person.
- FFF. **Provide.** To furnish and install a product, materials, systems, and/or equipment, complete in place, fully tested and approved.
- GGG. **Punch List.** A written document attached to the *Certificate of Substantial Completion* listing items to be completed or corrected prior to the *State's* approval of *Final Payment*.
- HHH. **Specifications.** The volume that is part of the *Contract Documents* which contain the *General Conditions*, *Supplementary General Conditions*, *Invitation to Bid*, and individual sections that consist of written requirements for material, equipment, construction systems, standards and workmanship, and other documents or reports as applicable.
- III. **State.** The State of New Hampshire.
- JJJ. **Subcontractor.** A *Corporation*, *Partnership*, *Proprietorship*, *Joint Venture* or any combination thereof, to whom the *Contractor* sublets any part of the *Contract*.
- KKK. **Substantial Completion.** As determined by an inspection by the *Department* that the work or portion thereof is substantially complete, in accordance with the *Contract Documents*, such that the *State* may occupy or utilize the *Work* for its intended use without disruption or interference by the *Contractor* in completing or correcting any remaining unfinished or unacceptable *Work*.
- LLL. **Substitution.** A *Material*, product or item of equipment in place of that specified.
- MMM. **Superintendent.** The *Contractor's* authorized representative responsible for field supervision, coordination, and completion of the *Work*.
- NNN. **Supplementary General Conditions.** A part of the *Contract Documents* which supplements and may also modify, change, add to or delete from provisions of the *General Conditions*.

- OOO. **Surety.** A *Corporation, Partnership, or Proprietorship* other than the *Contractor*, executing a bond furnished by the *Contractor*.
- PPP. **Umbrella Liability Insurance.** Insurance providing coverage in an amount above existing liability policies.
- QQQ. **Unit Price.** An amount stated in a *Lump Sum Grand Total Bid* as a price per unit for an item or portion of the contract or for specific materials and/or services described in the *Contract Documents*.
- RRR. **Using Agency.** The executive department, commission, independent establishment, public corporation which is an instrumentality of a state board, bureau, division, institution, service, office, officer, authority, administration or other establishment in the executive branch of the government, who are responsible for the facility and/or will occupy the facility after and/or during the Work. The Using Agency(ies) has/have no contractual agreement with the *Contractor* and therefore shall not direct the *Contractor* in any way.
- SSS. **Work.** The construction and services required by the *Contract Documents* to furnish all labor, materials, equipment, and incidentals necessary to complete the duties, obligations, and requirements imposed by the *Contract*.
- TTT. **Workers' Compensation Insurance.** Insurance covering the liability of an employer to employees for compensation and other benefits required by workers' compensation laws with respect to injury, sickness, disease or death arising from their employment.
- UUU. **Working Day.** Any calendar day, except Saturdays, Sundays, and Contract designated legal holidays.

PART 2 CONTRACT DOCUMENTS

- 2.1 The Contract Documents consist of the Invitation to Bid, Contract Agreement, General Conditions, Supplementary General Conditions, Drawings and Specifications, including all Addenda issued prior to execution of the Contract, wage scales where applicable, Bonds where required, insurance certificates, other documents listed in the Agreement and Modifications issued after the execution of the Contract, Change Orders and Alteration Orders issued in accordance with Part 12 of the General Conditions.
- A. Hierarchy of the Contract Documents shall be interpreted according to the following classes:
1. Department approved modifications to the Contract Documents after execution of the Contract.
 2. Addenda.
 3. Supplemental General Conditions.
 4. General Conditions.
 5. Division 1 – General Requirements.
 6. Remaining Specifications.
 7. Larger Scale Drawings & Details.
 8. Remaining Drawings.
- 2.2 A fully executed Contract shall not be in effect until approved by the Governor and Council and an issuance of the Notice to Proceed by the Division.
- 2.3 This Contract is executed in a number of counterparts, each of which is an original and constitutes the entire agreement between the parties. This Contract shall be construed according to the laws of the State. No portion of this Contract shall be understood to waive the sovereign immunity of the State. This Contract shall not be amended, except as specified in Parts 13 and 20.
- 2.4 The Contract Documents are complementary and anything called for by one of the Contract Documents and not called for by the others shall be of like effect as if required by all.
- 2.5 Should the Contract Documents contain inconsistencies within a class identified in Item 2.1A, the Contractor shall provide the better quality or greater quantity of work and/or materials. The Contractor shall identify any perceived discrepancies to the Contract Administrator prior to proceeding.
- 2.6 The Contractors and all Subcontractors shall refer to all of the Contract Documents, including those not specifically showing the work of their specialized trades, and shall perform all work reasonably inferable from them as being necessary to produce the intended results in compliance with applicable Federal, State, and Local codes.

- 2.7 All indications or notations which apply to one of a number of similar situations, materials or processes shall be deemed to apply to all such situations, materials or processes wherever they appear in the work, except where a contrary result is clearly indicated by the Contract Documents.
- 2.8 Where codes, standards, requirements, and publications of public and private bodies are referred to in the Contract Documents, such references shall be understood to be to the latest final and complete revision at the time of receiving Bids unless specifically identified, except where otherwise indicated.
- 2.9 Where no explicit quality or standards for materials or workmanship is established for work, such work is to be consistent with the best quality workmanship standards of the applicable trade.
- 2.10 All manufactured articles, materials, and equipment shall be applied, assembled, installed, connected, erected, tested, cleaned, and conditioned in accordance with the manufacturer's written or printed directions and instructions, unless specifically indicated otherwise in the Contract Documents.
- 2.11 The Drawings are made to scale as identified therein, but all working dimensions shall be taken from the figured dimensions and by actual measurements at the job; in no case by scaling. The Contractor shall study and compare all of the Drawings and verify all figures before laying out or constructing work. The Contractor shall be responsible for errors in his/her work that might have been avoided thereby. Whether or not an error is believed to exist, deviation from the Drawings and the dimensions given thereon shall be made only after approval in writing from the Contract Administrator.
- 2.12 All Drawings and Specifications and copies thereof are the property of the State and shall not be used by the Contractor or Subcontractor on other Projects.

PART 3 NOTICE

- 3.1 Any written notice by either party to the Contract shall be sufficiently given if delivered to or at the last known business address of the person, partnership or corporation constituting the other party to the Contract, or to his/her, their, or its duly authorized agent, representative, or officer, or when sent by registered mail to such last known business address. The last known business address shall be that location which is last provided in writing.
- 3.2 The parties shall provide their physical location/address, mailing address, telephone number, fax number, and, where available, pager number(s), email address(es), and other methods of contact for all persons associated with the Contract.

PART 4 ACCESS TO THE WORK

- 4.1 The Contractor shall provide for access to the work, at all times, for observation and/or inspection by the Department, Architect, Consultant, Engineer and government officials having jurisdiction. The Contractor shall provide proper facilities for such access and inspection.

PART 5 ACCIDENT PROTECTION

- 5.1 It is a condition of this Contract, and shall be made a condition of each subcontract entered into pursuant to the Contract, that the Contractor, any Subcontractors, or Independent Contractors shall not require any laborer or mechanic employed in the performance of the Contract to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous to the laborer's health or safety as determined by construction safety and health standards of the Occupational Safety and Health Administration, United States Department of Labor, which standards include, by reference, the established Federal Safety and Health Regulations for Construction. These standards and regulations comprise Part 1910 and Part 1926 respectively of Title 29 of the Code of Federal Regulations, as may be revised from time to time. In the event any revisions in the Code of Federal Regulations are published, such revisions will be deemed to supersede the appropriate Part 1910 and Part 1926, and be effective as of the date set forth in the revised regulation.

PART 6 HAZARDOUS MATERIALS

- 6.1 The Contractor shall also be aware of laws and regulations relating to hazardous materials that may be encountered during construction operations, either within project limits or at material sites off the project. The health and safety of employees, the general public, and the potential of damage to the overall environment is possible if hazardous materials are not recognized, reported, and the appropriate action taken to dispose of, remove from the site, or otherwise contain the possible contaminants.
- 6.2 If any abnormal condition is encountered or exposed that indicates the presence of a hazardous material or toxic waste, construction operations shall be immediately suspended in the area and the Contract Administrator notified. No further work shall be conducted in the area of the contaminated material until the site has been investigated and the Department has given approval to continue the work in the area. The Contractor shall fully cooperate with the State and perform any remedial work as directed. Work shall continue in other areas of the Project unless otherwise directed.
- 6.3 Exposure to hazardous materials may result from contact with, but not necessarily limited to, such items as drums, barrels, and other containers, waste such as cars, batteries, and building construction debris. Containers leaking unknown chemicals or liquids, abandoned cars leaking petroleum products, batteries leaking acid, construction debris which may include asbestos, or any other source of suspected hazardous material found within excavation areas or stockpiled on land within construction limits shall be referred to the Department of Environmental Services and Contract Administrator so that a proper identification of the materials may be made and disposal procedures initiated as required.
- 6.4 Disposition of the hazardous material or toxic waste shall be made under the requirements and regulations of the Department of Environmental Services. Work required to dispose of these materials and any remedial work shall be performed under a Supplemental Agreement or Contract item, if included in the Contract.

PART 7 SUBCONTRACTS

- 7.1 Nothing contained in the Specifications or Drawings shall be construed as creating any contractual relationship between any Subcontractor and the State. The Sections of the Specifications are not intended to control the Contractor in dividing the work among Subcontractors or to limit the work performed by any trade.
- 7.2 The Contractor shall be as fully responsible for the acts and omissions of Subcontractors and of persons employed by them, as he/she is for the acts and omissions of persons directly employed by him/her.
- 7.3 The Contractor shall, without additional expense to the State, utilize the services of specialty Subcontractors, as required to complete the work.
- 7.4 The Commissioner will not undertake efforts to settle or resolve any differences between the Contractor and Subcontractors or between Subcontractors.
- 7.5 The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind Subcontractors to the Contractor by the terms of the General Conditions and other Contract Documents insofar as applicable to the work of Subcontractors and to give the Contractor the same power to terminate any subcontract that the Commissioner may exercise over the Contractor under any provisions of the Contract Documents.

PART 8 RESPONSIBILITY OF CONTRACTOR TO ACT IN EMERGENCY.

- 8.1 In case of any emergency that threatens loss or injury of property, and/or safety of life, the Contractor shall act as the situation may warrant. He/she shall notify the Contract Administrator thereof immediately thereafter. Any compensation claimed by the Contractor together with substantiating documents in regard to expense, shall be submitted to the Contract Administrator and the amount of compensation shall be determined by agreement.
- 8.2 In the event the Department learns of an emergency that threatens loss or injury of property, and/or safety of life, the Department shall notify the Contractor using the contact information provided pursuant to PART 3 herein. The Department may, but shall have no duty to take reasonable steps to mitigate the damage or loss to the Contractor. In either event, the Department shall have no duty to undertake any specific acts and shall have no liability for actions or inactions taken absent gross negligence.

PART 9 MUTUAL RESPONSIBILITY OF CONTRACTORS

- 9.1 If the Contractor or any of his/her Subcontractors or employees causes loss or damage to any separate Contractor or Subcontractor on the work, the Contractor or Subcontractor agrees to settle with such separate Contractor or Subcontractor by agreement, if he/she will so settle. If such separate Contractor or Subcontractor sues the State because of any loss so sustained, the Commissioner shall notify the Contractor and/or their Subcontractors, who shall indemnify and hold harmless the State against any expenses or judgment arising therefrom.

PART 10 PAYMENTS TO CONTRACTOR

- 10.1 The State will process payments to the Contractor each month on the basis of duly certified and approved estimates of the work performed during the preceding period. In preparing estimates, the material delivered on the site and any preparatory work done may be taken into consideration. Payments will only be approved in an amount no greater than the percentage of project completion, as determined by the Contract Administrator.
- 10.2 At least ten (10) days before the end of the billing period, the Contractor shall submit to the Contract Administrator, an itemized Requisition for Payment, supported by such data substantiating the Contractor's right to payment as the Commissioner may require. If payment is to be made for materials or equipment not incorporated in the work, but delivered and suitably stored at the site, or at some other location agreed upon in writing, such payment shall be conditional upon inspection and/or observation by the Department and submission by the Contractor of bills of sale or such other procedure satisfactory to the Commissioner to establish the State's title to such materials or equipment or otherwise protect the State's interest including applicable insurance and transportation to the site.
- 10.3 Immediately upon receipt of the Monthly Requisition for Payment, Contractor shall post same at the Contractor's Field Office or project site in a location where Subcontractors have clear access.
- 10.4 Retainage:
- A. Contract Payment Withheld: A 5% retainage shall be withheld from each Progress Payment until issuance of a Certificate of Substantial Completion.. The balance remaining after the specified percentage has been retained, less all previous payments, will be certified for payment on each partial estimate.
- ***** [OR] *****
- B. Irrevocable Letter of Credit: In lieu of retainage for Projects amounting to Five Hundred Thousand (\$500,000.00) or more, the Contractor, with the approval of the Commissioner, may provide the Commissioner with a Letter of Credit in an amount equal to five percent (5%) of the total adjusted Contract amount at the time of such request. Any such Letter of Credit must be irrevocable (that is, it may be modified or revoked only with the consent of the Commissioner). It shall have a termination date at least one hundred twenty (120) days after the completion date specified in the underlying Contract, or as may be altered in accordance with the Contract Documents, whichever is later. The Letter of Credit shall authorize the Commissioner to require the issuing financial institution to deposit with the State an amount equal to the retainage that would have been deducted from payment to the Contractor, as specified in 10.4.A. The Commissioner may utilize the amount so deposited in the same manner as retainage.
- 10.5 Retainage will be released at Final Payment.
- A. After the Certificate of Substantial Completion has been issued, upon written application by the Contractor and with the approval of the Surety, the Commissioner may release a portion of the retained amount.

10.6 Payment for Material On Hand:

- A. Partial payments are made for materials to be incorporated in the Work, provided the materials meet the requirements of the Contract and are delivered on, or in the vicinity of, the Project site and stored in acceptable places. Partial payments will not exceed 90 percent of the Contract unit price for the item or the amount supported by copies of paid invoices, freight bills, or other supporting documents required by the Department. The quantity paid will not exceed the corresponding quantity estimate in the Contract. No partial payment will be made on living or perishable materials until incorporated in the Work.
- B. When material payments exceed \$100,000 or 10 percent (10%) of the total contract amount, whichever is less, notarized copies of paid invoices or copies of canceled checks for all such materials must be submitted to the Contract Administrator within 45 days of the end date of the estimate on which the material allowance was paid. Failure to provide such documentation will result in the deduction of such material allowance from future estimates until documentation is provided.
- C. All material and work covered by partial payments made shall thereupon become the sole property of the State, but this provision shall not be construed as relieving the Contractor of the sole responsibility of all materials and work upon which payments have been made or the restoration of any damaged work or as a waiver of the right of the State to require the fulfillment of all the terms of the Contract.

10.7 Payment for Material Not on Hand:

- A. Upon receipt of a written request by the Contractor, partial payment may be made for acceptable, fully-fabricated, nonperishable materials not delivered that are unique to the Project provided the materials meet the requirements of the Contract and are stored in excess of 30 days at locations approved by the Department, and provided all required certificates of compliance, mill test reports, shop inspector's acceptance and any other required materials certification have been furnished. Materials shall be identifiable and accessible for inspection. Storage areas shall provide adequate protection so that such materials will meet the Contract requirements upon delivery to the site.
- B. Partial payment will be based on the actual cost to the Contractor as indicated on invoices furnished to the Contract Administrator. When material payments exceed \$100,000 or 10 percent of the total contract amount, whichever is less, notarized copies of paid invoices or copies of canceled checks for all such materials must be submitted to the Contract Administrator within 45 days of the end date of the estimate on which the material allowance was paid. Failure to provide such documentation will result in the deduction of such material allowance from future estimates until documentation is provided. Payment shall not exceed 90 percent of the bid price. NO payment will be made on materials for any item in the contract whose total dollar value is less than \$5,000. Approval of partial payment will not constitute final acceptance of the materials for use in completing items of work.

10.8 Release of Claims:

- A. Neither the final payment nor any part of the retained percentage shall become due until the Contractor shall deliver a complete release of all claims arising under and by virtue of this Contract, including claims for all Subcontractors and suppliers of either materials or labor, plus a release of the Contract Bond and a statement that all Subcontractors and suppliers have been paid. The Commissioner, may pay any and all such claims, in whole or in part, and deduct the amount or amounts so paid from any partial or final payment.

10.9 Final Payment:

- A. Application for Final Payment received from the Contractor will be processed for payment not less than 90 days after project acceptance and final completion unless accompanied by a release of the Contract Bond. This payment shall be the amount of the Contract, amended by approved alteration orders, less previous payments minus liquidated damages, additional penalties or holdbacks. All prior partial estimates and payments shall be subject to correction in the final estimate and payment.

10.10 Acceptance of Final Payment Constitutes Release:

- A. The acceptance of the Final Payment by the Contractor shall be and shall operate as a release to the Contractor of all claims and of all liability to the State for all things done or furnished in connection with this work. No payment, however, final or otherwise, shall operate to release the Contractor and its Sureties from any obligations under this Contract or the Contract Bond. Acceptance of Final Payment shall not impact any warrantees provided by the Contractor with respect to this project.

PART 11 CONTRACTOR'S TITLE TO MATERIALS

- 11.1 No materials or supplies for the work shall be purchased by the Contractor or any Subcontractor subject to any chattel mortgage or under a conditional sale or other agreement by which an interest is retained by the seller. The Contractor warrants that good title has been obtained for all materials and supplies for which partial payment has been accepted. If any claim is made with respect to materials provided by the Contractor, Subcontractors, or Independent Contractors, the Contractor shall defend any such claim and shall pay any judgment or settlement thereon.

PART 12 CHANGES IN WORK

- 12.1 No charge for any extra work or material will be allowed without a fully executed Alteration Order. (Refer to Specification Section 01200-Price and Payment Procedures)
- 12.2 The Commissioner may at any time, by a written order, and without notice to the Sureties, make changes in the Drawings and Specifications and Completion Date of the Contract and within the general scope thereof.
- 12.3 If any part of the work as installed be at variance with the Contract requirements, the Department may allow all or any part of such work to remain in place, if found to be in the best interest of the State, subject to proper adjustment in the Contract Price. Acceptance of installed work in one instance or in any instance does not constitute a waiver of Specifications, General Conditions or contract requirements.

PART 13 PATENTS

13.1 The Contractor shall hold the State and its officers, agents, servants, and employees harmless from liability of any nature including cost and expenses, for or on account of any patented or unpatented invention, process, article or applicable items manufactured or used in the performance of the Contract, including its use, unless otherwise specifically stipulated in the Contract Documents.

PART 14 ASSIGNMENTS

14.1 The Contractor shall not assign the whole or any part of this Contract or any monies due or to become due, hereunder, without the written consent of the Commissioner and of all Sureties executing any Bonds on behalf of the Contractor if in connection with said Contract.

PART 15 SUPERINTENDENCE BY CONTRACTOR

15.1 The Contractor shall have on the project site, at all times when work is being performed, a competent English speaking Superintendent capable of reading and thoroughly understanding the contract documents and thoroughly experienced in the type of work being performed, satisfactory to the Department. The Contractor shall not change superintendents without permission from the Department and shall submit a request in writing with justification for such a change.

- A. The Superintendent shall be responsible for verifying that all materials, installation, coordination, and workmanship are in conformance with the contract documents.
- B. Unless the Department has granted prior written approval, the Superintendent shall not, himself, engage in "hands-on" construction work.
- C. In the event the Superintendent fails or refuses to perform functions mentioned above as determined by the Department, the Contractor agrees to a stipulated penalty of \$1,200.00 per day, in addition to any liquidated damages provided hereunder.

PART 16 FAILURE TO COMPLETE WORK ON TIME

- 16.1 If the Contractor fails to complete all of the work or sections of the Project, if sections are indicated, within the time specified in the Contract or within any additional time allowed, for each working day the Liquidated Damages identified in 16.3 will be deducted from any money due the Contractor. This deduction will be made, not as a penalty, but as fixed, agreed liquidated damages for inconvenience to the State and for reimbursing the Department and Using Agency the cost of the Administration of the Contract, including personnel, time, engineering and inspection. Should the amount of money otherwise due the Contractor be less than the amount of such liquidated damages, the Contractor and its Surety shall be liable to the State for such deficiency.
- 16.2 If the Division of Public Works Design & Construction permits the Contractor to continue and finish the work after the time fixed for its completion, it shall in no way operate as a waiver on the part of the State of any of its rights under the Contract. When the final acceptance has been duly made by the Department, any liquidated damage charges shall end.
- 16.3 The fixed, agreed, liquidated damages shall be assessed in accordance with the following schedule:

Original Contract Amount, Plus Any Extras, Alteration Orders, and Alternates		Amount of Liquidated Damages Per Working Day
From More Than:	To and Including:	
\$0	\$25,000.00	\$200.00
\$25,000.00	\$50,000.00	\$250.00
\$50,000.00	\$100,000.00	\$400.00
\$100,000.00	\$500,000.00	\$450.00
\$500,000.00	\$1,000,000.00	\$800.00
\$1,000,000.00	\$2,000,000.00	\$1,200.00
\$2,000,000.00	\$5,000,000.00	\$1,600.00
\$5,000,000.00	\$10,000,000.00	\$2,000.00
\$10,000,000.00	and above	\$2,400.00

PART 17 SUBSTANTIAL COMPLETION AND FINAL INSPECTION

17.1 The Contractor shall provide a signed Substantial Completion Application to the Contract Administrator when the work is believed to be substantially complete, in accordance with specification section 01700, accompanied by a list of items, referred to as the Punch List, to be completed or corrected. The failure to include any items of such list does not alter the responsibility of the Contractor to complete all work in accordance with the Contract Documents. On the basis of an inspection by the Department who determines that the work is substantially complete, a Certificate of Substantial Completion will be issued.

- A. The Certificate of Substantial Completion shall:
1. Include any modifications to the Punch List or value as determined by the Department.
 2. Establish the Date of Substantial Completion.
 - a. Warranties required by the Contract Documents shall commence on the Date of Substantial Completion unless otherwise provided in the Certificate of Substantial Completion.
 3. Identify the responsibilities of the State and the Contractor for security, maintenance, heat, utilities, and damage to the work and insurance.
 4. Fix the time limit within which the Contractor shall complete the items listed herein.

17.2 Partial Occupancy or Use: The State may take occupancy or use of completed or partially completed portions of the work upon written agreement between the Commissioner and the Contractor. Said partial occupancy or use shall have the approval of the insurer and Code enforcement authorities having jurisdiction. Said partial occupancy or use, (whether substantial completion has been obtained or not) provided the Department and Contractor have agreed upon written terms detailing each of the entities responsibilities in their entirety, may be exercised under these General Conditions.

- A. A Written agreement shall stipulate the time period for completion of all Work and the commencement date for all applicable contract warranties. Said written agreement shall be preceded by a Contractor generated listing of all incomplete Work, meeting with the approval of the Department, before partial occupancy or use is taken by the State with prior approval of the Division.

17.3 If the Contractor fails to complete the items on the "punch list," by the date specified on the Substantial Completion Certificate, then in addition to the corrective measures listed in the Certificate of Substantial Completion, the State may use the monies still due the Contractor to have such items completed and the Contractor shall lose any claim to the monies so used. The Surety may be notified of any delay or failure to complete the work.

17.4 Upon written notice that the work is ready for final inspection and acceptance, the Department shall promptly make such inspection, to determine the work is acceptable under the Contract Documents and the Contract fully performed. The Contractor shall submit a request for payment, specifically identifying Final Payment. The Contractor shall provide all certificates and reports, as required, throughout the contract and shall coordinate their preparation and submission prior to request for final payment. Failure to submit such certificates and reports shall be considered default of contract.

PART 18 DEFAULT AND TERMINATION OF CONTRACT**18.1 If the Contractor:**

- A. Fails to begin work under Contract within the time identified in specification section 01100.
- B. Fails to perform the work with sufficient workers and equipment, or with sufficient materials to assume prompt completion of said work, or
- C. Performs the work unsuitably or neglects or refuses to remove materials or to perform anew such work as may be rejected as unacceptable and unsuitable, or
- D. Discontinues the prosecution of the work, or
- E. Fails to resume work, which has been discontinued, within a reasonable time after notice to do so, or
- F. Becomes insolvent or has declared bankruptcy, or commits any act of bankruptcy or insolvency, or
- G. Makes an assignment for the benefit of creditors, or
- H. For any other causes whatsoever, fails to carry on the work in an acceptable manner.

18.2 The Commissioner will give notice, in writing, to the Contractor and his Surety for such delay, neglect, and default for any item identified above.

- A. Upon receipt of Notification of Default and the Contractor or Surety does not proceed in accordance with said Notification, then the Commissioner will Terminate the Contract. Upon which, the Commissioner shall have full power and authority, without violating the Contract, to assume the prosecution of the work. The Commissioner may enter into one or more agreements for the completion of said Contract according to the terms and conditions thereof, or use such other methods as will be required for the completion of said Contract in an acceptable manner.
 - 1. All extra costs and charges incurred by the Department as a result of such delay, neglect or default, together with the cost of completing the work under the Contract will be deducted from any monies due or which may become due said Contractor. If such expenses exceed the sum that would have been payable under the Contract, then the Contractor and the Surety shall be liable and shall pay to the Department, the amount of such excess.

PART 19 TERMINATION OF CONTRACT WITHOUT FAULT

- 19.1 Except in cases controlled by the preceding section, the Commissioner, for any cause, including, but not limited to an order of any Federal authority or petition of the Contractor due to circumstances beyond its control may, by written notice to the Contractor and the Surety, with the concurrence of the Governor and Council, terminate the Contract or any portion thereof subject to the Condition(s) A, B, C, and D provided below.
- 19.2 Notwithstanding anything to the contrary contained in these conditions, it is understood and agreed by the parties hereto that all obligations of the Department hereunder, including the continuance of payments, are contingent upon the availability and continued appropriation of State and/or Federal Funds, and in no event shall the Department be liable for any payments hereunder in excess of such available or appropriated funds. In the event of a reduction, termination or failure to appropriate any or all such available funds or appropriations or a reduction of expenditures of State funds by the Advisory Budget Control Committee, the Commissioner may, by written notice to the Contractor and Surety, immediately terminate this Contract in whole or in part in accordance with the following conditions:
- A. When a Contract, or portion thereof, is terminated before completion of all items of work in the Contract, payment will be made for the actual items of work completed. Payment of items of work not completed at time of termination shall be the greater of the following amounts:
 - 1. A percentage of the Contract unit price, which percentage shall be the percentage of completion of the particular item at time of termination.
 - 2. Such amount as shall be mutually agreed upon by the parties. No claim for loss of anticipated profits on items or units of work not completed will be allowed.
 - B. Reimbursement for organization of the work and mobilization, when not otherwise included in the Contract, shall be made where the volume of work completed is too small to compensate the Contractor for these expenses under the Contract; the intent being that an equitable settlement be made with the Contractor.
 - C. Acceptable materials, obtained or ordered by the Contractor for the work, and that are not incorporated in the work shall, at the option of the Contractor, be purchased from the Contractor based upon the delivered cost of the materials at such points of delivery as may be designated by the Department. The Contractor shall do everything possible to cancel unfilled orders.
 - D. Termination of a Contract, or a portion thereof, shall not relieve the Contractor of its responsibilities for the work completed nor shall it relieve the Surety of its obligations for and concerning any claims arising out of the work performed.

PART 20 ASSIGNMENT PROVISION

- 20.1 The Contractor hereby agrees that it will assign to the State, all causes of action that it may acquire under the anti-trust laws of New Hampshire and the United States as a result of conspiracies, combinations of contracts in restraint of trade which affect the price of goods or services obtained by the State under this Contract, if so requested by the State.

END OF SECTION

SECTION 01100

SUMMARY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Contract description.
- B. Contractor's use of site and premises.
- C. Work sequence.
- D. State occupancy.
- E. Rebates.
- F. Specification Conventions.

1.2 CONTRACT DESCRIPTION

- A. Work of the Project includes removal of existing boilers and installation of new boilers and associated controls as required.
- B. SITE EXAMINATION
 - 1. Examine Project site before submitting a Bid.
 - 2. A visit to the Project sites has been arranged for Bidders on Tuesday, June 27th.
9:00 AM on 6/27/23 at Dover Circuit Court, 25 St. Thomas St., Dover NH.
- C. Perform Work of Contract under stipulated lump sum grand total contract with State in accordance with Conditions of Contract.
- D. The Contractor shall, except as otherwise specifically stated in the Contract Documents, provide and pay for all materials, labor, tools, equipment, water, heat, fuel, light, power, transportation, superintendence, temporary construction of every nature, and all other services and facilities of every nature whatsoever necessary to execute, complete, and deliver the work within the specified time.

1.3 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Access to Site: Limited to normal working hours.

- B. Emergency Building Exits During Construction: Shall be maintained and all building entrances and exits shall remain functional.
- C. Construction Operations: Limited to areas noted on Drawings.
- D. Time Restrictions for Performing Work: Normal working hours of 7:00 am to 4:00 pm, Monday through Friday with the following restrictions:
 - 1. No access during the following observed holidays:
 - a. New Year's Day.
 - b. Martin Luther King Jr. Civil Rights Day.
 - c. Washington's Birthday.
 - d. Memorial Day.
 - e. Independence Day.
 - f. Labor Day.
 - g. Veterans' Day.
 - h. Thanksgiving Day.
 - i. Day after Thanksgiving.
 - j. Christmas Day.
 - 2. Access for work outside of normal working hours shall be requested in writing to the Contract Administrator, at least one week in advance. The Contract Administrator may accept or reject the request.
- E. Utility Outages and Shutdown: Shall be coordinated with the building users to minimize disruption of services and may require work to take place outside of normal working hours.

1.4 WORK SEQUENCE

- A. Work shall commence within 15 days after issuance of Notice to Proceed. Failure to comply shall constitute Default of Contract.

1.5 STATE OCCUPANCY

- A. The State will occupy the premises for the conduct of normal operations.
- B. Cooperate with State to minimize conflict, and to facilitate State's operations.
- C. Schedule the Work to accommodate State occupancy.

1.6 REBATES

- D. The contractor shall be responsible to complete rebate paperwork for all condensing boilers, pumps, and VFD's. The rebate money will be sent to the contractor and the State will take a credit in the contract. This credit can be used to increase the contract or added to the allowance at the discretion of the Contract Administrator.

1.7 SPECIFICATION CONVENTIONS

- E. These specifications are written in imperative mood and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise.

The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01200

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Bid Items.
- B. Allowances.
- C. Testing and inspection allowances.
- D. Schedule of values.
- E. Requisition for payment.
- F. Change procedures.
- G. Defect assessment.

1.2 BID ITEMS

- A. 901 Bid Item 1: All labor, materials, and equipment required to replace the boiler at Dover District Court.

1.3 ALLOWANCES

- A. 903 Bid Item 3: Allowance: Include in the Contract, a stipulated sum/price of **\$12,000** for use upon the Bureau's instruction. This Allowance will make money available for modifications and/or additions to contract items due to owner-initiated changes, or for unknown, latent or differing existing conditions, or for the removal of hazardous materials that are encountered by construction.
- B. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, equipment rental, overhead and profit will be included in Change Orders authorizing expenditure of funds from this Allowance. The cost of the bond for the amount of Allowance shall be included as part of the lump sum base bid.
- C. Funds will be drawn from an Allowance only by Change Order. Contractor can proceed with Change Order Work against Allowance with direction from the Contract Administrator. The Contractor shall not proceed with any work that will exceed the amount of Allowance remaining.

- D. Credits can only be added to an Allowance by Alteration Order. The Contractor may not use a credit until an Alteration Order is fully executed.
- E. Notwithstanding the Contractor's objection, the Contract Administrator may at any time reduce the funds remaining in the Allowance by Alteration Order.
- F. At Final Payment of the Contract, funds remaining in the Allowance will be credited to the State.

1.4 SCHEDULE OF VALUES

- A. Submit printed schedule on AIA Form G703 - Continuation Sheet for G702. Contractor's standard form or electronic media printout will be considered.
- B. Submit Schedule of Values in duplicate within 15 days after date of issuance of Notice to Proceed. Failure to submit within specified time period will constitute Default of Contract.
- C. Format: Utilize Table of Contents of these Specifications. Identify each line item with number and title of major specification Section. Identify bonds and insurance, allowances and alternates.
- D. Include a separate line item for the amount of each Allowance and Alternates specified in this section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by unit cost to achieve total for each item.
- E. Revise schedule to list approved Alteration Orders, with each Requisitions for Payment.

1.5 REQUISITION FOR PAYMENT

- A. Submit three copies of each application on the Bureau's Requisition for Payment Form.
- B. Content and Format: Items on the Requisition for Payment shall be consistent with the items on the Proposal Form. Utilize the Schedule of Values as documentation for payment items.
- C. Submit updated construction schedule with each Requisition for Payment.
- D. Payment Period: Submit at intervals stipulated in Document 00708 General Conditions – NHDAS-DPW, Item 10.
- E. Submit with transmittal letter as specified in Section 01330.
- F. Substantiating Data: When the Contract Administrator requires substantiating information, submit data justifying dollar amounts in question.
- G. Include the following with Requisition for Payment, payment will not be processed if any items are missing or incomplete:
 - 1. Record documents as specified in Section 01700, for review by the Contract Administrator, which will be returned to Contractor.

2. Affidavits attesting to off-site stored products.
3. Construction progress schedules, revised and current as specified in Section 01330.

1.6 CHANGE PROCEDURES

- A. Submittals: Submit name of individual authorized to receive change documents, and be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.
- B. The Contract Administrator will advise of minor changes in the Work not involving adjustment to Contract Sum/Price or Contract Time, or that may be necessary to carry out the work included in the Contract, by issuing supplemental instructions.
- C. The Contract Administrator may issue a Proposal Request including a detailed description of proposed change(s) with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change. The Contractor will prepare and submit estimate within ten days.
- D. Contractor may propose changes by submitting a request for change(s) to the Contract Administrator, describing proposed change and its full effect on the Work. Each request shall be a separate item and sequentially numbered. Include a statement describing reason for the change, and effect on Contract Sum/Price and Contract Time with full documentation and a statement describing effect on Work by separate or other Contractors.
- E. Stipulated Sum/Price Change Order: Based on Proposal Request and Contractor's fixed price quotation or Contractor's request for Change Order as approved by the Contract Administrator. Submit the breakdown of the following items on a Bureau Stipulated Sum/Price Change Order Form for review and approval by the Contract Administrator:
 1. The Contractor shall include the following indirect costs for work performed by the General Contractor as part of the Contractors' price:
 - a. Worker's Compensation and Employee Liability.
 - b. Unemployment and Social Security Taxes.
 2. In addition to the above indirect costs the General Contractor shall be allowed the following markups:
 - a. Twenty percent (20%). Said twenty percent (20%) shall be all inclusive for overhead, supervision, and profit for Work performed by the General Contractor
 - b. Materials (Actual Cost + 10%): For all materials entering permanently into the work plus freight charges thereon, and for all labor not entered directly on his payroll, the Contractor will receive the actual cost, as shown by original receipted bills forwarded to the Contract Administrator, to which cost will be added an amount equal to ten percent (10%) of the sum thereof. Bills presented by the Contractor for material taken back from his stock will be subject to the ten percent (10%) allowance if approved by the Contract Administrator.
 - c. Equipment (Reasonable Rental Charge + 0%): For any trucks, machinery or special equipment, the Contractor will receive a reasonable

rental charge to which sum no percentage will be added. This rental charge shall be agreed upon in writing before the work is begun and shall include an operator and all fuel, lubricants, and the upkeep of the equipment. Equipment does not include small tools and accessories for small tools.

- d. Ten percent (10%) on that part of work performed by Subcontractors:
 - e. The same percentages above shall apply to Subcontractors.
3. On any change that involves a net credit to the State, no allowance for overhead, supervision and profit shall be figured.
 4. Extension of Contract Time: State any requests for extension of Contract Time with justification for such a request.
- F. Unit Price Change Order: For contract unit prices and quantities, the Change Order will be executed on fixed unit price basis. For unit costs or quantities of units of work which are not pre-determined, execute Work under Construction Change Directive. Changes in Contract Sum/Price or Contract Time will be computed as specified for Time and Material Change Order.
- G. Construction Change Directive : The Contract Administrator may issue directive, signed by the Bureau Administrator or Assistant Administrator, instructing the Contractor to proceed with change in the Work, for subsequent inclusion in a Time and Material Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute change. Failure to comply will result in Default of Contract.
- H. Time and Material Change Order: Submit itemized account and supporting data within 10 days of completion of change. The Contract Administrator will determine change allowable in Contract Sum/Price and Contract Time as provided in Contract Documents.
1. Maintain detailed records of work done on Time and Material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.
 2. Document each quotation for change in cost or time with sufficient data to allow evaluation of quotation. If acceptable, a Change Order for a Not to Exceed Amount will be prepared.
 3. The Contractor as payment in full, including superintendence and overhead, shall accept the compensation herein provided and profit, for extra work performed. For all such work, the Contractor shall furnish certified copies of the payrolls on forms provided for that purpose, invoices of all materials, and such other information as may be required by the Contract Administrator. Submit the breakdown of items on a Bureau Time and Material Change Order Form for review and approval by the Contract Administrator:
 - a. Labor (Actual wage + 40%): The Construction Superintendent is responsible for logging the time for each individual. For all laborers and foremen engaged on the specific operation and entered directly on the Contractor's payroll, the Contractor will receive the actual rate of wage for each and every hour said laborers and Foremen are actually engaged in such work to which will be added an amount equal to forty percent (40%) of the sum thereof, which percentage shall include the cost percentages of the following items as applied to the labor cost involved:

- 1) Contract Bond Premium.
 - 2) Public Liability Insurance.
 - 3) Worker's Compensation Insurance.
 - 4) Federal Social Security.
 - 5) Unemployment Compensation Taxes
- b. Materials (Actual Cost + 10%): For all materials entering permanently into the work plus freight charges thereon, and for all labor not entered directly on his payroll, the Contractor will receive the actual cost, as shown by original receipted bills forwarded to the Contract Administrator, to which cost will be added an amount equal to ten percent (10%) of the sum thereof. Bills presented by the Contractor for material taken back from his stock will be subject to the ten percent (10%) allowance if approved by the Contract Administrator.
- c. Equipment (Reasonable Rental Charge + 0%): For any trucks, machinery or special equipment, the Contractor will receive a reasonable rental charge to which sum no percentage will be added. This rental charge shall be agreed upon in writing before the work is begun and shall include an operator and all fuel, lubricants, and the upkeep of the equipment. Equipment does not include small tools and accessories for small tools.
4. In addition to the above costs the General Contractor shall be allowed the following markups:
- a. Twenty percent (20%). Said twenty percent (20%) shall be all inclusive for overhead, supervision, and profit for Work performed by the General Contractor
 - b. Ten percent (10%) on that part of work performed by Subcontractors.
 - c. The same percentages above shall apply to Subcontractors.
5. Extension of Contract Time: State any requests for extension of Contract Time with justification for such a request.
- I. Any Changes that result in a credit to any portion of the contract and/or a change in the Contract Time must be processed as an Alteration Order except as provided for in Item 1.2E.
- J. Execution of Alteration Orders: Bureau of Public Works will issue Alteration Orders per the following procedures.
1. The Contract Administrator reviews cost for Change in Work with the Using Agency and Consultant(s). If needed the Contract Administrator will request additional items, back-up information, and request any possible changes or clarifications.
 2. Bureau Accountant will prepare an Alteration Order on a Bureau form.
 3. Bureau Administrator or Assistant Administrator will issue the Alteration Order to the Contractor for review and signature.
 4. Contractor submits signed Alteration Order to the Bureau Administrator.
 5. The Bureau completes the Alteration Order with the signature of the Bureau Administrator or Assistant Administrator.
 6. A fully signed and executed Alteration Order is issued to Contract Administrator, Clerk of the Works, Contractor, and Using Agency.

- K. Execution of Change Orders: The Contractor is responsible for preparing and updating a spreadsheet log itemizing all Proposed Changes. A separate spreadsheet shall be completed for each Allowance Item. The spreadsheet shall include columns for Proposed Change Number, Description, Amount of Change, Status, and Approved Amounts. In addition a current balance remaining shall be included. Change Orders will be processed per the following procedures:
1. The Contract Administrator reviews cost for Change in Work with the Using Agency and Consultant(s). If needed the Contract Administrator will request additional items, back-up information, and request any possible changes or clarifications.
 2. Contract Administrator and Using Agency Representative signs Change Order.
 3. Contractor can proceed with Change Order Work with direction from the Contract Administrator.
 4. Contractor shall not proceed with any work that will exceed the amount of Allowance remaining.
 5. Fully signed and executed Change Order is issued to the Contract Administrator, Clerk of the Works, Contractor, and the Using Agency.
- L. Correlation Of Contractor Submittals:
1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Alteration Order as separate line item and adjust Contract Sum/Price.
 2. Promptly revise progress schedules to reflect change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
 3. Promptly enter changes in Project Record Documents.

1.7 DEFECT ASSESSMENT

- A. Replace the Work, or portions of the Work, not conforming to specified requirements.
- B. If, in the opinion of the Contract Administrator, it is not practical to remove and replace the Work, the Contract Administrator will direct appropriate remedy or adjust payment.
- C. The defective Work may remain, but unit sum/price will be adjusted to new sum/price at discretion of the Contract Administrator.
- D. Defective Work will be repaired to instructions of and acceptance by the Contract Administrator, and unit sum/price will be adjusted to new sum/price at discretion of the Contract Administrator.
- E. Authority of the Contract Administrator to assess defects and identify payment adjustments, is final.
- F. Non-Payment For Rejected Products: Payment will not be made for rejected products for any of the following:
1. Products wasted or disposed of in a manner that is not acceptable.
 2. Products determined as unacceptable before or after placement.
 3. Products not completely unloaded from transporting vehicle.
 4. Products placed beyond lines and levels of required Work.

5. Products remaining on hand after completion of the Work.
6. Loading, hauling, and disposing of rejected products.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01300

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Coordination and project conditions.
- B. Permits and fees.
- C. State Labor Requirements
- D. Field engineering.
- E. Preconstruction meeting.
- F. Site mobilization meeting.
- G. Progress meetings.
- H. Pre-installation meetings.
- I. Cutting and patching.
- J. Special procedures.

1.2 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and Work of various sections of the Specifications to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Comply with the "Underground Utility Damage Prevention System" per NH RSA 374 Sections 48 through 56 by notification to DIG-SAFE SYSTEM, Inc.; of intent to excavate within 100 feet of an underground utility. Contact DIG-SAFE at 1-888-334-7233 (1-888-DIG-SAFE) or on-line at <http://www.digsafe.com> at least seventy-two (72) hours in advance of starting any excavation. Saturday, Sundays, and legal holidays are not included in the computation of the required seventy-two (72) hour notice.
- C. Maintain proper environmental conditions for installation of all building components and materials. This shall include but not be limited to manufacturers recommended temperature and humidity requirements. Maintain a weather tight building envelope and protect new work from any kind of spillage.
- D. Prior to the start of any Work, provide an independent company to locate utilities potentially affected by the Work and as shown and/or identified in the Contract Documents. All utilities shall be identified by the Contractor on the Record Drawings.

- E. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, operating equipment.
- F. Coordinate space requirements, supports, and installation of mechanical and electrical Work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- G. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.
- H. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion.
- I. After State occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of State's activities.

1.3 PERMITS AND FEES

- A. Obtain and pay for all construction licenses, permits, and fees as may be required by law for construction of State's facility, and pay for all fees and charges, and use of the property other than the site of the work for storage of materials or other purposes.
 - 1. Per "**Saf-C 8100 State Building Permit System**" a Building Permit shall be obtained by the Contractor from the Office of the State Fire Marshal.
 - 2. A Construction Permit Application Form (DSFM#106), a Letter of Permission signed by the DAS Commissioner and complete set of Construction Documents have been submitted to the State Fire Marshal Office for review by DPW. A copy of the Construction Permit Application form and Permission Letter are attached at the end of this section for your use in picking up each required permit.
 - 3. **Permit applications** for the Trades (Mechanical, Mechanical gas, Electrical, Fire Protection, Plumbing and Fire Alarm) are 'sub-permits' to the Building Construction Permit and each requires a separate application and payment.
 - 4. Application for Trade Permits may be submitted in person at the SFMO 110 Smokey Bear Blvd. Concord, NH (603) 223-4289; or electronically at **DOS.FMO.INSPEC@DOS.NH.GOV.**
 - 5. **When applying for a permit you will need the following:**
 - a. Submit a copy of the **SFMO Approval Letter** (Letter will be given to the Contractor by DPW at the pre-construction meeting).
 - b. Submit the **Construction Permit Application Form** attached to the end of this section, which has Owner, Property and DPW PM information already completed.
 - 1) Contractor shall write in the Contractor Information, Licensing Information and Calculate the Permit Fees.
 - 2) Contractor shall write in the design professional information available on the drawing set (the seal of the architect/engineer of

- record contains their registration number, or call the design professional).
- 3) Contractor shall write the SFMO Project Number in the area next to the word "APPLICATION". The SFMO Project Number may be obtained from the Building Permit available from the State Contract Administrator at the Pre-Construction meeting.
 - c. Submit the **Permission to Sign Letter** from the DAS Commissioner must be copied and attached to EVERY APPLICATION by the applicant.
 - d. Submit payment for the permit fee.
6. **Please direct all questions related to permitting process and fees to Phil Biron at the Office of the State Fire Marshal -- (603) 223-4289.**
 7. **Fees for all re-inspections shall be paid by the Contractor as stated on the application form.**
 8. **Immediately upon receipt of Permits from the Office of the Fire Marshal, Contractor shall transmit copies to the Contract Administrator.**
 9. **NOTE: along with Permits the State Fire Marshal's Office will issue:**
 - a. **A list of required inspections and inspection contact information to the contractor in the form of an "inspection card." This card shall be maintained on site in a location available to the SFMO Inspectors and the Contract Administrator.**
 - b. **Permits may be applied for, and Inspections may be requested at DOS.FMO.INSPEC@DOS.NH.GOV and by telephone at (603) 223-4289.**
 10. **Contractor shall post all paid Permits at the Contractor's Field Office or project site in a conspicuous location prior to beginning the work.**
 11. **Fees for interface with municipal (Town or City) and/or Private Infrastructure (Liberty, Eversource, Etc.) must be applied for and paid for separately from this permit process. The General Contractor is responsible to apply for, obtain and pay for required permits from each municipality and/or Private company as required. Unless noted otherwise in the Construction Documents.**
- B. **Pay all applicable Federal, State, and Local sales and other taxes, except taxes and assessments on the real property comprising the site of the Project.**
 - C. **The Contractor's attention is called to RSA 72-B, Excavation Tax and related administrative rules of the Department of Revenue Administration, which among other provisions, levies a tax on earth and excavations as defined in RSA 155-E. The Contractor is required, on a yearly basis, to file a Notice of Intent to Excavate in each municipality where excavation operations are anticipated. Additionally, the Contractor shall post the Excavation Tax Certificate, received from the Dept of Revenue Administration, at the contractor's project bulletin board.**
 - D. **Contractor must file with the Federal Aviation Administration in accordance with CFR Title 14 Part 77.9 at least 45 days prior to construction.**

1.4 STATE LABOR REQUIREMENTS

- A. Work Certificate for Contractors Before Beginning Their Work on Public Projects
1. Pursuant to RSA 21-I:80 and RSA 228:4-b, prior to any work being done by an individual contractor, such contractor, including ALL subcontractors and independent contractors, shall provide a Work Certificate for Contractors Before Beginning their Work on Public Projects (Work Certificate) to the Contract Administrator. Sample form can be obtained at <http://das.nh.gov/publicworks/pwdocuments.asp>
 2. The Work Certificate of this Contractor is required to be provided for APPROVAL of the Contract. This Work Certificate shall be provided to the Contractor during the Contract approval process by the NH DOT Bureau of Finance & Contracts. All required information shall be completed with attached documentation and shall be returned to the NH Department of Transportation, Bureau of Finance and Contracts.
 3. Subcontractors, including main and lower tier, will not be allowed to perform any work until their Work Certificates have been submitted to the Contract Administrator via this Contractor.
 4. This Contractor shall maintain a log of all submitted subcontractor Work Certificates on-site. The log shall identify all main and lower-tier subcontractors and the status of the Work Certificate submission. This log shall be reviewed at each Progress Meeting to coordinate scheduled work with required Work Certificate submissions. An up-dated log shall be submitted with each Payment Application.
 5. This Contractor shall keep a copy of all Work Certificates on the jobsite, either in electronic or hardcopy form.
- B. The Contractor shall obey all applicable State and Federal Labor laws.
- C. Pursuant to RSA 21-I:81-a, the Contractor shall provide to the Contract Administrator a list of the names and addresses of the CEO, CFO, other LLC principals, and each subcontractor to be used in the performance of the contract. This list shall be provided at the Preconstruction meeting. The name and address of each subcontractor shall be provided on the Subcontractor/Employee Master List (below).
- D. The Contractor shall maintain a Subcontractor/Employee Master List (Master List) of all personnel performing work on the job site, including the Contractor's employees, all subcontractors and subcontractor employees, and all independent contractors. Pursuant to RSA 21-I:81-b, the Master List shall identify which entity has hired each subcontractor and independent contractor and which entity is providing Workers Compensation coverage for the on-site personnel. The Master List shall also confirm that each employee has an OSHA-10 certification as required per RSA 277:5-a. Subcontractors and independent contractors will not be allowed to perform any work until they have been correctly identified on the Master List. A sample Master List document, created in Microsoft Word, can be obtained at <http://das.nh.gov/publicworks/pwdocuments.asp>. The initial Master List submission shall be at the Preconstruction meeting.

- E. The Master List shall be posted on the jobsite and updated as needed to reflect any new subcontractors and independent contractors. The Master List shall be reviewed at each Progress Meeting. On a monthly basis, the Contractor shall provide to the Contract Administrator a .pdf or Microsoft Word file of the Master List, showing all current subcontracts.
- F. The Contractor shall maintain a daily log-in sheet of all personnel performing work on the jobsite. Personnel shall list their name, name of employer or identify themselves as independent contractors. No contractor, subcontractor or independent contractor performing work on the job site shall be allowed on site without first signing the daily log-in sheet.
- G. The Contractor shall verify that personnel listed on the daily log-in sheet are also listed on the Master List. If personnel are not listed on the Master List, they will not be allowed on site until their employer has certified, in writing, that the employee is covered under Workers Compensation coverage for the appropriate work classification noted on the Work Certificate.
- H. The Contractor shall post six (6) mandatory labor posters in a conspicuous, weather-tight place at the jobsite: Protective Legislation Law; Criteria to Establish an Employee or Independent Contractor; NH Minimum Wage Law; and Whistleblowers Protection Act; Workers Right to Know; Equal Pay Law. These posters can be found at the NH Dept. of Labor website <https://www.nh.gov/labor/forms/mandatory-posters.htm>
- I. The Contractor shall maintain, on the jobsite, copies of OSHA-10 certificates for all personnel listed on the Master List and required per RSA 277:5-a to have OSHA-10 certificates.

1.5 PRECONSTRUCTION MEETING

- A. The Contract Administrator will schedule meeting at the Project site prior to Contractor occupancy.
- B. Attendance Required (unless otherwise waived): Contract Administrator, Clerk of the Works, Using Agency Representative(s), Architect/Engineer, Contractor, Contractor's Superintendent, and major Subcontractors.
- C. Potential Agenda Topics:
 - 1. Distribution of Contract Documents: The Contract is responsible for any and all reproduction of Contract Documents.
 - 2. The Contractor shall submit Work Certificate(s) (as defined in this Section) for the Contractor and all known subcontractors.
 - 3. Submission of Work Certificate Log.
 - 4. Submission of names and addresses of the Contractor's CEO, CFO, other LLC principals, and each subcontractor. The name and address of each subcontractor shall be reported on the Master List.
 - 5. Submission of Master List of subcontractors and all personnel expected to be on site.
 - 6. Review daily log-in sheet requirement and format. Contractor shall verify that personnel listed on log-in sheet are also on Master List.

7. Review file of OSHA-10 certificates for all on-site personnel required to be certified per RSA 277:5-a.
8. Verify that all mandatory labor posters are posted in a conspicuous, weather-tight place.
9. Submission of list of products, schedule of values, and progress schedule.
10. **Submittal and posting of Excavation Tax Certificate, as required per RSA 72-B if over 1000CY of material are anticipated to be removed from the site.**
11. Designation of personnel representing parties in Contract.
12. Use of premises by State and Contractor.
13. State's requirements and occupancy.
14. Construction facilities and controls provided by State.
15. Temporary utilities provided by State.
16. Security and housekeeping procedures.
17. Schedules.
18. Application for payment procedures.
19. Procedures for testing.
20. Procedures for maintaining record documents.
21. Requirements for start-up of equipment.
22. Inspection and acceptance of equipment put into service during construction period.

- D. Contract Administrator shall record minutes and distribute copies within two days after meeting to participants, with one copy to each person in attendance and one to those affected by decisions made.

1.6 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum weekly intervals.
- B. Attendance Required (unless otherwise waived): Contract Administrator, Clerk of the Works, Using Agency Representative(s), Architect/Engineer, Contractor, Contractor's Superintendent, and major Subcontractors.
- C. Potential Agenda Topics:
1. Review minutes of previous meetings.
 2. Review of Work progress.
 3. Field observations, problems, and decisions.
 4. Identification of problems impeding planned progress.
 5. Review of submittals schedule and status of submittals.
 6. Review Work Certificate Log.
 7. Review Master List of subcontractors and on-site personnel.
 8. Review daily log-in sheets. Contractor shall verify that all personnel on log-in sheets are on Master List and all OSHA-10 certificates required per RSA 277:5-a are on file.
 9. Review of off-site fabrication and delivery schedules.
 10. Maintenance of progress schedule.
 11. Corrective measures to regain projected schedules.
 12. Planned progress during succeeding work period.

13. Traffic Control Plan.
 14. Coordination of projected progress.
 15. Maintenance of quality and work standards.
 16. Effect of proposed changes on progress schedule and coordination.
 17. Other business relating to Work.
- D. Contractor shall record minutes and distribute copies within two days after meeting to participants, with one copy to each person in attendance and one to those affected by decisions made.
- 1.7 PRE-INSTALLATION MEETING(S)
- A. When required in individual specification sections, convene pre-installation meetings at Project site prior to commencing work of specific section.
 - B. Require attendance of parties directly affecting, or affected by, Work of specific section.
 - C. Notify the Contract Administrator seven days in advance of meeting date.
 - D. Contractor shall prepare agenda and preside at meeting:
 1. Review conditions of installation, preparation and installation procedures.
 2. Review coordination with related work.
 - E. Contractor shall record minutes and distribute copies within two days after meeting to participants, with one copy to each person in attendance and one to those affected by decisions made.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 CUTTING AND PATCHING

- A. Employ skilled and experienced installer to perform cutting and patching.
- B. Submit written request in advance of cutting or altering elements affecting:
 1. Structural integrity of element.
 2. Integrity of weather-exposed or moisture-resistant elements.
 3. Efficiency, maintenance, or safety of element.
 4. Visual qualities of sight exposed elements.
 5. Work of State or separate contractor.
- C. Execute cutting, fitting, and patching to complete Work, and to:
 1. Fit the several parts together, to integrate with other Work.
 2. Uncover Work to install or correct ill-timed Work.
 3. Remove and replace defective and non-conforming Work.

4. Remove samples of installed Work for testing.
 5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- D. Execute work by methods to avoid damage to other Work, and to provide proper surfaces to receive patching and finishing.
 - E. Cut masonry and concrete materials using masonry saw or core drill.
 - F. Restore Work with new products in accordance with requirements of Contract Documents.
 - G. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
 - H. Maintain integrity of wall, ceiling, roof, or floor construction; completely seal voids.
 - I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material to full thickness of penetrated element.
 - J. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.
 - K. Identify hazardous substances or conditions exposed during the Work to the Contract Administrator for decision or remedy.

3.2 SPECIAL PROCEDURES

- A. Materials: As specified in product sections; match existing with new products and salvaged products for patching and extending work.
- B. Employ skilled and experienced installer to perform alteration work.
- C. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion.
- D. Remove unsuitable material not marked for salvage, including rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.
- E. Remove debris and abandoned items from area and from concealed spaces.
- F. Prepare surface and remove surface finishes to permit installation of new work and finishes.
- G. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity. Provide temporary heating, cooling and dehumidification systems for specific product requirements identified within specification sections.

- H. Remove, cut, and patch Work in manner to minimize damage and to permit restoring products and finishes to specified condition.
- I. Refinish existing visible surfaces to remain in renovated rooms and spaces, to specified condition for each material, with neat transition to adjacent finishes.
- J. Where new Work abuts or aligns with existing, provide smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.
- K. When finished surfaces are cut so that smooth transition with new Work is not possible, terminate existing surface along straight line at natural line of division and submit recommendation to Contract Administrator for review.
- L. Where change of plane of 1/4 inch or more occurs, submit recommendation for providing smooth transition to [Contract Administrator for review.
- M. Trim existing doors to clear new floor finish. Refinish trim to specified condition.
- N. Replace portions of new surfaces, which are damaged, lifted, discolored, or showing other imperfections, which do not conform to product specifications.
- O. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections.
- P. Finish surfaces as specified in individual product sections.

END OF SECTION

Collaborator Portal

MyGov's intuitive Collaborator Portal allows you to participate directly with an Agency and is equipped with a Dashboard that automatically updates in real-time, allowing you to stay up-to-date on all projects.

Becoming A Collaborator

There are two ways to become a collaborator:

1. A person may request access to collaborate with an Agency by creating a new Collaborator account.
2. An Agency may extend an invitation to whom they would like to collaborate.

Creating a Collaborator Account

1. Follow [this link](#) to begin creating your new account
2. Type in the required information
3. Click the checkbox once you have read and agreed to the Terms of Service
4. Click "Validate Email"
5. Check your email for a verification message containing a 6-Digit Code
6. Once received, enter the 6-Digit Code. Then click "Create Account"
7. Complete the information on your Contact Record
8. Click "Save Contact"
9. Click the checkboxes by the Agencies to work with online
10. Click "Send Request" to request access to work with the selected agencies.
11. You will automatically be logged into your Collaborator account. Once the requested agencies have accepted your request, you will see the status of your request updated to "Approved".

Accepting an Invitation to Collaborate

1. An invitation email will be sent to you from the Agency.
2. Click the "Collaborator Interface" button in the email
3. Select "Collaborator Login". Using the email address and temporary password found in the email, log in to the Collaborator Interface
4. Once logged in, you will see your Dashboard and be prompted to finish your "Contact Details". Click this link and update information as needed.
5. Click "Save Contact" when finished
6. On your Dashboard, you will see agencies who have requested to collaborate with you.
7. To work with this agency, select "Send Approval"
8. Click "Yes, Accept This"
9. At the top left, next to your Main Dashboard icon, you will now see your Agency appear. You may select the agency to begin working with them.

Resetting Your Password

1. Click "Forgot your password?"
2. Type in your email address and click "Reset Password"
3. Check your email for a message from MyGov, containing a temporary password.
4. Return to the [Login Page](#), and select "Collaborator Login"
5. Using the email address and temporary password, login to the Collaborator Interface
6. Once logged in, click the "Settings" tool in the top right corner of the page
7. Under "Enter Old Password" paste the temporary password
8. Confirm the new password, and click "Edit Contact" to save all changes

Collaborator Portal - Main Dashboard

In the top, right corner of the page you will see:

- ❖ The option to "Logout".
- ❖ A "Settings" tool. Here you can edit your Contact Record or change your password.
- ❖ A "Contextual Help" tool. This tool provides an explanation of the current page and can be found at the top, right-hand corner of every page of your Collaborator Portal.

MyGov University

- ❖ In the upper right corner of the page, you will see a link to "Help". Once clicked, this will open MyGov University.
- ❖ MyGov University is a learning system that can be accessed by collaborators at any time.
- ❖ Through MyGov University, you can learn how to collaborate with an agency online through a series of short, instructional videos.
 - Select "Help" to begin.
 - Read and agree to the terms of service.
 - Once viewing your MyGov University dashboard, select any available course to begin learning.

Main Dashboard - Sidebar

- ❖ Under "Agency Access" you can view:
 - *Agency Listing*: All agencies available to collaborate with online.
 - *Validation Listing*: Agencies that you have requested access to, but require email validation from you before continuing.
 - *Pending Access*: Agencies that are pending approval to access.
 - *Approved Access*: Agencies that have approved you for Collaboration.
- ❖ Under "General Info" you can view and edit your profile, including your contact details, notification settings, and saved credit cards.

Requesting Access to Another Agency

- ❖ To request access to collaborate with another Agency, select the green button "Request Access" on the Sidebar.
- ❖ Begin on step #7 under the "Creating a Collaborator Account" section found above.

Collaborator Interface - Agency Dashboard

The Agencies you have been granted access to will appear next to your Main Dashboard icon at the top of the page. By selecting an Agency icon, you will land on a Dashboard specific to that Agency. Dashboard widgets can be activated or inactivated by selecting the gear tool in the top right corner of the page and selecting or deselecting the items you wish to see.

Agency Dashboard - Sidebar

- ❖ Under "Credentials" you may view:
 - *Applications*: A listing of all applications for Credentials.
 - *Active*: Credentials that are active.
 - *Renewing*: Credentials that are in the process of being renewed.
 - *Expiring*: Credentials that will be expiring soon.
 - *Expired*: Credentials that have expired.
 - *Revoked*: Credentials that have been revoked.
 - The option to *Estimate Fees* for a particular Credential.

- ❖ Under "Projects" you may view:
 - *Projects*: A listing of all projects.
 - *Requested*: Projects that have not been accepted yet.
 - *Reviews*: Projects that are currently on a Review step.
 - *Inspections*: Projects that are currently on an Inspection step.
 - *Archived*: Projects that have been archived.
 - The option to *Estimate Fees* for a particular project.

- ❖ Under "Abatements" you may view:
 - *All*: A listing of all abatement jobs.
 - *Requested*: Abatement jobs that have not been accepted or rejected yet.
 - *Working*: Abatement jobs that are in the process of being completed.
 - *In Review*: Abatement jobs that are being reviewed.
 - *On Hold*: Abatement jobs that have been placed on hold.
 - *Archived*: Abatement jobs that have been archived.

- ❖ Under "Licenses" you may view:
 - *Applications*: A listing of all applications for Licenses.
 - *Inspections*: Applications that are currently on an Inspection step.
 - *Active*: Licenses that are active.
 - *Renewing*: Licenses that are in the process of being renewed.
 - *Expiring*: Licenses that will be expiring soon.
 - *Expired*: Licenses that have expired.
 - *Suspended*: Licenses that have been suspended.
 - *Revoked*: Licenses that have been revoked.
 - The option to *Estimate Fees* for a particular License.

- ❖ Under "Invoices" you may view:
 - *All*: A listing of all invoices.
 - *Due*: Invoices that are due.
 - *Past Due*: Invoices that are past due.
 - *Paid*: Invoices that have been paid.

- ❖ From the invoice pages you can email, pay or print an invoice.

Note: The items described above are dependent on the Agency's subscribed modules.

Completing an Abatement Job With An Agency

- ❖ When an agency has assigned an abatement job to you, your list of "Requested" Abatements will update.
- ❖ Select *Requested* Abatements, and then select the Job ID of the Abatement Job
- ❖ Depending on your agency's settings, you may first have to "Accept" or "Reject" the abatement job at the top of the page.
- ❖ Complete the relevant abatement job details, and click "Update Changes" at the bottom of the page to save your work.
- ❖ Once the abatement job details have been completed, select "Request Review" at the top of the page.
- ❖ This will submit the abatement job back to the agency user who created the job. The agency can take two actions:
 1. The agency may archive/complete the abatement job.
 2. The agency may ask that the job is "Retried". If this option is chosen, the agency will send the reasoning for the Retry.
- ❖ If a Retry is submitted, your list of "Working" Abatements will update.
- ❖ Select *Working* Abatements, and then select the Job ID of the Abatement Job
- ❖ You will see the retry reason and have the opportunity to submit abatement details again.
- ❖ Select "Request Review" at the top of the page when you are ready to submit back to the agency.
- ❖ This process will continue until the agency has archived the abatement job as completed.

Making a New Request With An Agency

- ❖ Select the green button "Make New Request" on the Sidebar
- ❖ Select the Department with whom you choose to work.
- ❖ All request types for this Department will expand for your selection.
- ❖ Enter the required information and click the "Request" button at the bottom of the page.
- ❖ Upon submission, you will be directed to a "Details" page. The purpose of this page is to identify the current step of the process of your application.
- ❖ There are three actions available to you from your Details page:
 1. **Respond to a Correction Item**
 - When a correction item is available and in need of your response, you will see an option to "Reply" on the Details page. This is your direct connection to your Agency via your Collaborator Interface.
 2. **Pay A Fee**
 - When a fee has become available to pay, you will see an option appear to "Pay Fees".
 3. **Schedule An Inspection**
 - When an inspection step has become available to schedule, you will see an option appear to "Schedule Inspection".

Note: The above actions are dependent on the Agency's subscribed modules. When an action is requested of you for a project, you will receive an email from MyGov, and your Dashboard will be updated.

If you have questions or need additional information, please contact your Agency administrator directly.

Office Use Only
(DSFM 106 rev 7/2021)

Date Rcv: _____

Rev By: _____

Amount: _____

CK #: _____

Rev: _____

Permit #: _____

STATE OF NEW HAMPSHIRE DEPARTMENT OF SAFETY

John J. Barthelmes

Division of Fire Safety

Office of the State Fire Marshal

Sean Toomey, State Fire Marshal

Mailing Address: 33 Hazen Drive Concord NH 03305

603-223-4289, Fax 603-223-4294

TDD Access: Relay NH 1-800-735-2964 Arson Hotline 1-800-400-3526



STATE BUILDING PERMIT APPLICATION

Submit a separate application per permit

APPLICATION

Applicant Information (Property Owner)

Name: Sarah Lineberry _____

Title: DAS, Bureau of Court Facilities, Superintendent _____

Address: 25 Capitol St., Room 115 _____

City: Concord _____ State: NH _____ Zip: 03301 _____

Email: Sarah.b.lineberry@das.nh.gov _____

Telephone #: 603-271-3936

Property Information

Building Name: Dover Circuit Court _____

Map/Lot#: _____

Address: 25 St. Thomas St. _____

City: Dover _____ State: NH _____ Zip: 03820 _____

DPW Project Manager: Dina Pinnell
Dina.M.Pinnell@das.nh.gov 603-271-1642

APPLICATION INFORMATION

Permit Type (Check One):

- Building Construction Mechanical (Fuel Gas/Equipment)
 Fire Protection Mechanical (Non-Fuel gas portion of work)
 Electrical Plumbing

Construction Type:

- New Construction
 Addition
 Renovation

IBC Use Group: _____

Building Area: _____ SF

CONTRACTOR INFORMATION

General Contractor Name: _____ Email: _____

Company Name: _____ Telephone #: _____

Address: _____

City: _____ State: _____ Zip: _____

LICENSING INFORMATION

Please provide a copy of applicable license for electrical, plumbing or mechanical applications.

- Electrical Fire Protection Mechanical (Fuel Gas) Plumbing

NH License #: _____ Exp. Date: _____ Email: _____

Name: _____ Telephone #: _____

Company: _____

Address: _____

City: _____ State: _____ Zip: _____

RESPONSIBLE DESIGN PROFESSIONAL (IF APPLICABLE)

Name: Christopher Hildreth _____ NH License # & Exp. Date: _____

Company: NV5 _____

Address: 200 Brickstone Square _____

City: Andover _____ State: MA _____ Zip: 01810 _____

Brief Description: Removal and replacement of existing gas-fired boilers in the Dover Circuit Court.

Owner's Signature _____ Date: _____

I hereby certify, subject to the penalties of unsworn falsification pursuant to RSA 641:3, that all statements made on this application are true to the best of my knowledge and that I am responsible to ensure that all construction work will be completed in accordance with all Federal, State and local laws and ordinances, including local Zoning Ordinances as applicable and the State of NH Building Code, and that I further authorize employees and or agents of the NH Fire Marshal's Office to enter this property for purposes of inspections.

PERMIT FEES PURSUANT TO NH CODE OF ADMINISTRATIVE RULES Sa-C 8105
 Please make checks payable to "Treasurer, State of New Hampshire"

Calculations: (Electrical/Mechanical/Plumbing)

Total cost of construction for permit calculation :\$ _____ (electrical/mechanical/plumbing only)

JOB COST	AMOUNT	MULTIPLIER	INSP. FEE (MIN \$75.00)
1 st 100,000 0.01-100,000		1.2%	0.00
Cost 100,000.01-300,000	+	0.5%	+ 0.00
Costs 300,000.01 +	+	0.3%	+ 0.00
Total:	= 0.00	Total Fee:	= 0.00

Re-Inspection Fee (Electrical/Mechanical/Plumbing)

10% Re-inspection Fee: 10% of the fee calculated, provided that the fee shall not be less than \$100.00 nor more than \$500.00.

New Commercial Permit Fee (Building)

FEE TYPE	SQUARE FOOTAGE	FEE AMOUNT	TOTAL INSP. FEE
BUILDING PERMIT		0.30	0.00
OTHER STRUCTURES min. \$35.00		1.00	0.00

New Commercial Renovation Permit Fee (Building)

FEE TYPE	SQUARE FOOTAGE	FEE AMOUNT	TOTAL INSP. FEE
BUILDING PERMIT		0.15	0.00
OTHER STRUCTURES min. \$35.00		\$1.00	0.00

New Commercial Permit & Renovation Permit Fee (Fire Protection)

FEE TYPE	# OF DEVICES	FEE AMOUNT EACH	TOTAL INSP. FEE MIN \$35.00
FIRE PROTECTION		1.00	0.00

Re-Inspection fee for Building, Fire Protection and Other: Permit fee is \$100.00 per inspection



State of New Hampshire

DEPARTMENT OF ADMINISTRATIVE SERVICES

25 Capitol Street - Room 100
Concord, New Hampshire 03301
(603) 271-3201 | Office@das.nh.gov

Charles M. Arlinghaus
Commissioner

Catherine A. Keane
Deputy Commissioner

Sheri L. Rockburn
Assistant Commissioner

November 1, 2022

Sean P. Toomey, Fire Marshal
NH State Fire Marshal Headquarters
Incident Planning and Operations Center (IPOC)
110 Smokey Bear Blvd.
Concord, NH 03301

RE: Permission for contractors to sign permits for projects under contract with the Department of Administrative Services, Division of Public Works Design and Construction.

Dear Fire Marshal Toomey:

I hereby give my permission for contractors who have an active contract with the State of New Hampshire Department of Administrative Services, Division of Public Works Design and Construction to sign construction permit applications as an agent of the "owner".

Sincerely,

A handwritten signature in black ink, appearing to read "Charles M. Arlinghaus".

Charles M. Arlinghaus
Commissioner

cma/dph



State of New Hampshire

DEPARTMENT OF ADMINISTRATIVE SERVICES
25 Capitol Street - Room 120
Concord, New Hampshire 03301

Charles M. Arlinghaus
Commissioner
(603) 271-3201

Joseph B. Bouchard
Assistant
Commissioner
(603) 271-3204

Catherine A. Keane
Deputy Commissioner
(603) 271-2059

SUBSTANTIAL COMPLETION APPLICATION

Date:

Project Title: Dover Circuit Court Boilers

Project Number: 81224

Contract: B

Instructions: The items checked below are required to be completed, operational and documented in order for the project to be declared Substantially Complete. If Substantial Completion is anticipated on a portion of the work, the sequence and portions of the project shall be identified and the selected items below will be required for each substantial completion area. The Contractor shall submit this document, with attachments, to the Contract Administrator for review to determine if the terms of Substantial Completion have been met. If the terms have been met, the Contract Administrator will issue a Certificate of Substantial Completion. If the terms have not been met, the Contract Administrator will notify the Contractor of missing, incomplete, or incorrect items.

PART 1 STATE AND LOCAL REQUIREMENTS:

In addition to the requirements of the Construction Documents, Substantial Completion requires the following identified items be fully completed, executed, approved with certifications attached to this document. The Contractor is required to arrange and pay for all inspections and fees.

1.1 State of NH Office of the State Fire Marshal:

- A. Certificate of Occupancy.
- B. Modular Building Certificate

1.2 State of NH Office of the State Fire Marshal and Local Fire Official:

- A. Sprinkler system. Reference NFPA 13 - Contractor's Material and Test Certificate for Aboveground Piping Form.
- B. Fire detection and notification system. Reference NFPA 72 - Inspection and Testing Form
- C. Range hood and fire suppression system.
- D. Emergency lighting and exit signs.
- E. Oil fired equipment.
- F. Other (list): Gas Fired Equipment

1.3 State of NH Department of Labor Division of Boilers and Elevators:

- A. Elevator Inspection Certificate.
- B. Boiler Inspection Certificate.

Substantial Completion Application

- C. Pressure Vessel Certificate.
- 1.4 Local Building Inspection Department:
 - A. Building Permit.
- 1.5 State of NH Plumber's Licensing Board and Local Building Inspection Department:
 - A. Plumbing Inspections.
- 1.6 State of NH Electrician Board and Local Building Inspection Department:
 - A. Electrical Inspections.
- 1.7 State of NH Department of Environmental Services and Local Building Inspection Department:
 - A. Approved Underground/Above Ground Tank Approved Registration Form.
 - B. Approved Underground/Above Ground Storage Tank Closure Notification Form.
 - C. Septic System Operation Approval.
 - D. Water System Operation Approval.
 - E. Statement of Certification that compliance with the Clean Indoor Air in State Buildings, ENV A-2200 has been met.
 - F. Other (list):
- 1.8 Other (list):
 - A. Other (list):

PART 2 CONTRACTOR'S REQUIREMENTS

In addition to the requirements of the Construction Documents, Substantial Completion requires the following identified items be fully completed, executed, approved with certifications attached to this document. The Contractor is required to arrange and pay for all inspections and fees.

- 2.1 Contractor has completed and verified the following:
 - A. Building egress and exit paths are clear of construction materials and equipment.
 - B. All building systems are functional and correctly operating.
 - C. Other (list):
- 2.2 Contractor has furnished the required Documents, Training and Manuals:
 - A. Field Record Drawings with markings.
 - B. Building systems operations and maintenance manuals.
 - C. Spare parts and extra materials stocks as per specifications.
 - D. Final Punch List as required by the General Conditions (*Failure to include incomplete Work does not relieve the Contractor of the responsibility to complete or correct the Work*)
 - E. Hazardous Waste Shipment Record (WSR).
 - F. Hazardous Material Abatement/Remediation Report.

SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Submittal procedures.
- B. Construction progress schedules.
- C. Subcontractor list.
- D. Proposed products list.
- E. Product data.
- F. Shop drawings.
- G. Samples.
- H. Design data.
- I. Test reports.
- J. Certificates.
- K. Manufacturer's instructions.
- L. Manufacturer's field reports.
- M. Construction photographs.

1.2 SUBMITTAL PROCEDURES

- A. Contractor to also provide one hard-copy of all approved submittals to the Clerk of the Works.
- B. **At completion of the project the Contactor shall provide two (2) digital copies on USB drives and two (2) hard copies in the form of a three-ring binder with all information from contract document software.**
- C. Transmit each submittal with Division accepted form.
- D. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.

- E. Identify Project, Contractor, subcontractor and supplier; pertinent drawing and detail number, and specification section number, appropriate to submittal.
- F. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with requirements of the Work and Contract Documents. Incomplete items or items submitted without the Contractor's signed stamp of approval thereon will be returned rejected.
- G. Schedule submittals to expedite Project. Coordinate submission of related items. Deliver to:
- Christopher Hildreth
NV5
200 Brickstone Square
Andover, MA 01810
- cc: below when submittals are sent directly to Architect and or Engineer.
Dina Pinnell
John O. Morton Building, Rm. 250
7 Hazen Drive, POB 483
Concord, NH 03302-0483
- H. For each submittal for review, allow 14 days excluding delivery time to and from Architect, Engineer and the Division and Contractor.
- I. All shop drawings to be returned to Contractor from the Contract Administrator. Direct return of shop drawings from Architect or Engineer to Contractor is not permitted.
- I. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of completed Work.
- J. Allow space on submittals for Contractor and Architect or Engineer review stamps.
- K. When revised for resubmission, identify changes made since previous submission.
- L. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.
- M. Submittals not requested will not be recognized or processed.
- N. Work shall not begin until submittal items have been approved and returned to General Contractor by the Contract Administrator.

1.3 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit initial schedules at Pre-Construction Meeting.
- B. Submit revised Progress Schedules with each Application for Payment.

- C. Distribute copies of reviewed schedules to Project site file, subcontractors, suppliers, and other concerned parties.
- D. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.
- E. Submit horizontal bar chart with separate line for each section of Work, identifying first work day of each week.
- F. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate early and late start, early and late finish, float dates, and duration.
- G. Indicate estimated percentage of completion for each item of Work at each submission.
- H. Revisions To Schedules:
 - 1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
 - 2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
 - 3. Prepare narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect.

1.4 SUBCONTRACTOR LIST

- A. Submit list, at the Pre-Construction Meeting, of subcontractors setting forth in detail the work for which they will be responsible. In addition, the General Contractor shall identify what work will be performed with the Bidder's own forces.

1.5 PRODUCT DATA

- A. Product Data: Submit for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. Submit number of copies Contractor requires, plus digital copies to Contract Administrator, Architect, Engineer.
- C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- E. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01700.

1.6 SHOP DRAWINGS

- A. Shop Drawings: Submit for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

- B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Submit number of copies Contractor requires, a digital copy to Contract Administrator, Architect, Engineer.
- D. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01700.

1.7 SAMPLES

- A. Samples: Submit for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. Samples For Selection as Specified in Product Sections:
 - 1. Submit to Contract Administrator for aesthetic, color, or finish selection.
 - 2. Submit samples of finishes from full range of manufacturers' standard colors, textures, and patterns for Contract Administrator and Architect/Engineer selection and State approval.
- C. Submit samples to illustrate functional and aesthetic characteristics of Products, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- D. Include identification on each sample, with full Project information.
- E. Submit number of samples specified in individual specification sections; Contract Administrator will retain one sample and Architect or Engineer will retain one sample.
- F. Reviewed samples which may be used in the Work are indicated in individual specification sections.
- G. Samples will not be used for testing purposes unless specifically stated in specification section.
- H. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents purposes described in Section 01700.

1.8 DESIGN DATA

- A. Submit for Contract Administrator's and Architect or Engineer's knowledge.
- B. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.9 TEST REPORTS

- A. Submit for Contract Administrator's and Architect or Engineer's and State's knowledge.
- B. Submit test reports for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.10 CERTIFICATES

- A. When specified in individual specification sections, submit certification by manufacturer, installation/application subcontractor, or Contractor, to Contract Administrator in quantities specified for Product Data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or Product, but must be acceptable to the Contract Administrator.

1.11 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to the Contract Administrator in quantities specified for Product Data.
- B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.12 MANUFACTURER'S FIELD REPORTS

- A. Submit reports for Contract Administrator's, and Architect and/or Engineer, and State's benefit.
- B. Submit report in duplicate within 7 days of observation to the Contract Administrator for information.
- C. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.13 CONSTRUCTION PHOTOGRAPHS

- A. Provide photographs of construction throughout progress of Work produced by an experienced photographer, acceptable to the Contract Administrator.
- B. Each month submit photographs with Application for Payment.
- C. Photographs: Submit digital images via e-mail or on compact discs.
- D. Identify each image. Identify name of Project, orientation of view, date and time of view.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01400
QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Quality control and control of installation.
- B. Tolerances
- C. References.
- D. Safety
- E. Mock-up requirements.
- F. Supervision
- G. Testing and inspection services.
- H. Manufacturers' field services.
- I. Examination.
- J. Preparation.

1.2 QUALITY CONTROL AND CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality. Prior to acceptance of approved materials on site, establish & maintain controlled environmental conditions required for proper, sequential installations. Products affected by inadequate environmental control (in storage or installed) shall be removed, disposed of and replaced in-kind with no adjustment to the contract price or work schedule.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. When manufacturers' instructions conflict with Contract Documents, request clarification from the Contract Administrator before proceeding.
- D. The Contractor shall notify the Contract Administrator of any discrepancies, ambiguities or obvious omissions found in the Contract Documents before proceeding with the work affected thereby. Such notification shall be made in writing requesting clarification and/or interpretation with reasonable promptness consistent with and reasonably inferable from the Contract Documents. If the Contractor fails to make such request, no excuse will thereafter be entertained for failure to carry out work in a satisfactory manner, and no monies will be paid for correcting of items.

- E. The Contractor shall give the Contract Administrator timely notice of any additional drawings, specifications or instructions required to define the work in greater detail or to permit the proper progress of the work.
- F. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- G. Where, on any of the Drawings, a portion of the work is drawn out and the remainder is indicated in outline, the parts drawn out shall also apply to all other portions of the work.
- H. Perform Work by persons qualified to produce required and specified quality.
- I. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.
- J. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.3 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from the Contract Administrator before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

- A. Conform to reference standard by date prior to the date of receiving bids, except where specific date is established by code. The standard referred to, except as modified in the specifications, shall have full force and effect as though printed in the Specifications.
- B. Obtain copies of standards where required by product specification sections.
- C. When specified reference standards conflict with Contract Documents, request clarification from the Contract Administrator before proceeding.
- D. Neither contractual relationships, duties, nor responsibilities of parties in Contract nor those of Architect or Engineer shall be altered from Contract Documents by mention or inference otherwise in reference documents.
- E. The Contractor shall comply with all applicable Federal, State, Local laws, ordinances, regulations, and requirements to work hereunder, including building code requirements. If the Contractor ascertains at any time that any requirement of this Contract is at variance with applicable laws, ordinances, regulations or building code requirements, he/she shall notify the Contract Administrator in writing.

1.5 SAFETY

- A. The Contractor shall, at all times, safely guard the State's property and persons from injury or loss in connection with this Contract. The Contractor shall, at all times, safely guard and protect their own work and that of adjacent property from damage. All passageways, guard fences, lights, and other facilities required for protection by Federal, State or Municipal laws and regulations must be provided and maintained.
- B. Place upon the work or any part thereof, only such loads as are consistent with the safety of that portion of the work.

1.6 SUPERVISION

- A. All work shall be done under the observation and inspection of the Contract Administrator.
- B. The Contract Administrator may observe, examine and test materials and workmanship at any and all times during manufacture and/or construction, and at any and all places where such manufacture and/or construction is carried on.
- C. The Contract Administrator shall suspend work that may be subject to damage by climatic conditions.
- D. Prior to final acceptance, the Contract Administrator at any time before final acceptance of the entire work to make an examination of work already completed that was not specifically called for to receive an inspection prior to covering over, and shall require removing or tearing out same, the Contractor shall, upon request, promptly furnish all necessary facilities, labor, and materials. If such work is found to be defective in any material respect, due to the fault of the Contractor or his Subcontractors, he shall defray all expenses of such examination and of satisfactory reconstruction. If however, such work is found to meet the requirements of the Contract, the actual cost of labor and material necessarily involved in the examination and replacement, shall be completed per a Time and Material Alteration Order.

1.7 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to the Contract Administrator 30 days in advance of required observations.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- D. Refer to Section 01330 - SUBMITTAL PROCEDURES, MANUFACTURERS' FIELD REPORTS article.

PART 2 PRODUCTS.

Not Used.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing site conditions, controlled environment, protective measures and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections. Notify the Contract Administrator and the Clerk of the Works of conditions, which prevent start of work.
- D. Verify utility services are available, of correct characteristics, and in correct locations.

3.2 PREPARATION

- A. Maintain specific environmental controls required in individual sections.
- B. Clean substrate surfaces prior to applying next material or substance.
- C. Seal cracks or openings of substrate prior to applying next material or substance.
- D. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary Utilities:
 - 1. Temporary electricity.
 - 2. Temporary lighting for construction purposes.
 - 3. Temporary heating.
 - 4. Temporary ventilation.
 - 5. Temporary water service.
 - 6. Temporary sanitary facilities.
- B. Construction Facilities:
 - 1. Field offices and sheds.
 - 2. Vehicular access.
 - 3. Parking.
 - 4. Progress cleaning and waste removal.
 - 5. Traffic regulation.
- C. Temporary Controls:
 - 1. Security.
 - 2. Dust.
 - 3. Noise Control.
 - 4. Removal of Utilities, Facilities, and Controls.
- D. All work completed herein must conform to applicable state, federal requirements, and guidelines at the Contractor's expense as is necessary to complete the Work.

1.2 TEMPORARY ELECTRICITY

- A. State will pay cost of energy used. Exercise measures to conserve energy. Utilize State's existing power service.

1.3 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Permanent building lighting may be utilized during construction.

1.4 TEMPORARY HEATING

- A. Provide and pay for heating devices and heat as needed to maintain specified conditions for construction operations.
- B. Contractor will pay cost of temporary heat and temporary heat devices when the permanent heating devices are not functional. Work shall not be done in the seasonal heating season.

1.5 TEMPORARY VENTILATION

- A. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- B. Utilize existing ventilation equipment. Extend and supplement equipment with temporary fan units as required to maintain clean air for construction operations.

1.6 TEMPORARY WATER SERVICE

- A. State will pay cost of temporary water. Exercise measures to conserve energy. Utilize State's existing water system, extend and supplement with temporary devices as needed to maintain specified conditions for construction operations.

1.7 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Existing facility use is not permitted. Provide facilities at time of project mobilization.

1.8 ON SITE STORAGE

- A. Storage Areas: Existing space within the Courthouse may be utilized for storage. If additional storage is necessary, the Contractor shall provide exterior storage units as required.
- B. Maintenance And Cleaning:
 - 1. Maintain approach walks free of mud, water, and snow.
- C. Removal: At completion of Work remove storage boxes and debris. Restore areas.

1.9 VEHICULAR ACCESS

- A. Location as approved by the Contract Administrator in consultation with the Owner.
- B. Maintain and do not block existing driveways.
- C. Provide and maintain access to fire hydrants and control valves free of obstructions.

1.10 PARKING

- A. Arrange for surface parking areas to accommodate construction personnel from the City on adjacent streets as necessary.
- B. Use of designated areas of existing parking facilities used by construction personnel is not permitted unless previously approved by the Contract Administrator.
- C. Do not allow heavy vehicles or construction equipment in parking areas.

1.11 PROGRESS CLEANING AND WASTE REMOVAL

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing spaces.
- C. Broom and vacuum clean interior areas prior to start of surface finishing and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and rubbish from site and dispose off-site.

1.12 SECURITY

- A. Security Program:
 - 1. Protect Work existing premises from theft, vandalism, and unauthorized entry.
 - 2. Initiate program in coordination with State's existing security system at project mobilization.

1.13 DUST CONTROL

- A. Execute Work by methods to minimize raising dust from construction operations.
- B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

1.14 NOISE CONTROL

- A. Provide methods, means, and facilities to minimize noise produced by construction operations.

1.15 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.
- B. Clean and repair damage caused by installation or use of temporary work.
- C. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01505

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Construction waste management plan.
 2. Construction waste recycling.
 3. Construction waste adaptive reuse.

1.2 PLAN REQUIREMENTS

- A. Construction Waste Management Plan shall be developed with the following intent:
1. Divert construction, demolition, and land clearing debris from landfill disposal.
 2. Redirect recyclable material back to manufacturing process.
- B. Develop and implement a Construction Waste Management plan to be reviewed by the Contract Administrator for compliance with the following
1. Divert 75 % of Project generated waste from landfills.

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Requirements for submittals.
- B. Construction Plan: Submit construction waste management plan describing methods and procedures for implementation and monitoring compliance including the following:
1. Project specific analysis of the projected jobsite waste to be generated. Include materials and estimated quantities (weight/volume) of projected waste.
 2. Construction waste materials anticipated for recycling and adaptive reuse.
 3. On site sorting and site storage methods.
 4. Name and location of landfill(s) to be used.
 5. Certification from the landfill of ability to receive the types of waste to be generated and of sufficient capacity to accept the waste.
 6. Transportation company hauling construction waste to waste processing facilities.
 7. Recycling and adaptive reuse processing facilities and waste type each facility will accept.
- C. Submit documentation with each application for payment substantiating that the construction waste management plan goals are being achieved. Include the following information:
1. Material category
 2. Trash: Quantity by weight deposited in landfills.

3. Salvaged, recovered and recycled material: Quantity by weight with destination for each type of material salvaged or recovered for resale, recycling, or adaptive reuse.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Requirements for submittals.
- B. Waste Management final report: Prior to Completion, submit a written Waste Management Final report summarizing the types and quantities of materials recycled and disposed of under the Waste Management Plan. Include the name and location of disposal facilities. Include the following:
 1. Material category
 2. Total quantity of waste, by weight
 3. Quantity of waste salvaged, both estimated and actual, by weight
 4. Quantity of waste recycled, both estimated and actual, by weight
 5. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste. (Compare to minimum requirement of 75% by weight of waste.)

1.5 CONSTRUCTION WASTE MANAGEMENT PLAN

- A. Construction Waste Landfill Diversion: Minimum 75 percent by weight of construction waste materials for duration of Project through resale, recycling, or adaptive reuse.
- B. Implement construction waste management plan at start of construction.
- C. Review construction waste management plan at pre-construction meeting and progress meetings.
- D. Distribute the Construction Waste Management Plan to subcontractors and others affected by Plan Requirements.
- E. Oversee plan implementation, instruct construction personnel for plan compliance, and document plan results.
- F. Manager: The Contractor shall designate on-site personnel responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the Project.

1.6 CONSTRUCTION WASTE RECYCLING

- A. Use source separation method or co-mingling method suitable to sorting and processing method of selected recycling center.
- B. Source Separation Method: Recyclable materials separated from trash and sorted into separate bins or containers, identified by waste type, prior to transportation to recycling center.

- C. Co-Mingling Method: Recyclable materials separated from trash and placed in unsorted bins or container for sorting at recycling center.
- D. Materials recommended for recycling include:
 - 1. Packing materials including paper, cardboard, foam plastic, and sheeting.
 - 2. Recyclable plastics.
 - 3. Organic plant debris.
 - 4. Earth materials.
 - 5. Native stone and granular fill.
 - 6. Concrete and Asphalt paving.
 - 7. Wood with and without embedded nails and staples.
 - 8. Glass, clear and colored types.
 - 9. Metals.
 - 10. Gypsum products.
 - 11. Acoustical ceiling tile.
 - 12. Carpeting.
 - 13. Equipment oil.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 CONSTRUCTION WASTE COLLECTION

- A. Collect construction waste materials in containers identified for specific waste materials and arrange for transportation to recycling centers or adaptive salvage and reuse processing facilities.
- B. Maintain recycling and adaptive reuse storage and collection area in orderly arrangement with materials separated to eliminate co-mingling of materials required to be delivered separately to waste processing facility.
- C. Store construction waste materials to prevent environmental pollution, fire hazards, hazards to persons and property, and contamination of stored materials.
- D. Cover construction waste materials subject to disintegration, evaporation, settling, or runoff to prevent polluting air, water, and soil when not in use.
- E. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials. Location shall be acceptable to the Contract Administrator.

3.2 CONSTRUCTION WASTE DISPOSAL

- A. Deliver construction waste to waste processing facilities. Obtain receipt for deliveries.

- B. Dispose of construction waste, not capable of being recycled or adaptively reused, by delivery to landfill, incinerator, or other legal disposal facility. Obtain receipt for deliveries.

END OF SECTION

SECTION 01600

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Products.
- B. Product delivery requirements.
- C. Product storage and handling requirements.
- D. Product options.
- E. Product substitution procedures.
- F. Equipment electrical characteristics and components.

1.2 PRODUCTS

- A. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise.
- B. All materials and equipment shall be new, except as specifically permitted by Contract Documents.
- C. Furnish interchangeable components from same manufacturer for components being replaced.
- D. The use of asbestos containing materials shall be prohibited.

1.3 PRODUCT DELIVERY REQUIREMENTS

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

- A. Store and protect products in accordance with manufacturers' instructions.
- B. Store with seals and labels intact and legible.

- C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- D. For exterior storage of fabricated products, place on sloped supports above ground.
- E. Provide bonded off-site storage and protection when site does not permit on-site storage or protection only with prior approval from the Contract Administrator.
- F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- G. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.
- H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers with or without provision for substitutions: Products of one of manufacturers named and meeting specifications, no options or substitutions allowed. Submit request for substitution for any manufacturer not named in accordance with the following article.

1.6 PRODUCT SUBSTITUTION PROCEDURES

- A. Where Bidding Documents stipulate particular Products, substitution requests will ONLY be considered before receipt of Bids. Submit requests per the requirements specified in this section.
 - 1. All requests shall be submitted to the Contract Administrator not later than five (5) working days before the hour and day set for bid opening. Incomplete requests or requests received after this deadline will not be considered.
 - 2. All requests that are approved and are acceptable to the Department will be issued as part of an Addendum to each Bidder who has received a set of bidding documents, so that all Bidders may avail themselves of the change in submitting their Proposals.
- B. Substitutions may be considered after bid opening when a product becomes unavailable through no fault of the Contractor. The Contractor shall apply to the Contract Administrator, in writing, within ten (10) days of his realizing his inability to furnish the article specified, describing completely the substitution he desires to make. The Contractor shall include a dated written statement from the manufacturer outlining an explanation for the unavailability of the product. Substitutions for reasons of lead times, i.e., the time between when the Contractor orders necessary materials from the vendor

and anticipated delivery, will only be reviewed if the lead time is more than the length of the contract time. The Department may extend the contract time to accommodate the product specified. No additional costs from the Contractor will be considered due to the fact that the Contractor shall verify lead times and coordinate with contract time during the bidding phase.

- C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
- D. A request constitutes a representation that Bidder:
1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
 2. Will provide same warranty for Substitution as for specified product.
 3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to the State.
 4. Waives claims for additional costs or time extension which may subsequently become apparent.
 5. Will reimburse Department and Architect and/or Engineer for review or redesign services associated with re-approval by authorities having jurisdiction.
- E. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals, without separate written request, or when acceptance will require revision to Contract Documents.
- F. Substitution Submittal Procedure:
1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
 2. Submit Shop Drawings, Product Data, and certified test results attesting to proposed product equivalence. Burden of proof is on proposer.
 3. The Department will notify Bidders in writing of decision to accept by issuing an addendum.

PART 2 PRODUCTS

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01700

EXECUTION REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Closeout procedures.
- B. Final cleaning.
- C. Starting of systems.
- D. Demonstration and instructions.
- E. Testing, adjusting and balancing.
- F. Protecting installed construction.
- G. Project record documents.
- H. Operation and maintenance data.
- I. Manual for materials and finishes.
- J. Manual for equipment and systems.
- K. Spare parts and maintenance products.
- L. Product warranties and product bonds.
- M. Maintenance service.
- N. Guarantee of work.

1.2 CLOSEOUT PROCEDURES

- A. Submit a signed Substantial Completion Application attesting that the Contract Documents have been reviewed, Work has been inspected, and that all Work is complete in accordance with Contract Documents and ready for Contract Administrator review. The Substantial Completion Application for use by the Contractor is attached to the end of this specification section. The Contract Administrator may modify this Agreement to accommodate any changes in Work.
 - 1. Provide submittals to the Contract Administrator as required by the Contract Documents and as required by authorities having jurisdiction.

- B. Only after completion of all Punch List items and submission of all items the Contractor shall submit a Final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.3 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
- B. Clean equipment and fixtures to sanitary condition with cleaning materials appropriate to surface and material being cleaned.
- C. Replace filters of operating equipment.
- D. Remove waste and surplus materials, rubbish, and construction facilities from site.

1.4 STARTING OF SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify the Contract Administrator seven days prior to start-up of each item.
- C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable manufacturer's representative in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

1.5 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to State's personnel two weeks prior to date of Substantial Completion.
- B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with State's personnel in detail to explain all aspects of operation and maintenance.

- D. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at equipment designated location.
- E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- F. Required instruction time for each item of equipment and system is specified in individual sections.

1.6 TESTING, ADJUSTING AND BALANCING

- A. Perform services specified in Section 15950.
- B. Reports will be submitted by independent firm to the Contract Administrator indicating observations and results of tests and indicating compliance or non-compliance with requirements of Contract Documents.

1.7 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual specification sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- F. Prohibit traffic from landscaped areas.

1.8 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed Shop Drawings, Product Data, and Samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by State.

- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress, not less than weekly.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured depths of foundations in relation to finish [first] [main] floor datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 4. Field changes of dimension and detail.
 - 5. Details not on original Contract drawings.
- G. Submit documents to the Contract Administrator at time of Substantial Completion.

1.9 OPERATION AND MAINTENANCE DATA

- A. Submit data bound in 8-1/2 x 11 inch (A4) text pages, three D side ring binders with durable plastic covers.
- B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.
- C. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- D. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- E. Contents: Prepare Table of Contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
 - 1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Engineer(s), Contractor, Subcontractors, and major equipment suppliers.
 - 2. Part 2: Operation and maintenance instructions, arranged by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - 3. Part 3: Project documents and certificates, including the following:

- a. Shop drawings and product data.
- b. Balance reports.
- c. Certificates.
- d. Originals of warranties and bonds.

1.10 MANUAL FOR MATERIALS AND FINISHES

- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. The Contract Administrator will review draft and return one copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by State, submit documents within ten days after acceptance.
- C. Submit two copies of completed volumes 15 days prior to Substantial Completion. Draft copy be reviewed and returned after Substantial Completion, with Architect/Engineer comments. Revise content of document sets as required prior to final submission.
- D. Submit two sets of revised final volumes in final form prior to final inspection.
- E. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Include information for re-ordering custom manufactured products.
- F. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- G. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.
- H. Additional Requirements: As specified in individual product specification sections.
- I. Include listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.11 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Submit one copy of preliminary draft or proposed formats and outlines of contents before start of Work. Contract Administrator will review draft and return one copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by State, submit documents within ten days after acceptance.
- C. Submit one copy of completed volumes 15 days prior to Substantial Completion. Draft copy be reviewed and returned after Substantial Completion, with Architect/Engineer comments. Revise content of document sets as required prior to final submission.

- D. Submit two sets of revised final volumes in final form prior to final inspection.
- E. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.
- F. Include color coded wiring diagrams as installed.
- G. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and special operating instructions.
- H. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- I. Include servicing and lubrication schedule, and list of lubricants required.
- J. Include manufacturer's printed operation and maintenance instructions.
- K. Include sequence of operation by controls manufacturer.
- L. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- M. Include control diagrams by controls manufacturer as installed.
- N. Include Contractor's coordination drawings, with color coded piping diagrams as installed.
- O. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- P. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- Q. Include test and balancing reports as specified in Section 01400.
- R. Additional Requirements: As specified in individual product specification sections.
- S. Include listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

1.12 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Furnish spare parts, maintenance, and extra products in quantities specified in individual specification sections.

- B. Deliver to Project site and place in location as directed by State; obtain receipt prior to final payment.

1.13 PRODUCT WARRANTIES AND PRODUCT BONDS

- A. Obtain warranties and bonds executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten days after Substantial Completion. All warranties start dates shall be the Substantial Completion Date, if project is phased all warranties to start at the date of Substantial Completion of each phase.
- B. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.
- C. Verify documents are in proper form, contain full information, and are notarized.
- D. Co-execute submittals when required.
- E. Include Table of Contents and assemble in three D side ring binder with durable plastic cover.
- F. Submit prior to final Application for Payment.
- G. Time Of Submittals:
 - 1. For equipment or component parts of equipment put into service during construction with State's permission, submit documents within ten days after acceptance.
 - 2. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

1.14 MAINTENANCE SERVICE

- A. Furnish service and maintenance of components indicated in specification sections during warranty period.
- B. Examine system components at frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by manufacturer of original component.
- D. Do not assign or transfer maintenance service to agent or Subcontractor without prior written consent of State.

1.15 GUARANTEE OF WORK

- A. Except as otherwise specified, all work shall be guaranteed by the Contractor against defects resulting from the use of inferior materials, equipment or workmanship for one (1) year from the Date of Substantial Completion of the work.
- B. If, within any guarantee period, repairs or changes are required in connection with guaranteed work, which in the opinion of the Contract Administrator, is rendered necessary as a result of the use of materials, equipment or workmanship which are inferior, defective, or not in accordance with the terms of the Contract shall, promptly upon receipt of notice from the Commissioner, and at his own expense:
1. Place in satisfactory condition in every particular, all such guaranteed work, correct all defects therein.
 2. Make good all damage to the building or site, or equipment or contents thereof, which in the opinion of the Contract Administrator, is the result of the use of materials, equipment or workmanship which are inferior, defective, or not in accordance with the terms of the Contract.
 3. Make good any work or material, or the equipment and contents of said building or site disturbed in fulfilling any such guarantee.
- C. In any case, wherein fulfilling the requirements of the Contract or of any guarantee, embraced in or required thereby, the Contractor disturbs any work guaranteed under another contract, he shall restore such disturbed work to a condition satisfactory to the Contract Administrator and guarantee such restored work to the same extent as it was guaranteed under such other contracts.
- D. If the Contractor, after notice, fails to proceed promptly to comply with the terms of the guarantee, the Commissioner may have the defects corrected and the Contractor and his/her Surety shall be liable for all expense incurred.
- E. All special guarantees applicable to definite parts of the work that may be stipulated in the Specifications or other papers forming a part of the Contract shall be subject to the term of this paragraph during the first year of the life of such special guarantee.
- F. Failure to adhere to guarantee terms may result in suspension or barring from the prequalification list, or, alternatively, the requirement of a Letter of Credit or other guaranty equal to a percentage of the Contract amount.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 02 41 19
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 equipment, finishes, building components or structure in coordination with the installation of the New Boilers and their associated systems.
 2. Removal, reinstallation, and replacement of interior finishes in coordination with the installation of new architectural finishes and the New Boilers systems.
 3. Items to be salvaged as noted in the documents.
 4. Legal off-site disposal of all abandoned equipment, demolition debris and construction waste generated by any section other than hazardous waste unless specifically within individual sections.
- B. Related Requirements:
1. Section 01100 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
 2. Section 01700 "Execution Requirements" for cutting and patching procedures.
 3. Section 07 84 13 "Penetration Firestopping", for firestopping walls and/or ceilings from utility penetrations through building enclosures.
 4. Section 23 00 00 "HVAC" for scope of work for Boiler replacement.

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.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.
- F. Disposal: The removal and legal disposition of unwanted materials generated by the work of this project.

1.4 MATERIALS OWNERSHIP

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

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.
- B. 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.
- C. Submit mapping of areas required for coring and cutting new structural penetrations.
- D. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 3. Coordination for shutoff, capping, and continuation of utility services.
 4. Use of elevator and stairs.
 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- E. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.6 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.7 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 expected that hazardous materials will be NOT encountered in the Work.
1. If suspected hazardous materials are encountered that are not identified within the Project Documents, immediately notify Owner.
- 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.

1.8 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.

1.9 COORDINATION

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

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

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

- B. Review Project Record Documents of existing construction or other existing conditions and information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- 3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS
- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- 3.3 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. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 3. Cover and protect furniture, furnishings, and equipment that have not been removed.
 4. Comply with requirements for temporary enclosures and dust control, specified in Section 01500 "Temporary Facilities and Controls."
- B. Remove temporary barricades and protections where hazards no longer exist.
- 3.4 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.
 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.
 5. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 6. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 7. Dispose of demolished items and materials promptly.
 8. Remove gypsum wall-board to enable the installation of wood blocking for television screens and equipment.
- 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 reinstalled in their original locations after selective demolition operations are complete.

3.5 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.
- B. Burning: Do not burn demolished materials.

3.6 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.

3.7 SELECTIVE DEMOLITION SCHEDULE

- A. Items to be removed and re-installed:
 - 1. Salvaged items noted on the documents.
- B. Items to be removed and salvaged for Owner:
 - 1. NONE

END OF SECTION

**SECTION 07 8413
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 DESCRIPTION OF WORK

- A. **Work Included:** Provide labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:
1. Through-penetration firestop systems for *new and existing* penetrations through fire-resistance-rated construction, including both empty openings and openings containing penetrating items.
 2. Through-penetration firestop systems for *new and existing* penetrations through vertical and horizontal construction separating rooms even if the existing assembly is not fire rated.
 3. At conditions currently concealed, include 12 dozen 6-inch diameter utility penetrations that need firestopping in the Scope of Work.
- B. **Items To Be Installed Only:** Not Applicable.
- C. **Items To Be Furnished Only:** Not Applicable.
- D. **Related Work:** The following items are not included in this Section and will be performed under the designated Sections:
1. Section 02 4119 "Selective Demolition", for work associated for the new HVAC equipment.
 2. See HVAC Drawings, for equipment and utilities work.

1.3 ACTION SUBMITTALS

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

1.4 INFORMATIONAL SUBMITTALS

- A. **Product Test Reports:** For each penetration firestopping system, for tests performed by a qualified testing agency.

1.5 QUALITY ASSURANCE

- A. **Installer Qualifications:** A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

1.6 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.**

1.7 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, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. 3M Fire Protection Products.
 - b. Hilti, Inc.
 - c. Tremco, Inc.
- B. **Penetrations in Fire-Resistance-Rated Walls:** Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
1. Penetration Firestopping: Not less than 1 hour.
- C. **Penetrations in Horizontal Assemblies:** Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
 2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
 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 E 84.
- 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.

2.3 FILL MATERIALS

- A. **Latex Sealants:** Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
- B. **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.

- C. **Silicone Foams:** Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam.
- D. **Silicone Sealants:** Single-component, silicone-based, neutral-curing elastomeric sealants.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. **Surface Cleaning:** Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

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."
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

**SECTION 07 9200
JOINT SEALANTS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
1. Silicone joint sealants.
 2. Nonstaining silicone joint sealants.
 3. Urethane joint sealants.
 4. Immersible joint sealants.
 5. Silane-modified polymer joint sealants.
 6. Mildew-resistant joint sealants.
 7. Polysulfide joint sealants.
 8. Butyl joint sealants.
 9. Latex joint sealants.

1.3 ACTION SUBMITTALS

- A. Product Data:
1. Joint sealants.
 2. Joint-sealant backing materials.
- B. Samples for Initial Selection: Manufacturer's standard color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Joint-Sealant Schedule: Include the following information:
1. Joint-sealant application, joint location, and designation.
 2. Joint-sealant manufacturer and product name.
 3. Joint-sealant formulation.
 4. Joint-sealant color.

1.4 CLOSEOUT SUBMITTALS

- A. Manufacturers' special warranties.
- B. Installer's special warranties.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Authorized representative who is trained and approved by manufacturer.
- B. Testing Agency Qualifications: Qualified in accordance with ASTM C1021 to conduct the testing indicated.

1.6 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
 2. When joint substrates are wet.
 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.

4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

- A. **Special Installer's Warranty:** Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 1. **Warranty Period:** Two years from date of Substantial Completion.
- B. **Special Manufacturer's Warranty:** Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 1. **Warranty Period:** Five years from date of Substantial Completion.
- C. **Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:**
 1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 2. Disintegration of joint substrates from causes exceeding design specifications.
 3. Mechanical damage caused by individuals, tools, or other outside agents.
 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain joint sealants from single manufacturer for each sealant type.

2.2 JOINT SEALANTS, GENERAL

- A. **Compatibility:** Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. **Colors of Exposed Joint Sealants:** As selected by Architect from manufacturer's full range.

2.3 SILICONE JOINT SEALANTS

- A. **Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant:** ASTM C 920, type S, Grade NS, Class 50, for Use NT.
 1. **Products:** Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Dow Corning Corporation; 791 or 795
 - b. Pecora Corporation; 864 or 895
 - c. Tremco Incorporated; Spectrem 3
 - d. May National Associates, Inc.; Bondaflex Sil 295.
 - e. Or equal.
- B. **Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant:** ASTM C 920, type S, Grade NS, Class 100/50, for Use NT.
 1. **Products:** Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Dow Corning Corporation; 790
 - b. Pecora Corporation; 890FTS
 - c. Tremco Incorporated; Spectrem 1
- C. **Mildew Resistant, Single Component, Acid-Curing Silicone Joint Sealant:** ASTM C 920, Type S, Grade NS, Class 25, for use NT.
 1. **Products:** Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BASF Building Systems; Omnipus.
 - b. Down Corning Corporations, 786 Mildew Resistant.

- c. GE Advanced Materials; Sanitary SCS1700.
- d. May National Associates, Inc.; Bondaflex Sil 100 WF.
- e. Tremco Incorporated, Tremsil 200 Sanitary.
- f. Or equal.

2.4 URETHANE JOINT SEALANTS

- A. Single-Component, Nonsag, Urethan Joint Sealant: ASTM C920, Type S, Grade NS, Class 25, for Use NT.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BASF Building Systems; MasterSeal NP1 or Ultra.
 - b. Sika Corporation, Construction Products Division; Sikaflex - 1a.
 - c. May National Associates, Inc.; Bondaflex PUR 25 or Bondaflex PUR 40FC.
 - d. Pecora Corporation; Dynatrol I-XL.
 - e. Polymeric Systems, Inc., Flexiprene 1000
 - f. Or equal.
 - 2. Locations:
- B. Single-Component, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920. Type S, Grade NS, Class 25, for Use T.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BASF Building Systems; Sonolastic Ultra.
 - b. Sika Corporation, Construction Products Division; Sikaflex - 1a.
 - c. Tremco Incorporated; Vulkem 116.
 - d. May National Associates, Inc.; Bondaflex PUR 40FC.
 - e. Or equal.

2.5 ACRYLIC LATEX JOINT SEALANTS

- A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Adfast.
 - b. Pecora Corporation.
 - c. Tremco Incorporated.
 - d. Or equal.

2.6 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin), or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.7 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: 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 performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
 - d. Exterior insulation and finish systems.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 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.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile in accordance with Figure 8A in ASTM C1193 unless otherwise indicated.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 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, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION

**SECTION 08 31 13
ACCESS PANELS**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

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

1.02 SUMMARY

- A. Section Includes:
1. 1-hour rated access doors and frames
- B. Related Requirements:
1. Section 09 54 00 "Gypsum Board Suspended Ceiling System".
 2. Section 09 91 23 "Painting".
 3. Division 22 – Plumbing.
 4. Division 23 – Heating, Ventilating and Air Conditioning.
 5. Division 26 – Electrical.

1.03 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded. Deliver such items to Project site in time for installation.
- C. Coordinate locations of hanger rods and struts with other work so that they do not encroach access area.

1.04 ACTION SUBMITTALS

- A. Product Data: For the following:
1. Access Panel System

1.05 INFORMATIONAL SUBMITTALS

- A. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

1.06 FIELD CONDITIONS

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

PART 2 - PRODUCTS**2.01 PRODUCTS**

- A. Flush, gasketed Fire Rated access doors and frames with concealed flanges by Karp Industries KRP-150 FR or PF, Acudor or Equal.
1. Material: Steel, 22 gauge, minimum size as required for service access.
- B. Finishes:
1. Steel: Factory finished.
 2. Color: White.
- C. Sizes: General Contractor shall coordinate size of access doors with HVAC and Plumbing drawings.

PART 3 - EXECUTION

3.01 SUPPORTS

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

END OF SECTION

SECTION 09 54 00
GYPSUM BOARD SUSPENDED CEILING SYSTEM

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. Description of work: Provide labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:
1. Metal suspension system framing members for Gypsum Board Assemblies
 2. Gypsum Wall board, Main Tees, Cross Tees, Perimeter Angles, Perimeter Channels, Hanger Wire, and Accessories.
 3. Finishing of gypsum board surfaces - **Level 4.**
- B. Related Work: The following items of work are not included in this Section and are specified under the designated Sections.
1. Section 02 41 19 "Selective Demolition" for scope of reinstallation of framing and gypsum board required as part of selective demolition.
 2. Section 07 84 13 "Penetration Firestopping", for penetrations through rated gypsum board ceiling and visible structural penetrations.
 3. Section 09 91 23 "Painting", for primers and finish coats applied to gypsum board surfaces.
 4. Division 22 – Plumbing
 5. Division 23 – HVAC
 6. Division 26 – Electrical.
- C. Items To Be Installed Only:
1. Section 083113 "Access Panels", access to utilities as required for all trades.
 2. Divisions 21, 22, 23 & 26 Sections for access panels furnished under those Sections.

1.3 SUBMITTALS

- A. Product Data: For each type of product.
1. Submit manufacturer's specifications and installation instructions with Project conditions and materials clearly identified or detailed for each required system.
- B. Samples: For each type of system.
1. 12-inch-long samples of suspension system components
 2. Label each Sample for location.

1.4 QUALITY ASSURANCE

- A. Reference Standards:
1. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
 2. ASTM A 645 Standard for Nonstructural Framing Members
 3. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated, (Galvanized) by the Hot-Dipped Process
 4. ASTM C635, Standard Specifications for Metal Suspension Systems
 5. ASTM C636, Recommended Practice for Installation of Metal Suspension Systems
 6. CISCA Ceiling Systems Installation Handbook
 7. ASTM C645, Standard Specification for Non-Bearing (Axial) Steel Studs, Runners, (Track), and Rigid Furring Channels for Screw Application of Gypsum Board
 8. ASTM C754, Specification for Installation of Steel framing Members to Receive Screw-Attach Gypsum Boards

9. ASTM C840 Specification for Application & Finishing of Gypsum Board
10. (ASTM E119, Standard Test Methods for Fire Tests of Building Construction and Materials)
11. (Underwriters Laboratories Inc. (UL) Fire Resistance Directory)
12. NOA # 17-09-19.03, TAS 202 and TAS 203

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery:
 1. Deliver material to site promptly without undue exposure to weather.
 2. Deliver in manufacturer's unopened containers or bundles, fully identified with name, brand, type and grade.
- B. Inspection:
 1. Promptly inspect delivered materials, file freight claims for damage during shipment, and order replacement materials as required. Any damaged materials shall be promptly removed from the job site.
- C. Storage:
 1. Store above ground in dry, ventilated space.
 2. Protect materials from soiling, rusting, and damage.
 3. Store board to be directly applied to masonry walls at 70°F for 24 hours prior to installation.
- D. Handling:
 1. Handle in such a manner to insure against racking, distortion or physical damage of any

1.6 COORDINATION WITH OTHER WORK

- A. General:
 1. Coordinate with other work including mechanical and electrical work and partition systems. Installation of conduit and ductwork above suspension system shall be complete before installation of suspension system.
- B. Protection:
 1. Follow good safety and industrial hygiene practices during handling and installation of all products and systems, with personnel to take necessary precautions and wear appropriate personal protective equipment as needed. Read Material Safety Data Sheets and related literature for important information on products before installation. Contractor to be solely responsible for all personal safety issues during and subsequent to installation; architect, specifier, owner and manufacturer will rely on contractor's performance in such regard.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products by USG Interiors.

2.2 SUSPENSION SYSTEMS

- A. USG Drywall Suspension Systems – Commercial quality, cold-rolled steel, hot dipped galvanized finish.
 1. Main Tees: Fire-Rated Heavy-Duty classification 1.617" high x 144" long, integral reversible splice with knurled face. (DGLW-26 1-1/2" Face and 1.617" high)
 2. Cross Members: Fire-Rated members with knurled face. Cross Tees: DGLW-424 cross tee 1-1/2" high x 48" long with 1-1/2" wide face; DGLW-224 Fire-Rated: 1-1/2" high x 24" long with 1-1/2" face quick release cross tee ends for positive locking and removability without tools.
 3. Accessory Cross Tees: Cross tees must have knurled faces and quick release cross tee ends for positive locking and removability without tools.
 - a. DGW-6026DM: 1.617 inches high x 5 feet long with a 1-1/2 inch face

- b. DGW-7226DM: 1.617 inches high x 6 feet long with a 1-1/2 inch face
- c. DGW-8426DM: 1.617 inches high x 7 feet long with a 1-1/2 inch face
- d. DGW-9626DM: 1.617 inches high x 8 feet long with a 1-1/2 inch face
- 4. Wall Moldings: Single web with knurled face
 - a. DGWM-24: 1-1/2 inch x 1 inch x 144 inch long wall molding
 - b. DGCM-27: 144 inch x 1-5/8 inch x 1 inch x 1 inch channel molding
 - c. DGLC-12: 144 inch x 1-3/4 inch x 1 inch x 1 inch index channel molding
- 5. Accessories
 - a. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width required to provide support for Gypsum Wallboard around ceiling penetrations.
 - 1) Minimum Base-Metal Thickness: 24 gauge
 - b. DGSC-180: Splice Clip
 - c. DGTC-90: Transition Clip
 - d. DGWC: Wall Attachment Clip
 - e. DGSP-180: Splice Plate
 - f. DGHUB: Dome Hub
 - g. CMAC-1: Close Mount Attachment Clip
- 6. Wire: Hanger Wire 12 ga., galvanized or as noted on drawings
- B. USG Drywall Wall-to-Wall Suspension Systems – Commercial quality, cold-rolled steel, hot dipped galvanized finish for use in corridors and short span applications.
 - 1. Main Tees: 1HR Fire-Rated Heavy-Duty classification 1.617 inch high x [6] [8] [10] [12] [14] Custom long, integral reversible splice with 1-1/2 inch knurled face.
 - 2. Wall Moldings: Single web with knurled face, 1-1/2 inch x 1 inch x 12' long, DGWM24
 - 3. Wall Channel: Single web with knurled face, 1-5/8 inch x 1 inch x 12' long, DGCM27
 - 4. Locking Wall Channel: Single web with knurled face, 1-3/4 inch x 1 inch x 12' long, DGLC-12
- C. Grid Suspension Assemblies: Listed products establish standard of quality and are manufactured by United States Gypsum Company (USG), Chicago, IL

2.3 GYPSUM BOARD

- A. Gypsum Board
 - 1. ASTM C36, regular type except where Type X or Type C fire-resistant type is indicated or required to meet UL assembly types.
 - 2. Edges: Tapered
 - 3. Thickness: 5/8 inch.
 - 4. Acceptable products:
 - a. Typical partitions and ceilings: Equivalent to SHEETROCK Brand Ultralight FC 30, SHEETROCK Brand SW, FIRECODE or FIRECODE "C" Gypsum Panels by USG.
 - b. SHEETROCK brand Gypsum Panels, FIRECODE Core meet the definition of a Type X gypsum board for fire-rated assemblies in the Gypsum Association Fire Resistance Design Manual. Edges: SW tapered or tapered.
- B. Ceiling board
 - 1. ASTM C36, non-sag type
 - 2. Acceptable product: Equivalent to SHEETROCK® Brand UltraLight Panels by USG
 - 3. Thickness:
 - 4. 5/8 inch, unless otherwise indicated.
- C. Mold-resistant gypsum board
 - 1. ASTM C1396, regular except where Type X (FIRECODE) or Type C (FIRECODE C) indicated or required to meet UL assembly types
 - 2. Edges: Tapered
 - 3. Thickness: 5/8 inch.
 - 4. Acceptable product: Equivalent to SHEETROCK brand MOLD TOUGH gypsum panels by USG

2.4 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape: Interior Gypsum Wallboard: Paper.
- C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Prefilling: At open joints 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 all-purpose compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 - 3. Fill Coat: For second coat, use all-purpose compound.
 - 4. Finish Coat: For third coat, use all-purpose compound.

2.5 ACCESSORIES

- A. Metal trim for gypsum board
 - 1. Conform to profile and dimensions indicated
 - 2. Material for interior Work: Galvanized steel, 26 gauge minimum
 - 3. Corner beads: Equivalent to Dur-A-Bead No. 103 [104] [800] [900] by USG
 - 4. Casing beads (edge beads): Equivalent to 200A [200B] [401] [402] [P-1] [701-B] [801-A] [801-B] by USG
 - 5. Control joints
 - a. Roll-formed zinc with perforated flanges
 - b. Size: 1-3/4 inch wide, with 1/4 inch wide center channel
 - c. Provide with removable tape strip over channel.
 - d. Acceptable product: Equivalent to No. 093 by others
- B. Paper-faced metal trim for gypsum board
 - 1. Conform to profile and dimensions indicated
 - 2. Material for interior Work: Comply with ASTM C1047
 - 3. Outside corners: SHEETROCK Brand Paper Faced Metal Bead and Trim [81W] [B1XWEL] [B1 Super Wide] by USG.
 - 4. Outside Bullnose corners: SHEETROCK Brand Paper Faced Metal Bead and Trim [SLOC] [Danish] [Santa Fe] by USG.
 - 5. Inside corners: SHEETROCK Brand Paper Faced Metal Bead and Trim [B2] [SLIC] by USG.
 - 6. Trims: L shape - B4 SERIES, J shape: B9 SERIES by USG.
- C. Special Trim and Reveals: Extruded aluminum alloy 6063-T5, profiles as indicated.
- D. Gypsum Board Screws: Self-drilling, self-tapping steel screws.
 - 1. For steel framing less than 0.03 inch thick: Comply with ASTM C1002
 - 2. For steel framing from 0.033 inch thick to 0.112 inch thick: Comply with ASTM C954
 - 3. Provide Type S or Type S-12 screws.
- E. Acoustical Sealant: USG Acoustical Sealant or equal.
 - 1. Comply with ASTM C919 and ASTM C834.
- F. Mineral Wool Insulation for Fire Rated Penetrations
- G. Miscellaneous Accessories: Provide as required for complete installations and as detailed on the drawings.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Examine substrates and adjoining construction and conditions under which work is to be installed. Do not proceed with work until unsatisfactory conditions are corrected.

3.2 INSTALLATION – GENERAL

- A. Standard reference: Install grid members in accordance with ASTM C636, CISCA installation standards, and other applicable references.

- B. Manufacturer's reference: Install in accordance with manufacturer's current printed recommendations.
- C. Drawing reference: Install in accordance with approved shop drawings and locate ceiling in accordance with main tee dimensions relative to elevations.
- D. Install in accordance with reference standards and manufacturer's instructions and as required to comply with seismic requirements.

3.3 INSTALLATION – FLAT CEILING APPLICATIONS

- A. Hanger Wire Installation: Secure hanger wires to upper structural elements and space hangers so that each hanger wire supports a maximum of 16 sq. ft.
- B. Space main tee members a maximum span of 48" on center (or as specified by the UL Fire Resistance Directory).
- C. Space cross tees recommended 16 inch o.c. 5/8 inch SHEETROCK gypsum board or 5/8 inch FIBEROCK Interior panels can span 24 inch o.c. Check USG AC3095, for maximum allowable spacing based on wind load. Install extra cross tees where butt joints occur, 8 inches from each side of the butt joint.
- D. Attach SHEETROCK gypsum board to the suspension system main runners, cross tees, and cross channels with 1-1/4 inch bugle head screws – single layer of board spaced 16 inch o.c. – SHEETROCK gypsum Board in the field and at the perimeter of the panels, locate 3/8 inch in from panel edges. Hold panels in firm contact with framing while driving fasteners. Drive fastener heads flush with, or slightly below surface of SHEETROCK gypsum board.
- E. Install trim, and similar accessories as necessary and as applicable to meet project requirements where indicated on drawings.
- F. Install control joints at locations of properly detailed control joints, including additional cross tees as necessary, per direction of architect and/or design professional.
- G. Finish boards as described to achieve "Level of Finish" specified.

3.4 INSTALLATION – CORRIDOR (WALL-TO-WALL) APPLICATIONS

- A. Hanger Wire Installation: Secure hanger wires to upper structural elements and space hangers so that each hanger wire supports a maximum of 16 sq. ft.
 1. Note:
 2. If using 5/8 inch single layer of drywall, no hangers are required for spans up to 6 feet 0 inch (L/240 uniform load, single span design).
 3. If using 5/8 inch single layer of drywall for spans over 6 feet 0 inch to 12 feet-0 inch, one hanger at mid span per each main is required (L/240 uniform load, single span design).
 4. If using 5/8 inch single layer of drywall for spans over 12 feet 0 inch to 14 feet 0 inch, two hangers at 1/3 point per each main is required (L/240 uniform load, single span design).
- B. Space main tee members as required by span and design load

Maximum load (lbs/sf)	Unsupported span	Main tee spacing
18	4 feet-0 inch	16 inch o.c.
12	4 feet-0 inch	24 inch o.c.
9.2	5 feet-0 inch	16 inch o.c.
6.1	5 feet-0 inch	24 inch o.c.
5.3	6 feet-0 inch	16 inch o.c.
3.6	6 feet-0 inch	24 inch o.c.
3.4	7 feet-0 inch	16 inch o.c.

- C. Attach SHEETROCK gypsum board to the suspension system main runners, cross tees, and cross channels with 1-1/4 inch bugle head screws – single layer of board spaced 16 inch o.c. – SHEETROCK gypsum Board in the field and at the perimeter of the panels, locate 3/8 inch in from panel edges. Hold panels in firm contact with framing while driving fasteners.

- D. Install trim, and similar accessories as necessary and as applicable to meet project requirements where indicated on drawings.
- E. Install control joints at locations of properly detailed control joints, including additional cross tees as necessary, per direction of architect and/or design professional.
- F. Finish boards as described to achieve 'Level of Finish' specified.

3.5 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 and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840.
 - 1. **Level 4 Finish:** At joints and interior angles, embed the tape in the joint compound and immediately apply the joint compound over the tape. Apply two additional separate coats of the joint compound over flat joints. Apply one additional coat of the joint compound over interior angles. Apply three separate coats of the joint compound over fastener heads and flanges of trim accessories. Panel surfaces and the joint compound must be smooth and free of tool marks and ridges. "Drywall primer" must be applied to surfaces before applying final decoration.
 - a. Exposed surfaces entrances.

3.6 PROTECTION

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

SECTION 09 91 23**PAINTING****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. Provide labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Examine the various trade sections of the Project Manual and be thoroughly familiar with all provisions regarding painting and finishing work included therein.
2. Refer to the Contract Drawings for various surfaces to be painted or finished.
3. Specified first coat material, for back-priming all surfaces of new exterior and interior finish carpentry woodwork, plywood that will be concealed from view after installation thereof.
4. Complete specified finish systems, for all exterior and interior surfaces and materials, ferrous and non-ferrous materials, and painted or natural or transparent finishes of all trades, except as otherwise specified hereunder.
5. Touch-up all scratches and other blemishes on surfaces of pre-primed items and surfaces, prior to applying finish systems hereunder. Touch-up all surface defects in finishes applied hereunder, prior to final acceptance of the General Contract.
6. The following items do not require painting:
 - a. Pre-finished items.
 - b. Prefinished aluminum, stainless steel, and surfaces of finished hardware.
 - c. Piping, ductwork, conduits, and similar items that are concealed in the finished Work.
 - d. Glass, unless otherwise indicated.
 - e. Existing surfaces that are not disturbed by the Work of this Contract, unless indicated to be painted.

- B. Related Requirements:

1. Section 09 54 00 "Gypsum Board Ceiling Suspended Ceiling Systems", for gypsum drywall work, including sanding of all joint and fastener head compound.
2. Section 08 31 13 "Access Panels", for access panels in ceilings-
3. Divisions 22 - Plumbing, and Division 23 – Heating, Ventilating and Air Conditioning, for stenciling of plumbing and HVAC piping, respectively.
3. Division 22 -Plumbing, Division 23 – Heating, Ventilating and Air Conditioning, and Division 26 – Electrical, for factory-finishing of new mechanical and electrical equipment:
4. Staging and planking over eight (8) feet in height shall furnished, installed, and maintained at no cost to the Painting Sub-Contractor.

1.3 DEFINITIONS

- A. Gloss is measured by a gloss meter from 60 degree angle from vertical, as a percentage of the amount of light that is reflected. The following terms are used to describe gloss:

1. Flat: Less than 5 units (Gloss Level 1 according to ASTM D 523)
2. Matte: 0 – 10 units (Gloss Level 2 according to ASTM D 523)
3. Eggshell: 10 – 25 units (Gloss Level 3 according to ASTM D 523)
4. Satin: 20 – 35 units (Gloss Level 4 according to ASTM D 523)
5. Semi-Gloss: 35 – 70 units (Gloss Level 5 according to ASTM D 523)
6. Gloss: 70 – 85 (Gloss Level 6 according to ASTM D 523)
7. High-Gloss: More than 85 units (Gloss Level 7 according to ASTM D 523)

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. For paints and coatings, including printed statement of VOC content and MPI System number.
- B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Step coats on Samples to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.

1.5 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. Paint: Not less than 1 gal. of each material and color applied.

1.6 QUALITY ASSURANCE

- A. Mockups: None required.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials in manufacturer's original sealed containers, bearing the manufacturer's standard label indicating type and color. Deliver sufficient quantities of materials in advance of the time needed, in order that work shall not be delayed.
- B. Store all materials in tightly-covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F., in a manner which meets the requirements of applicable codes and fire regulations.
 - 1. When not in use, ensure that such spaces are kept secure and inaccessible to those not performing work under this Section.
 - 2. Provide a carbon dioxide or dry-chemical type fire extinguisher, bearing the label of the National Board of Fire Underwriters and tag of recent inspection for each space where coating materials are stored.
- C. Do not use the sanitary system for mixing or disposal of refuse material. Carry water to mixing rooms and dump waste material in a suitable refuse receptacle.
- D. Remove oily rags and waste each day.
- E. Before application, thoroughly stir all canned materials, unless otherwise directed by the manufacturer of the specific coating used, to ensure uniformity of color and mass and remove all skins, coating lumps, and other foreign matter by straining. Apply materials without reducing or thinning, except as otherwise recommended by the specific material manufacturer, and then only with approval by the Architect.

1.8 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS**2.1 MANUFACTURERS**

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Benjamin Moore & Co.
 - 2. Glidden Paints.
 - 3. Sherwin-Williams.

4. PPG Wood Coatings (for transparent finishes)
5. Or approved equal.

2.2 PRODUCTS, GENERAL

- A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
- B. Material Compatibility:
 1. Provide materials for use within each paint system that are compatible with one another, and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 1. Flat Paints and Coatings: 50 g/L.
 2. Nonflat Paints and Coatings: 150 g/L.
 3. Primers, Sealers, and Undercoaters: 200 g/L.
 4. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
 5. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
- D. Colors: As selected by the Architect from manufacturer's full range.

2.3 PAINT PRODUCTS – METAL SUBSTRATES

- A. Primer, Rust-Inhibitive, Water Based: MPI #107.
 1. Benjamin Moore & Co., product "FP04 Ultra-Spec HP Acrylic Metal Primer" or approved equal.
- B. Finish Coat: Waterborne acrylic epoxy, semi-gloss, (Gloss Level 5): MPI #15.
 1. Benjamin Moore & Co, product "V341 CoroTech Pre-Catalized Waterborne Epoxy Semi-Gloss" or approved equal.
 2. Up to a total of 4 trim colors may be selected.
 3. Number of Coats: Two.

2.4 PAINT PRODUCTS – CONCRETE MASONRY UNITS (CMU) SUBSTRATES

- A. Primer: Interior/Exterior Latex Block Filler, MPI # 4.
 1. Water-based, high-solids, emulsion coating formulated to bridge and fill porous surfaces of concrete masonry units in preparation for specified subsequent coatings.
 - a. Benjamin Moore & Co., product "571 Ultra-Spec Hi-Build Masonry Block Filler" or approved equal.
- B. Finish Coat: Latex, Interior, Institutional Low Odor/VOC, (Gloss Level 2): MPI #143.
 1. Benjamin Moore & Co., product "N537 BM Ultra Spec 500 Low Sheen Eggshell" or approved equal.
 2. Number of Coats: Two.
 3. Up to a total of 4 wall colors may be selected.

2.5 PAINT PRODUCTS – GYPSUM BOARD SUBSTRATES

- A. Primer Sealer, Interior, Institutional Low Odor/VOC: MPI #149.
 1. Benjamin Moore & Co, product "N534 Ultra Spec Waterborne 500 Primer Sealer" or approved equal.
- B. Finish Coat: 100% acrylic interior, MP #144.
 1. Benjamin Moore & Co., product "N537 BM Ultra Spec 500 Low Sheen Eggshell" or approved equal.
 2. Number of coats: Two.
 3. Up to a total of 4 wall colors may be selected.

2.6 PAINT PRODUCTS – WOOD TRIM

- A. Primer/Sealer: Alkyd primer/sealer formulated for use on interior wood trim, MPI #45.
 - 1. Benjamin Moore & Co., product "Fresh Start Undercoat and Primer Sealer 032" or approved equal.
- B. Finish Coat: Waterborne interior alkyd, semi-gloss finish (Gloss Level 5), MPI #157.
 - 1. Benjamin Moore & Co., product "Advance Waterborne Interior Alkyd Semi-Gloss 793" or approved equal.
 - 2. Number of Coats: Two.

2.7 PAINT PRODUCTS – CONCRETE FLOORING

- A. Primer: Clear acrylic epoxy primer/sealer formulated for use on interior concrete surfaces.
 - 1. Benjamin Moore & Co., product "INSL-X FLB-100 Tuffcrete Bonding Primer & Sealer" or approved equal.
- B. Finish Coat: 100% acrylic enamel coating designed for interior concrete surfaces, satin finish (Gloss Level 4).
 - 1. Benjamin Moore & Co., product "INSL-X Tough Shield Acrylic Floor Coating" or approved equal.
 - 2. Number of Coats: Two.

2.8 TRANSPARENT FINISHES – WOOD TRIM

- 1. Single component, oil modified polyurethane varnish for new or previously varnished or stained interior wood surfaces, semi-gloss finish (Gloss Level 6), MPI #56.
 - a. PPG Architectural, product "DEFT Interior Poly Gloss 350", or approved equal.
 - b. Number of Coats: Two.

2.9 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
 - 1. Owner may engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
 - 2. Testing agency will perform tests for compliance with product requirements.
 - 3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Gypsum Board: 12 percent.
 - 2. Concrete: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
 - 1. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
- E. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Furnish and lay suitable drop cloths in all areas where coating work is being done to protect floors and all other surfaces from damage during the work.
- B. At the completion of work in each area, remove all coating spots from all surfaces, including finish hardware. Do not use abrasive paper or abrasive cleaner on hardware.
- C. Follow manufacturer's written application and preparation instructions at each step for all three coats of paint and transparent finishes. Back prime and seal exterior wood products prior to installation.
- D. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.
- E. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. The Contractor shall remove and replace all finish hardware applied to doors except hinges and locks on exterior doors. Do not paint around hardware except on exterior doors where hardware will remain in place.
 - 2. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- F. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
- G. Remove incompatible primers on previously painted surfaces, and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- H. Concrete Substrates: Surface must be clean and free of dirt, chalk, wax, grease, rust or flaking paint. Remove dirt and chalk by power washing or scrubbing with warm soapy water followed by thorough rinsing with clean water. Remove wax with commercial wax stripper or solvent cleaner. Remove grease with oil and grease emulsifier. Remove rust by hand sanding vigorously or by conscientious power tool cleaning. Remove loose paint by scraping. Feather sand rough edges to ensure smooth finish coat. Glossy surfaces should be dulled by lightly sanding. Remove sanding dust before paint application. Spot prime any exposed substrate.
- I. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:
 - 1. SSPC-SP 3, "Power Tool Cleaning."
- J. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
- B. Use applicators and techniques suited for paint and substrate indicated.
- C. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
- D. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
- E. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- F. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- G. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- H. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

- I. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- J. Painting concrete floors: Apply by brush or roller. Allow 24 hours cure time prior to light foot traffic, and 5-7 days prior to heavy use.
- K. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 - 1. Paint the following work where exposed in equipment rooms:
 - a. HVAC ductwork, conduits and other metal utilities part of the walls, floor or ceilings.
 - b. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

END OF SECTION

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SECTION 22 00 00**PLUMBING****PART 1 - GENERAL****1.0 GENERAL PROVISIONS**

- A. The General Requirements, Division 01, and Bidding And Contract Requirements, Division 00, are hereby made a part of this Specification Section.
- B. Examine all drawings and all sections of the specifications and requirements and provisions affecting the work of this section.
- C. Refer to work in the following Specification Sections
 - 1. 22 00 00 PLUMBING

1.1 SCOPE OF WORK

- A. This project includes the replacement of 2 gas fire boilers in the Dover location (by HVAC). Plumbing scope of work shall include reconnecting gas piping and make up water to both locations. Selective demolition of existing systems shall be required including the existing gas drops and make up water connections. Gas will be provided for the Dover location from the utility Unitil Corp.
- B. The work under this section shall include the furnishing of all materials, labor, equipment and supplies and the performance of all operations to provide complete working systems. In general, the following items are specified under this section:
- C. Water Systems:
 - 1. Domestic (Potable) water piping system.
 - 2. Cross Connection Control-all Backflow Preventers.
 - 3. Non-Potable Water System for HVAC.
- D. Compressed Gas Systems:
 - 1. Natural gas Systems.
 - 2. Gas Piping from existing Utility meter to new boilers as shown in drawings.
 - 3. Extend all gas train vents to atmosphere.
 - 4. Gas Flue Piping: this contractor is responsible for supervision, licensure and permitting of gas flues $\geq 400,000$ BTU/hr. this includes all gas flues, listed chimney linings, metal and factory built chimney's, ventilation hoods used for exhausting combustion by-products and F-Vent systems. See HVAC drawings and 230000 specifications for more information.
 - 5. Final connection to all gas fired equipment includes valves, regulators, drip and dirt pockets, unions and necessary appurtenances.
- E. General:
 - 1. Testing and Cleaning of all piping systems
 - 2. Insulation.

3. Valves.
4. Fittings unions, flanges and couplings.
5. Service water connections for equipment provided under HVAC section.
6. Hangers, plates and inserts.
7. Cleaning, testing and disinfection of piping systems.
8. All supplementary steel for piping and equipment support.
9. Drilling for installation of inserts.
10. Operating and Maintenance Manuals
11. Shop Drawings
12. Record (As-Built) Drawings

F. Work of this section is generally shown on the Plumbing Drawings.

1.2 RELATED WORK

- A. Principal classes of Work related to the Work of this section are listed in the specification Table of Contents, and are specified to be performed under the indicated sections of the specifications. Refer to the indicated sections for description of the extent and nature of the indicated Work, and for coordination with related trades. This listing may not include all related Work items. Coordinate and schedule the Work of this section with that of all other trades.
- B. The following work is not included in this section and will be provided under other sections:
1. Painting, except as specified herein.
 2. Temporary light, power, water, heat, gas and sanitary facilities for use during construction and testing. Refer to Division 01, General Conditions.

1.3 DEFINITIONS

- A. As used in this section, the following items are understood to have the following meaning:
1. "Contractor or Subcontractor", unless otherwise qualified, shall mean the installer of the work specified under this section.
 2. "Furnish" shall mean purchase and deliver to the project site, complete with every necessary appurtenance.
 3. "Install" shall mean unload at the delivery point at the site and perform all work necessary to establish secure mounting and proper operation at the proper location in the project.
 4. "Provide" shall mean "Furnish" and "Install".
 5. "Work" shall mean all labor, materials, equipment, apparatus, controls, accessories and all other items required for a proper and complete installation.
 6. "Concealed" shall mean hidden from sight in chases, furred-in spaces, shafts, hung ceilings, embedded in construction or in a crawl space. Areas to be concealed as part of tenant alterations to the building shall also be considered in this definition.
 7. "Exposed" shall mean not installed underground or concealed as defined above.
 8. "Furnished by others" shall mean materials or equipment purchased under other sections of the general contract and installed by this section of the specifications by this trade Contractor.
 9. "Owners Representative" shall be the party responsible to make decisions regarding all contractual obligations in reference to the Scope of Work for the Owner.

10. *"Date of Substantial Completion"* shall indicate the date where the work has been formally accepted as evidenced by completed final punchlist or where the work has reached the stage that the Owner obtains beneficial use and commences utilization of the installed systems for business or occupancy purposes. The General Requirements, Division 01, shall supercede this definition where specifically defined.
11. *"Piping"* shall mean, in addition to pipe or tubing, all fittings, flanges, unions, valves, strainers, drains, hangers and other accessories relative to such piping.

1.4 CODES, REFERENCES AND PERMITS

- A. Materials, installation of systems and equipment provided under this section shall be done in strict accordance with New Hampshire Department of Public Safety Codes, Department of Environmental Protection, State Building Code BCR 303, with the IBC 2009 and any other Codes and Regulations having jurisdiction including but not limited to:
1. New Hampshire State Plumbing Code (BCR 304, IPC 2009)
 2. State and Local Building Codes and Presiding State Energy Code
 3. All applicable NFPA Standards
 4. Occupational Safety and Health Administration (OSHA)
 5. Underwriters' Laboratories, Inc. (UL)
- B. Unless otherwise specified or indicated, materials, workmanship and equipment performance shall conform with the latest governing edition of the following standards, codes, specifications, requirements, and regulations, except when more rigid requirements are specified or are required by applicable codes but not limited to:
1. American National Standards Institute (ANSI)
 2. American Society of Mechanical Engineers (ASME)
 3. American Society of Testing and Materials (ASTM)
 4. American Water Works Association (AWWA)
 5. Factory Mutual System (FM)
 6. Institute of Electrical and Electronic Engineers (IEEE)
 7. Cast Iron Soil Pipe Institute (CISPI)
 - a. All cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and be listed by NSF International.
 - b. Standard, Stainless-Steel Shielded, Couplings: Standard Couplings shall conform to CISPI 310 and ASTM C 1277. Shield Assemblies shall consist of a stainless steel bi-directional corrugated shield; stainless-steel bands and tightening devices; and an ASTM C 564, rubber sleeve. Couplings shall bear the NSF Trademark, and be manufactured in the USA.
 8. Plumbing and Drainage Institute (PDI)
 9. National Association of Plumbing-Heating Cooling Contractors (NAPHCC)
 10. National Electrical Manufacturer's Association (NEMA)
 11. National Fire Protection Association (NFPA)
 12. National Sanitation Foundation (NSF)
- C. 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.

- D. ASHRAE/IESNA Compliance: Fabricate and label fuel-fired, domestic-water heaters to comply with ASHRAE/IESNA 90.1.
- E. ASME Compliance:
 - 1. Where ASME-code construction is indicated, fabricate and label commercial, water heater storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
 - 2. Where ASME-code construction is indicated, fabricate and label commercial, finned-tube, water heaters to comply with ASME Boiler and Pressure Vessel Code: Section IV.
- F. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61, "Drinking Water System Components - Health Effects."
- G. UL Compliance: Comply with UL 778 for motor-operated water pumps.
- H. All pipe and fittings shall be manufactured in the United States.
- I. Codes, laws and standards provide a basis for the minimum installation criteria acceptable. The drawings and specifications illustrate the scope required for this project, which may exceed minimum codes, laws and standards.
- J. Give all notices, file all plans, obtain all permits and licenses, and obtain all necessary approvals from authorities having jurisdiction.. Deliver all certificates of inspection to the authorities having jurisdiction. No work shall be covered before examination and approval by the Owner's Representative, inspectors, and authorities having jurisdiction. Replace imperfect or condemned work to conform to requirements, satisfactory to Owner's Representative, and without extra cost to the Owner. If work is covered before inspection and approval, this Contractor shall pay costs of uncovering and reinstalling the covering, whether it meets contract requirements or not.

1.5 GENERAL REQUIREMENTS

- A. Nameplates
 - 1. Each major component of equipment shall have the manufacturer's name, address, type or style, model or serial number, and catalog number on a plate secured to the equipment.
- B. Equipment Guards
 - 1. Belts, pulleys, chains, gears, couplings, projecting setscrews, keys, and other rotating parts so located that any person may come in close proximity thereto shall be completely enclosed or guarded. High-temperature equipment and piping so located as to endanger personnel or create a fire hazard shall be guarded or covered with insulation of type specified for service.

1.6 OBTAINING INFORMATION

- A. Obtain from the manufacturer the proper method of installation and connection of all equipment that is to be furnished and installed. Obtain all information that is necessary to facilitate the work and to complete the project.

- B. Prior to performing any new work, uncover, locate and determine the routing, size, material and direction of slope of all existing piping system to which connection is to be made. The invert elevation of the existing drains and sewers must be established prior to any slab cutting for new piping systems.

1.7 MATERIAL AND EQUIPMENT STANDARDS

- A. Where equipment or materials are specified with the name of a manufacturer, such specification shall be deemed to be used for the purpose of establishing a standard for that particular item. No equipment or material shall be used unless previously approved by the Owner's Representative.
- B. Substitutions may be offered for review provided the material, equipment or process offered for consideration is equal in every respect to that indicated or specified. The request for each substitution must be accompanied by complete specifications together with drawings or samples to properly appraise the materials, equipment or process. Highlight and list all applicable specification requirements, which the substituted material deviates from.
- C. If a substitution of materials or equipment in whole or in part is made, bear the cost of any changes necessitated by any other trade as a result of said substitution.
- D. All materials, equipment and accessories provided under this section shall be new and unused products of recognized manufacturers as approved.

1.8 SUBMITTALS

- A. Conform to the requirements of Division 01, General Conditions, for schedule and form of all submittals unless specifically noted otherwise in this section. Coordinate this submittal with submittals for all other finishes. Shop drawings and design layouts shall be prepared by licensed installing Contractors and shall note the name(s), license number(s) and license expiration dates(s) of the Contractor(s) installing the Plumbing work.
- B. Definitions:
1. Shop Drawings are information prepared by the Contractor to illustrate portions of the work in more detail than indicated in the Contract Documents.
 2. Acceptable Manufacturers: The mechanical design for each product is based on the single manufacturer listed in the schedule or shown on the drawings. In Part 2 of the specifications, certain Alternate Manufacturers are listed as being acceptable. In addition, the MATERIAL AND EQUIPMENT STANDARDS paragraph potentially allows for substitutions as being acceptable. These are acceptable only if, as a minimum, they:
 - a. Meet all performance criteria listed in the schedules and outlined in the specifications.
 - b. Fit within the available space it was designed for, including space for maintenance and component removal, with no modification to either the space or the product. Clearances to walls, ceilings, and other equipment will be at least equal to those shown on the design drawings. The fact that a manufacturer's name appears as acceptable shall not be taken to mean the Engineer has determined that the manufacturer's products will fit within the available space – this determination is solely the responsibility of the Contractor.

- c. Products must adhere to all architectural considerations including, but not limited to; being of the same color as the product scheduled or specified and fitting within the architectural enclosures and details.

C. Submittal Procedures, Format and Requirements

1. Review submittal packages for compliance with Contract Documents and then submit to Owner's Representative for review. Submit enough sets of shop drawings such that, after review, two (2) sets will be kept by the reviewer, with only the remaining sets returned with reviewer's marks and comments.
2. Each Shop Drawing shall indicate in title block, and each Product Data package shall indicate on cover sheet, the following information:
 - a. Title
 - b. Equipment number
 - c. Name and location of project
 - d. Names of Owner, Engineer and Seller
 - e. Names of manufacturers, suppliers, vendors, etc.
 - f. Date of submittal
 - g. Whether original submittal or resubmitted
3. Shop Drawings showing manufacturer's product data shall contain detailed dimensional drawings (minimum ¼ inch = 1 foot scale) including plans and sections (where physical clearance could be an issue). Provide larger scale details as necessary.
4. Submit accurate and complete description of materials of construction, manufacturer's published performance characteristics, sizes, weights, capacity ratings (performance data, alone, is not acceptable), electrical requirements, starting characteristics, wiring diagrams, and acoustical performance for complete assemblies. Drawings shall clearly indicate location (terminal block or wire number), voltage and function for all field terminations, and other information necessary to demonstrate compliance with all requirements of Contract Documents.
5. Provide Shop Drawings showing details of piping connections to all equipment. If connection details are not submitted and connections are found to be installed incorrectly, this Contractor shall reinstall them within the original contract price.
6. Provide complete data for all auxiliary services and utilities required by submitted equipment.
7. Provide a complete description of all controls and instrumentation required including electrical power connection drawing for all components and interconnection wiring to starters, detailed information on starters, control diagrams, termination diagrams, and all control interfaces with a central control system.
8. Provide installation and erection information including; lifting requirements, and any special rigging or installation requirements for all equipment.
9. The Owner's Representative shall approve all materials before commitment for materials is made.

D. Specifications and Schedule Compliance Statement

1. The manufacturer shall submit a point by point statement of compliance with each specification criteria listed in each paragraph for those submittals listed in Paragraph E: Product Data that are noted with an asterisk (*).
2. The statement of compliance shall consist of a list of all paragraphs (line by line) identified in Part 2 and applicable Part 3 of the specification for which the submitted product in the opinion of the manufacturer complies, deviates, or does not meet.

3. Where the proposed submittal complies fully, the word "comply" shall be placed opposite the paragraph number.
 4. Where the proposed submittal does not comply, or accomplishes the stated function in a manner different from that described, a full description of the deviation shall be provided.
 5. Verify each field of the associated schedule where associated technical data is presented on the drawings. Where the submitted material does not "comply" provide the value the submitted equipment will achieve based upon the specified conditions.
 6. Where a full description of a deviation is not provided, it shall be assumed that the proposed system does not comply with the paragraph in question and the product will be rejected.
 7. Submissions which do not include a point by point statement of compliance as specified shall be disapproved.
- E. Product Data: Submit complete manufacturer's product description and technical information including:
1. Piping - General. A submittal is required for each pipe class listed in these specifications.
 2. Unions and Flanges
 3. Pipe Joint Materials
 4. Gauges
 5. Hangers, Inserts and Supports
 6. Valves
 7. Backflow Preventers
 8. Insulation
 9. O&M table of contents
 10. Submit All Related Valves, Fittings, Unions, Flanges And Couplings
 11. For welded systems, submit weld coupons
- F. Submit shop drawings and product data grouped to include complete submittals of related systems, products and accessories in a single submittal.
1. Do not submit multiple product information in a single bound manual.
 2. Three-ring binders shall not be accepted.
- G. Deviations
1. Concerning deviations other than substitutions, proposed deviations from Contract Documents shall be requested individually in writing whether deviations result from field conditions, standard shop practice, or other cause. Submit letter with transmittal of Shop Drawings which flags the deviation to the attention of the Owner's Representative.
 2. Without letters flagging the deviation to the Owner's Representative, it is possible that the Engineer may not notice such deviation or may not realize its ramifications. Therefore, if such letters are not submitted to the Owner's Representative, the Seller shall hold the Engineers, his consultants and the Owner harmless for any and all adverse consequences resulting from the deviations being implemented. This shall apply regardless of whether the Engineer has reviewed or approved shop drawings containing the deviation, and will be strictly enforced.
 3. Approval of proposed deviations, if any, will be made at discretion of Engineer.
- H. Schedule: Incorporate shop drawing review period into construction schedule so that Work is not delayed. This Contractor shall assume full responsibility for delays caused by not incorporating the following shop drawing review time requirements into his project

schedule. Allow at least ten (10) working days, exclusive of transmittal time, for review each time shop drawing is submitted or resubmitted with the exception that twenty (20) working days, exclusive of transmittal time are required when more than five (5) shop drawings of a single trade are received in one (1) calendar week.

I. Responsibility

1. Intent of Submittal 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 of this and other sections. Work shall comply with approved submittals to extent that they agree with Contract Documents. Submittal review shall not diminish responsibility under this Contract for dimensional coordination, quantities, installation, wiring, supports and access for service, nor the shop drawing errors or deviations from requirements of Contract Documents. The Engineer's noting of some errors while overlooking others will not excuse the Plumbing Contractor from proceeding in error. Contract Documents requirements are not limited, waived nor superseded in any way by review.
2. Inform Contractors, manufacturers, suppliers, etc. of scope and limited nature of review process and enforce compliance with contract documents.

J. In the event that the Shop Drawings for any of the products specified herein are not provided:

1. Furnish and install all materials and equipment herein specified in complete accordance with these specifications.
2. If materials and/or equipment are installed that are not in complete accordance with these specifications, remove this material and/or equipment. Replace material and/or equipment with material and/or equipment that are in complete accordance with these specifications, at the direction of the Owner's Representative.
3. Removal and replacement of materials and/or equipment that is not in complete compliance with these specifications shall be done at no extra cost to the Owner.
4. Removal and replacement of materials and/or equipment that is not in complete compliance with these specifications shall not be allowed as a basis for a claim of delay of completion of the Work.

K. Mark dimensions and values in units to match those specified.

L. Submit Material Safety Data Sheets (MSD) on each applicable product with submittal.

1.9 RECORD DRAWINGS

- A. Refer to Division 01, General Conditions, for record drawings and procedures to be provided under This section, unless specifically noted otherwise in this section.
- B. Record Drawings (red-line drawings) will be updated daily for review with the monthly requisition. The record drawing shall be an accurate depiction of the systems as completed, including dimensions (vertical/horizontal of concealed components off fixed building elements).
- C. Maintain complete and separate set of prints of Contract Drawings at job site at all times and record work completed and all changes from original Contract Drawings clearly and accurately including work installed as a modification or addition to the original design.

- D. At completion of work prepare a complete set of record drawings on AutoCAD showing all systems as actually installed. The architectural background AutoCAD files will be made available for the Contractor's copying, at his expense, to serve as backgrounds for the drawings. Transfer changes from field drawings onto AutoCAD drawings and submit copy of files and three (3) sets of prints to Owner's Representative for comments as to compliance with this section. CAD layering as established by the A&E design team shall be maintained with any and all changes done by the Contractor.
- E. The Architect and Engineer are not granting to the Contractor any ownership or property interest in the CADD Drawings by the delivery of the CADD Disks to the Contractor. The Contractor's rights to use the CADD disks and the CADD Drawings are limited to use for the sole purpose of assisting in the Contractor's performance of its contractual obligations under its contract with respect to the Project. The Architect and Engineer are granting no further rights. Any reuse or other use by the Contractor will be at the Contractor's sole risk and without liability to the Architect and Engineer. The Contractor hereby waives and releases any losses, claims, damages, liabilities of any nature whatsoever, and costs (including attorney fees) arising out of, resulting from, or otherwise related to the use of the CADD Disks and CADD Drawings by the Contractor. The Contractor, to the maximum extent permitted by law, hereby agrees to indemnify, defend and hold the Architect and Engineer harmless from all losses, claims, damages, liabilities, and costs (including attorney fees) arising out of, resulting from, or otherwise related to the use of the CADD Disks and CADD Drawings by the Contractor.
- F. Record Drawings, shall show "as-built" condition of details, sections, riser diagrams, control changes and corrections to schedules. Schedules shall show actual manufacturer and model numbers of final equipment installation.
- G. Submit the record set for approval by the engineer a minimum of four (4) weeks prior to seeking the permanent certificate of occupancy.

1.10 OPERATION AND MAINTENANCE DATA

- A. Commence preparation of the Operating and Maintenance (O&M) Manuals immediately upon receipt of "Approved" or "Approved as Noted" shop drawings and submit each section within one (1) month. The final submission shall be no later than two (2) months prior to the projected date of Substantial Completion of the Project.
- B. Each O&M document shall include the manufacturer's web address for equipment specific O&M information for Internet access by the Owner.
- C. The manual shall consist of three (3) sets of manuals and include three (3) sets of CDs, which shall contain the scanned content of the entire manual. The manual shall highlight the actual equipment used and not be a master catalog of all similar products of the manufacturer. The manual shall be submitted for review prior to creation of the CDs.
- D. The Manual shall contain the following:
 - 1. Operations Manual
 - a. Systems description including all relevant information needed for day-to-day operations and management including start-up and shut-down instructions.
 - b. Systems description including all relevant information needed for day-to-day operations and management.

- c. Wiring diagrams, schematics, logic diagrams and sequence of operations that accurately depict the controls system.
2. Maintenance Manual
 - a. Maintenance and Lubricating Chart: furnish three (3) sets of charts indicating equipment tag number, location of equipment, equipment service, greasing and lubricating requirements, lubricants and intervals of lubrication. One (1) chart shall be framed under glass and mounted where directed by the Owner's Representative.
 - b. Valve and System Chart: correspond to valve tags, refer to paragraph identification systems.
 - c. Recommend List of Spare Parts: furnish two (2) typed sets of instructions for ordering spare parts with sectional views of the fittings or equipment showing parts numbered or labeled to facilitate ordering replacements. Each set shall include a list with itemized prices of those parts recommended to be kept on hand as spares, as well as the name and address of where they may be obtained.
 - d. Provide copy of all warranty information with associated date of substantial completion (Commencement of Warranty) and end date of coverage all components / subsystems specifically included and excluded.
 3. Provide O&M manuals for each of the following:
 - a. Backflow Preventers

1.11 WARRANTIES

- A. Submit manufacturer's standard replacement warranties for material and equipment furnished under this section. Such warranties shall be in addition to and not in lieu of all liabilities which the manufacturer and the Contractor may have by law or by provisions of the Contract Documents.
- B. All materials, equipment and work furnished under this section shall be guaranteed against all defects in materials and workmanship for a minimum period of one-year (1) commencing with the Date of Substantial Completion. Any failure due to defective material, equipment or workmanship which may develop, shall be corrected at no expense to the Owner including all damage to areas, materials and other systems resulting from such failures.
- C. Guarantee that all elements of each system meet the specified performance requirements as set forth herein or as indicated on the drawings.
- D. Upon receipt of notice from the Owner of the failure of any part of the systems during the warranty period, the affected parts shall be replaced. Any equipment requiring excessive service shall be considered defective and shall be replaced.

1.12 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

- A. It is the intention of the specifications and drawings to call for complete, finished work, tested and ready for continuous operation. Any apparatus, appliance, material or work not shown on the drawings, but mentioned in the specifications or vice-versa, or any incidental accessories necessary to make the work complete in all respects and ready for

operation, even if not particularly specified, shall be provided without additional expense to the Owner.

- B. The drawings are generally diagrammatic. The locations of all items that are not definitely fixed by dimensions are approximate only. The exact locations must be determined at the project and shall have the approval of the Owner's Representative before being installed. Follow drawings, including his shop drawings, in laying out work and shall check the drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions. Where space conditions appear inadequate, notify the Owner's Representative before proceeding with the installation. Without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work.
- C. Any requests for information (RFI) for resolving an apparent conflict or unclarity, or a request for additional detail, shall include a sketch or equivalent description of proposed solution.
- D. Size of pipes and methods of running them are shown, but it is not intended to show every offset and fitting, nor every structural difficulty that may be encountered. To carry out the true intent and purpose of the drawings, all necessary parts to make complete approved working systems ready for use, shall be furnished without extra charge. All work shall be installed in an approved workmanlike manner.

1.13 INSPECTION OF SITE CONDITIONS

- A. Prior to submission of bid, visit the site and review the related construction documents to determine the conditions under which the Work has to be performed. Report, in writing to the Owner's Representative, any conditions which might adversely affect his work.

1.14 SURVEY AND MEASUREMENTS

- A. Base all required measurements, horizontal and vertical, from referenced points established WITH the Owner's Representative and be responsible for correctly laying out the Work required under this section of the specification.
- B. In the event of discrepancy between actual measurements and those indicated, notify the Owner's Representative in writing and do not proceed with the related work until instructions have been issued.

1.15 DELIVERY, STORAGE AND HANDLING

- A. No materials shall be delivered or stored on site until corresponding Shop Drawings have been approved.
- B. All manufactured materials shall be delivered to the site in original packages or containers bearing the manufacturers labels and product identification.
- C. Protect materials against dampness. Store off floors, under cover and adequately protected from damage.
- D. Inspect all plumbing equipment and materials, upon receipt at the job site, for damage and conformance to approved shop drawings.

1.16 PROTECTION OF WORK AND PROPERTY

- A. Be responsible for the care and protection of all work included under this section until the completion and final acceptance of this Contract.
- B. Protect all equipment and materials from damage from all causes including, but not limited to, fire, vandalism and theft. All materials and equipment damaged or stolen shall be repaired or replaced with equal material or equipment at no additional cost to the Owner.
- C. Protect all equipment, outlets and openings with temporary plugs, caps and covers. Protect work and materials of other trades from damage that might be caused by work or workmen under this section and make good damage thus caused.
- D. Damaged materials are to be removed from the site; no site storage of damaged materials will be allowed.

1.17 SUPERVISION

- A. Supply the service of a competent Supervisor with a minimum of five (5) years' experience in Plumbing Construction Supervision who shall be in charge of the Plumbing work at the site.

1.18 SAFETY PRECAUTIONS

- A. Life safety and accident prevention shall be a primary consideration. Comply with all of the safety requirements of the Owner and OSHA throughout the entire construction period of the project.
- B. Furnish, place and maintain proper guards and any other necessary construction required to secure safety of life and/or property.

1.19 SCHEDULE

- A. Construct work in sequence under provisions of Division 01 and as coordinated with the Owner's Representative.

1.20 HOISTING, SCAFFOLDING AND PLANKING

- A. The work to be done under this section of the specifications shall include the furnishing, set-up and maintenance of all derricks, hoisting machinery, cranes, helicopters, scaffolds, staging and planking as required for the work.

1.21 CUTTING AND PATCHING

- A. Include all coring, cutting, patching, and fireproofing necessary for the execution of the work of this section. Structural elements shall not be cut without written approval of the Architect. This Contractor shall be responsible for taking all precautions required to identify hidden piping, conduits, etc. before any core drilling and/or cutting of slabs commences, including X-raying the affected slabs. Provide fire stopping to maintain the fire rating of the fire resistance-rated assembly. All penetrations and associated fire

stopping shall be installed in accordance with the fire stopping manufacturer's listed installation details and be listed by UL or FM.

- B. When core drilling and/or cutting of the slab, this Contractor shall be responsible for taking all precautions for identifying hidden piping, conduits, etc. before core drilling proceeds, include x-raying the slabs
- C. All work shall be fully coordinated with all phases of construction, in order to minimize the requirements for cutting and patching.
- D. Form all chases or openings for the installation of the work of this section of the specifications, or cut the same in existing work and see that all sleeves or forms are in the work and properly set in ample time to prevent delays. Be responsible that all such chases, openings, and sleeves are located accurately and are of the proper size and shape and consult with the Owner's Representative and all other trades concerned in reference to this work. Confine the cutting to the smallest extent possible consistent with the work to be done. In no case shall piers or structural members be cut without the approval of the Owner's Representative.
- E. Fit around, close up, repair, patch, and point around the work specified herein to match the existing adjacent surfaces and to the satisfaction of the Owner's Representative.
- F. Fill and patch all openings or holes left in the existing structures by the removal of existing equipment which is part of this section of the specifications.
- G. All of this work shall be carefully done by workmen qualified to do such work and with the proper and smallest tools applicable.
- H. Assume any cost caused by defective or ill-timed work required by this section of the specifications.
- I. When, in order to accommodate the work required under this section of the specifications, finished materials of other trades must be cut or fitted, furnish the necessary drawings and information to the trades whose materials must be cut or fitted.

1.22 SLEEVES, INSERTS AND ANCHOR BOLTS

- A. Coordinate with other trades the location of and maintaining in proper positions, sleeves, inserts and anchor bolts to be supplied and/or set in place under this section of the specifications. In the event of incorrectly located preset sleeves, inserts and anchor bolts, etc., all required cutting and patching of finished work shall be done under this section of the specifications.
- B. All pipes passing through floors, walls, ceilings or partitions shall be provided with fire stopping to maintain the fire rating of the structure. All penetrations and associated fire stopping shall be installed in accordance with the fire stopping manufacturer's listed installation details. Provide sleeves for all penetrations where required by the listed detail, for the penetration of all mechanical room floors and where specifically required on the drawings.
- C. Field drilling (core drilling), when required, shall be performed under this section of the specifications, after receipt of approval by the Owner's Representative.

1. When coring cannot be avoided, provide 1/4 inch pilot hole prior to coring. When coring through floor or slab, verify location of core on floor below and protect and piping, ductwork, wiring, furniture, personnel, etc., below the location of the core.

1.23 SUPPLEMENTARY STEEL, CHANNELS AND SUPPORTS

- A. Provide all supplementary steel, factory fabricated channels and supports required for the proper installation, mounting and support of all Plumbing equipment, piping, etc., required by the specifications.
- B. Supplementary steel and factory fabricated channels shall be firmly connected to building construction in a manner approved by the Owner's Representative as shown on the drawings or herein specified.
- C. The type and size of the supporting channels and supplementary steel shall be determined by the Contractor and shall be of sufficient strength and size to allow only a minimum deflection in conformance with the manufacturer's requirements for loading.
- D. All supplementary steel and factory fabricated channels shall be installed in a neat and workmanlike manner parallel to the walls, floors and ceiling construction. All turns shall be made with 90 degree and 45 degree fittings, as required to suit the construction and installation conditions.
- E. All supplementary steel including factory fabricated channels, supports and fittings shall be approved, shall be galvanized steel, aluminum or stainless steel where exposed or subject to rust producing atmosphere and shall be manufactured by Unistrut, H-strut, Powerstrut or approved equal.

1.24 HAZARDOUS MATERIALS

- A. Dispose of all hazardous materials in accordance with Federal and State laws. All handling shall conform to EPA requirements. A uniform hazardous waste manifest shall be prepared for all disposals and returned with all applicable signoffs prior to application for final payment. Provide breakout cost for this scope.
- B. Removed equipment or fluids containing any hazardous materials such as ethylene glycol, or oil shall be recycled by a licensed facility approved by the Owner's Representative.
- C. Where it has been identified that asbestos-containing material exists within the scope limits, refer to the Asbestos Abatement specification section for requirements. Where insulation is removed, provide new insulation (type and thickness as specified in this section). Where scope is not defined, provide unit prices with bid for all pipe and sizes involved.

1.25 ACCESSIBILITY

- A. All work provided under this section of the specification shall be installed so that parts requiring periodic inspection, maintenance and repair are accessible. Work of this trade shall not infringe upon clearances required by equipment of other trades, especially code required clearances to electrical gear. Minor deviations from the drawings may be made

to accomplish this, but changes of substantial magnitude shall not be made prior to written approval from the Owner's Representative.

1.26 WELDING QUALIFICATIONS

- A. Piping shall be welded in accordance with qualified procedures using performance qualified welders and welding operators. Procedures and welders shall be qualified in accordance with ASME BPV IX. Welding procedures qualified by others, and welders and welding operators qualified by another employer, may be accepted as permitted by ASME B31.1. The Owner's Representative shall be notified twenty-four (24) hours in advance of tests, and the tests shall be performed at the work site if practicable. Welders or welding operators shall apply their assigned symbols near each weld they make as a permanent record. Structural members shall be welded in accordance with Section 05055 WELDING STRUCTURAL.
- B. A fire watchman with an approved fire extinguisher shall be posted at the site of the welding work, during that work, and for a minimum of thirty (30) minutes after the work is completed, to see that sparks or drops of hot metal do not start fires.

1.27 ELECTRICAL WORK

- A. All electrical apparatus and controls furnished, and the installation thereof, as a part of the Plumbing work, equipment, and controls shall conform to applicable requirements under Division 26 - Electrical.

1.28 PROJECT CLOSEOUT

- A. Construction Observations By The Engineer
 1. The engineer shall make progress site visits during construction, and one substantial completion (punchlist) site visit for determining substantial completion.
 2. The Trade Contractors and the General Contractor are required to inspect their own work and make any corrections to the work to comply with the specifications and the contract documents. It is not the responsibility of the engineer to develop lists of incomplete work items.
 3. Progress Site Visits
 - a. The purpose of the progress site visit by the engineer is to observe if the work is proceeding in accordance with the contract documents.
 - b. The engineer will prepare a field report which will note in general the work completed since the last observation visit, work found not to be in accordance with the contract documents and work not corrected since the previous observation visit.
- B. Substantial Completion
 1. When the Work under this section is substantially complete, submit written notice with a detailed list of items remaining to be completed or corrected and a schedule of when each remaining work item will be completed. Should the engineer determine the list of remaining work does not constitute substantial completion the engineer will notify the Architect and/or Owner and he will not make a substantial completion site visit.

2. The following items shall be completed prior to the written request for substantial completion site visit:
 - a. Certification of successful operation of all systems.
 - b. Training of the Owner's personnel in the operation of the systems.
 - c. Record Drawings in accordance with the contract specifications.
 - d. Operation and Maintenance manuals.
 - e. Testing reports.
 - f. Balancing reports.
 - g. Manufacturers certificates of approvals.
 - h. Emergency contact list for reporting of malfunctioning equipment during the warranty period.
 - i. Contractors Project Completion certificate in accordance with the building code requirements.
3. Should the Engineer, during the substantial completion visit, observe that the Work is substantially complete, s/he will provide a written listing of the observed deficiencies referred herein as the Punchlist. The Punchlist will provide for a place for the Contractor and General Contractor to sign off and date each item individually indicating that the observed deficiency item has been corrected.
4. Should the Engineer, during the substantial completion site visit, observe that the Work is not substantially complete, s/he will provide, a written list of the major deficiencies and a reason for the work not being considered substantially complete.
5. If the work is found not to be substantially complete then the engineer shall be reimbursed for his time to reobserve the work. A reobservation fee shall be charged to the Contractor through the contractual agreement for any further observations by the engineer.
6. Remedy all deficiencies listed in the punchlist within the time frame required by the contract.

C. Engineer's Construction Completion Certification

1. Where required by the applicable code, the Engineer's Construction Completion Certification will be issued by NV5 when all life safety and health related issues are complete, all required functional tests are complete and all reports are complete. The following is a minimum listing of the required systems to be tested with reports generated indicating they are complete and ready for use:
 - a. Water Distribution and Supply Pressure Test
 - b. Gas Distribution Pressure Test
 - c. Disinfection Reports
 - d. Backflow Preventer Tests
 - e. Submit compaction reports for all piping systems where backfill and compaction is completed under the Plumbing Contract
2. There shall be NO outstanding items identified on the punchlist for scope within any of these categories.

D. Final Completion

1. The following items shall be submitted prior to the written request for Final completion:
 - a. Revised Substantial Completion items to be resubmitted in accordance with the review process comments.
 - b. Warranties commencing the date of Substantial completion
 - c. Individual Signed and dated Punchlist acknowledging completion of all punchlist items

2. When all of the punchlist work items are complete and resolved and the work is ready for final observation site visit. The signature lines for completion of each punchlist item shall be signed by the Contractor indicating the work is complete and signed by the General Contractor indicating s/he has inspected the work and found it to be complete. Should the Engineer find the work to be finally complete and all Punchlist items are complete the Engineer will make a recommendation to the Architect or Owner. If the Engineer has found the punchlist work to be incomplete during final inspection a written listing of the observed deficiencies will be prepared by the Engineer.

E. Contractor's Project Completion Certificate

1. Upon completion of work and prior to request for Certificate of Occupancy, each Trade Contractor and the General Contractor shall issue a certificate stating that work has been installed generally consistent with construction documents and all applicable codes. NV5 can furnish a blank Contractor's certificate form upon request. The certificate shall certify:
 - a. Execution of all work has been installed in accordance with the approved construction documents.
 - b. Execution and control of all methods of construction was in a safe and satisfactory manner in accordance with all applicable local, state and federal statutes and regulations.
2. The certificate shall include the following information:
 - a. Project.
 - b. Permit Number.
 - c. Location.
 - d. Construction Documents.
 - e. Date on Plans and specifications submitted for approval and issuance of the Building Permit.
 - f. Addendum(a) and Revision Dates.
3. The certificate shall be signed by the Contractor and include the following:
 - a. Signature.
 - b. Date.
 - c. Company.
 - d. License Number.
 - e. License Expiration Date.

PART 2 - PRODUCTS

2.0 PIPE, FITTINGS AND JOINTS - GENERAL

A. PIPE MATERIALS SPEC INDEX

SERVICE	CODE	MAXIMUM SERVICE OPERATING LIMITS		PIPE CLASS	PIPE MATERIAL
		(PSIG)	TEMPERATURE (°F)		
Domestic Cold Water	CW	100	250	A10	Copper
Non-Potable Water	NPW	100	250	A10	Copper
Gas (Natural)	G	50	70	A11	C. Steel
Gas Vent	GV	50	70	A11	C. Steel
Indirect Waste (above ground)	IW	Gravity	80	A10	Copper
Alternative Pipe Material - Water	Substitute for A-10 Piping	100	250	A20	Copper, ProPress Viega System

General Pipe Spec Notes:

1. Each valve type shall be the product of a single manufacturer. Each system shall be provided with valves as required by code and shown on the drawings and shall be installed to facilitate operation, replacement and repair.
2. Provide access panels for concealed valves behind non-removable ceilings or walls.
3. Provide shut-off valves on supply piping to individual pieces of equipment.
4. Provide pipe dope, Teflon tape, wax rings, neoprene gaskets and other jointing compounds as required by best standard practice and only on service as recommended by manufacturer.
5. Apply putties and jointing compounds for plumbing fixtures and trim as recommended by manufacturers.
6. Valves on insulated piping systems shall be equipped with extended handles to accommodate insulation thickness.
7. All piping insulation and materials installed in return air plenums shall be plenum rated. Thermoplastic piping systems are hereby prohibited in return air plenums.

PIPE CLASS A10	Various Systems Water Piping	
Item	1/2 INCH TO 2 INCHES	2 1/2 INCHES AND LARGER
<p>All pipe, fittings, and valves used in this distribution system and installed after January 4, 2014 must comply with the new Federal Mandate known as the "Reduction of Lead in Drinking Water Act 2014". Therefore, after the enactment date of 1/4/14, all products installed must comply. Any product pipe, fittings or valve installed after the enactment date that does not comply shall be removed and changed by this contractor at his/her own expense to comply with the Federal Law.</p>		
Pipe	Seamless copper water tube, drawn temper, Type L. ASTM B-88. See Note 1.	Seamless copper water tube, drawn temper, Type L. ASTM B-88. See Notes 2 & 5.
Fittings	Wrought copper, solder-joint. ASME B16.22 Press Connect Fittings: Copper and Bronze fittings shall conform to the material requirements of ASME B16.18 or ASME B16.22. Fittings shall also conform to ASME B16.51, ICC LC 1002, IAPMO PS 117, NSF 61, and NSF 61-G or NSF 372. Reference page 38-39.	Ductile iron coupling with copper alkyd enamel paint coating, ASTM A-536. Grade "P" Fluoroelastomer, "EHT", or "EHP" EPDM elastomer gasket rated -30F to 250F, ASTM D-2000. Equal to Grinnell Style 640 or 672 or Victaulic Style 607 with "P" Fluoroelastomer gasket coupling. ASTM B-75 or ASTM B-152 copper alloy fittings or ASTM B-584 grooved end cast bronze fittings per UNS C89836 or C92200 and C89833.
Joints	ASTM solder filler material shall be lead free to comply with the federal mandate of 2014 ASTM B-813 liquid or paste flux. Soldering procedures shall comply with ASTM B-828.	Rolled groove prepared and assembled in accordance with manufacturer instructions.
Mechanical joints	Cast copper alloy unions, hexagonal stock with ball-and-socket joint, solder joint ends. ASME B16.18.	ANSI Class 150 flange adapter equal to Grinnell Model 61 or Victaulic Style 641 for connections to flanged equipment. ANSI B16.1 dimensions.
Valves	Valves in the interior domestic water piping systems (cold water, hot water, and hot water return) shall be as manufactured by Apollo, Watts, Milwaukee, Nibco, Conbraco, or Grinnell.	
Ball	All bronze, lead free, 2 piece, full port, stainless steel ball and stem, PTFE seats, solder end connections. 600 PSIG WOG. Watts LF-B6080G2, Apollo 77CLF-240 or approved equal.	Class 125, cast iron body, FDA epoxy coated. Full port, flanged ends, stainless steel ball and stem. ANSI B16.1 flange dimensions. Watts G-4000-FDA series, Apollo 18V.
Drain	All bronze, 2 piece, RPTFE seats, thread x solder end connections. 600 Psig WOG. Apollo 70LF-100-HC, Milwaukee, Watts. Hose thread adapter with cap and chain. Provide hose end vacuum breaker to be lead free.	
Strainers	Bronze body, threaded or solder ends to suit, stainless steel screen, 400 pound WOG. Apollo 59LF series	

PIPE CLASS A10		Various Systems Water Piping	
Item	1/2 INCH TO 2 INCHES	2 1/2 INCHES AND LARGER	
<p>All pipe fittings and valves used in this distribution system and installed after January 4, 2014 must comply with the new Federal Mandate known as the "Reduction of Lead in Drinking Water Act 2014". Therefore after the enactment date of 1/4/14, all products installed must comply. Any product pipe fittings or valve installed after the enactment date that does not comply shall be removed and changed by this contractor at his/her own expense to comply with the Federal Law.</p>			
Pressure Reducing Valve	Control Valve, Apollo A127LF, Pilot Operated. Watts LF-M115, CLA-VAL. Victaulic Series 972. All Valves to be lead free		
<p>Notes:</p> <ol style="list-style-type: none"> Contact between dissimilar metals shall be made with di-electric couplings or di-electric flanges. Contact between ferrous and stud bolts and bronze flanges shall be electrically insulated with non-metallic washers. Provide mechanical joint connections to all equipment such as boilers, etc. Valves shall be provided with Buna-N, TFE or EPDM seats suitable for the service intended. The pressure classifications for valves specified herein are working steam or water, oil, gas (WOG) pressure ratings. Lever handles on all valves shall be color coded in conformance with ANSI Standard A-13.1. Grooved joint couplings shall incorporate an angled-pattern bolt pad design to provide confirmation of joint integrity upon visual metal-to-metal bolt pad contact with slight offset and no torque requirement. Tongue and recess designs may only be used if a torque wrench is utilized (IAW published installation instructions) and each coupling is either tagged or marked with indelible ink to indicate the actual torque value attained. A Grinnell Victaulic factory trained representative shall provide on-site training for contractor's field personnel in the use of grooving tools, application of groove, and product installation. Contractor shall remove and replace any improperly installed products. Gaskets used on potable water systems shall be UL classified in accordance with ANSI/NSF-61 for both hot (180F) and cold (86F). Pipe ends shall be clean and free from indentations, projections and roll marks in the area from pipe end to groove for proper gasket sealing. The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service as specified. 			

PIPE CLASS A11	Gas Piping	
ITEM	2 INCHES AND SMALLER	2 1/2 INCHES AND LARGER
Pipe	Schedule 40 Carbon Steel ASTM A53 Grade B, A106 Grade A Or ASTM A120.	Schedule 40 Carbon Steel ASTM A53 Grade B, ASTM A106 Grade A Or ASTM A120.
Fittings	Screwed Malleable Iron 150 PSI. Mechanical Press Connect Fittings: Viega MegaPress G 1/2-inch through 2-inch with HNBR sealing element shall conform to ANSI LC4-2012 /CSA 6.32-2012 2nd Edition. Installation must be in accordance to manufacturer's instructions and specifications utilizing manufacturer's approved tooling. All installers shall hold a manufacturer's credential card confirming individual has been trained by manufacturer.	Butt Weld Carbon Steel Schedule 40, ASTM A234.
Unions	Screwed 150# Malleable Iron ASTM A197 Grade II.	Use Flanges.
Flanges	150# Raised Face, Screwed, ASTM A197.	150# Raised Face Weld Neck ASTM A105
Valves - Note: All valves used for gas shall be Plumbing Board approved for use.		
Plug/Gas Cock	Apollo 70-100-07 series.	Watts FBV3C-IPS, or flanged ball valve for sizes up to four (4) inches. Valves larger than four (4) inches, Iron Body, Greasable and Lubricated Tapered Plug, rectangular port, regular opening, Flanged End, Valve shall be equal to R&M Energy Systems Inc. Resun Model #1431 200 PSI WOG, 125 PSI SWP. The valve shall be approved for use by the state fuel gas code. other acceptable manufacturers are Nordstrom, or Serck Audco
Ball	Bottom Loaded Pressure Stem. Valve Rated At 600 PSI WOG. Watts B-6000-UL-Mass. Apollo 70 series, or Equal.	Approved valves shall be 2-piece full port design constructed of a forged brass body and end adapter. Seats and stem packing shall be virgin PTFE. Stem shall be bottom loaded, blowout proof design with fluorocarbon elastomer O-ring to prevent stem leaks. Valve shall have chrome plated brass ball and adjustable packing gland. Valve sizes 2 1/2 inches - four (4) inches (65 - 100mm) threaded, shall be rated to 400PSI (27.5 bar) WOG non-shock and 125PSI (8.6 bar) WSP. Valve shall be a Watts Regulator Company Series FBV-3C (threaded) or equal.
Pressure Regulator Inlet Pressure Up to 2 PSIG	Provide a CSA design certified lever acting line pressure regulator where shown on plans. The regulator shall be in compliance with ANSI Z21.80, be a self-aligning valve with lever action for dead end lockup, and have an outlet pressure range of 7-11 inches WC. The regulator shall be constructed of an aluminum casting with corrosion resistant internal parts and a nitrile rubber valve. Provide ventless regulator, if vented regulator is used contractor to own all gas venting to exterior including penetrations and water sealing. The regulator shall be Maxitrol or equal by Equimeter or Fisher Controls.	

PIPE CLASS A11	Gas Piping	
ITEM	2 INCHES AND SMALLER	2 1/2 INCHES AND LARGER

Notes:

1. Provide two (2) wrenches for each gas cock size.
2. The Contractor, must weld the gas piping as required by local codes and gas company requirements.
3. All welders for gas piping must be certified per the requirements of Section 22 00 00.
4. Where multiple gas regulators are installed, regulators shall be marked with a metal tag designating the building or areas being supplied.

PIPE CLASS A20	Mechanical Press Copper Piping System	
All pipe, fittings, and valves used in this distribution system and installed after January 4, 2014 must comply with the new Federal Mandate known as the "Reduction of Lead in Drinking Water Act-2014". Therefore, after the enactment date of 1/4/14, all products installed must comply. Any product pipe, fittings or valve installed after the enactment date that does not comply shall be removed and changed by this contractor at his/her own expense to comply with the Federal Law.		
	1/2 INCH TO 2 INCHES	2 1/2 INCHES TO 4 INCHES
repairs have been made.		
Valves		
Valves in the interior domestic water piping systems (cold water, hot water, and hot water return) shall be as manufactured by Apollo, Watts, Milwaukee, Nibco or Viega. Valves for domestic potable use shall be lead-free*.		
Ball	Apollo Xpress with LBP or Viega ProPress ball valve Smart Connect feature, Zero Lead For potable water applications <ul style="list-style-type: none"> • Bronze • Press connection, Full port • Lockable metal handle, stainless steel ball and stem, EPDM sealing elements, Apollo 77VLF-140 series, Viega Model 2971.3ZL or 2970.3ZL with Viega ProPress stem extension Model 2970.96, Watts LF-FBV-Press series 	Class 125, cast iron body, FDA epoxy coated. Lead Free Full port, flanged ends, stainless steel ball and stem. ANSI B16.1 flange dimensions. Watts G-4000-FDA series, Apollo IBV.
Drain	All bronze, 2 piece, RPTFE seats, thread x solder end connections. 600 Psig WOG. Apollo 70LF-100-HC, Milwaukee, Watts. Hose thread adapter with cap and chain. Provide hose end LF vacuum breaker.	
Strainers	Bronze body, threaded or solder ends to suit, stainless steel screen, 400 pound wog., Watts LF-777777S series	
Pressure Reducing Valve	Control Valve, Pilot Operated. Apollo A127LF or Watts LF- M115, Victaulic Series 972. Or equal, All valves for potable service shall be lead-free*.	
Notes: <ol style="list-style-type: none"> 1. Contact between dissimilar metals shall be made with di-electric couplings or di-electric flanges. Contact between ferrous and stud bolts and bronze flanges shall be electrically insulated with non-metallic washers. 2. Provide mechanical joint connections to all equipment such as water heaters, pumps, compressors, etc. 3. Valves shall be provided with Buna-N, TFE or EPDM seats suitable for the service intended. 4. The pressure classifications for valves specified herein are working steam or water, oil, gas (WOG) pressure ratings. 5. Lever handles on all valves shall be color coded in conformance with ANSI Standard A-13.1 		

PIPE CLASS A20	Mechanical Press Copper Piping System	
<p>All pipe, fittings, and valves used in this distribution system and installed after January 4, 2014 must comply with the new Federal Mandate known as the Reduction of Lead in Drinking Water Act-2014. Therefore, after the enactment date of 1/4/14, all products installed must comply. Any product pipe, fittings or valve installed after the enactment date that does not comply, shall be removed and changed by this contractor at his/her own expense to comply with the Federal Law.</p>		
	1/2 INCH TO 2 INCHES	2 1/2 INCHES TO 4 INCHES
<p>6. Grooved joint couplings shall incorporate an angled-pattern bolt pad design to provide confirmation of joint integrity upon visual metal-to-metal bolt pad contact with slight offset and no torque requirement. Tongue and recess designs may only be used if a torque wrench is utilized (IAW published installation instructions) and each coupling is either tagged or marked with indelible ink to indicate the actual torque value attained.</p> <p>7. An Apollo Xpress, ProPress, Grinnell, or Victaulic factory trained representative shall provide on-site training for contractor's field personnel in the use of fit and grooving tools, application of groove, and product installation. Contractor shall remove and replace any improperly installed products. Gaskets used on potable water systems shall be UL classified in accordance with ANSI/NSF-61 for both hot (180F) and cold (86F). Pipe ends shall be clean and free from indentations, projections and roll marks in the area from pipe end to groove for proper gasket sealing. The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service as specified.</p>		

2.1 PIPING AND MATERIAL SUNDRIES

- A. Materials and equipment shall be of the best quality manufactured, new, unused and free from all defects. Piping and fittings shall conform to the latest ANSI, ASTM, and NFPA and AWWA Standards including latest amendments and shall be in conformance with state and local plumbing codes, material standards.
- B. Each length of pipe, each pipe fitting, trap, materials and/or device used in the respective system shall have cast, stamped or indelibly marked on it, the maker's name or mark, weight and quality of the product when such marking is required by the approved standard that applies.
- C. Unions and Flanges
 1. Unless otherwise specified herein, unions for copper and brass piping two (2) inches and smaller shall be 125 pounds (steam working pressure) brass ground joint type. Larger than two (2) inches in diameter shall be 150 pounds flat faced brass flanges conforming to ANSI Standard B16.24. Flanges shall have copper clad steel bolts and nuts and 1/16-inch minimum thickness red rubber full faced gaskets.
 2. Where brass flanges and ferrous flanges are to be joined, ferrous flanges shall be full faced.
 3. Mating of ferrous and non-ferrous flanges shall be separated with rubber gaskets (1/16-inch minimum thickness) and Teflon liners installed in the boltholes. Boltholes shall be drilled to receive the Teflon liners. Physical contact between the ferrous and non-ferrous flanges including the bolts, nuts, and washers will not be permitted.
- D. Nipples
 1. Close and shoulder nipples shall be of corresponding materials as specified for the respective piping system and shall be extra heavy.

2.2 HANGERS AND SUPPORTS

- A. Hangers shall be installed, as required, to meet code compliance as to location/spacing and Manufacturer's Standardization Society (MSS) Standard Practice Bulletins SP-58 & 69.
- B. Hanger material shall be compatible with piping materials with which it comes into contact.
- C. Hangers shall be installed, in addition to the above, at all changes of direction (horizontal and vertical), valves and equipment connections. Hangers shall be located so that their removal is not required to service, assemble or remove equipment.
- D. Horizontal runs may use band hangers up to four (4) inch size. Piping larger than four (4) inches shall be provided with Clevis type.
- E. Vertical support shall be by means of riser clamps (anchors with split ring type allowable up to two (2) inch size only) and adjustable pipe support with flange anchored to floor.

- F. Where three (3) or more pipes are running parallel to each other, factory fabricated gang pipe hangers with pipe saddle clips or rollers may be used in lieu of the hereinbefore specified hangers. These hangers shall be sized to provide for insulation protectors as hereinafter specified. Pipe saddle clips shall be not less than 16 gauge metal and shall be copper when installed with uninsulated copper piping. Where pipe rollers are provided for insulated copper piping, insulation protectors shall be provided at each set of rollers and filled with a section of heavy density fiberglass pipe covering.
- G. Insulation protectors (shields) for horizontal piping shall be constructed of galvanized steel formed to a 180 degree arc and twelve (12) inches long, 18 gauge for hangers five (5) inches in size and smaller, 16 gauge for hangers larger than five (5) inches in size.
- H. Exposed rods, clamps, hangers, and shields shall be electrogalvanized coated.
- I. Upper Attachments to Building Structure:
1. Existing Reinforced Concrete Construction: Upper attachment welded or clamped to steel clip angles that are expansion-bolted to the concrete. Expansion bolting shall be located so that piping loads place bolts in shear. Submit details for approval.
 2. Structural Steel Framing: Upper attachments welded or clamped to structural steel members. Additional steel members may be necessary in some support locations where piping locations differ from that known on contract drawings. Submit details for approval.
 3. Structural Wood Framing: Submit details for approval.
 4. Expansion Fasteners and Power Set Fasteners: In existing concrete slab construction, expansion fasteners may be used for hanger loads up to one-third the manufacturer's rated strength of the expansion fastener. Power set fasteners may be used for loads up to one-fourth of rated load. When greater hanger loads are encountered, additional fasteners may be used and interconnected with steel members combining to support the hanger.
- J. All inserts in new concrete construction shall be capable of developing the full strength of the rod or bolt used in them and shall be either continuous insert type or malleable iron concrete inserts for rod sizes 3/8 inch to 7/8 inch. Continuous inserts shall have anchors every four (4) inches and shall extend 1-1/2 inches above the back of the insert and shall hook to provide anchor. All inserts shall be tied into the reinforcing steel rods with wire and properly sized reinforcing rods shall be inserted through the special holes, hooks, or brackets provided in or on the inserts to securely anchor insert to the structure.
- K. Valve and piping supports, from the floor, shall be adjustable pipe support and complete with pipe standard and flange, anchored to floor.
1. Supports shall be installed at each control valve, riser tee or elbow and where any unsupported section exceeds 4 feet-0 inches in length measured along piping centerline and within 4 feet-0 inches off floor.

2.3 SLEEVES AND ESCUTCHEONS

- A. All pipes passing through rated floors, walls, or partitions shall be provided with sleeves having an internal diameter with a minimum of one (1) inch larger than the outside diameter of the pipe or insulation on covered lines.

- B. Sleeves through outside walls shall be Schedule 40 galvanized steel pipe with a 150 pound galvanized steel slip on welding flanges, welded at the center of the sleeve and shall be painted with one (1) coat of bitumastic paint, inside and outside.
- C. Sleeves through masonry floors and interior masonry walls shall be Schedule 40, black, steel pipe. Sleeves through interior nonmasonry walls or partitions shall be 22 gauge galvanized sheet steel.
- D. The sleeves through outside walls and slab on grade shall be provided with pipe to wall penetration closures. Seals shall be mechanical type of interlocking rubber links shaped to fill space between pipe and sleeve. Links shall be assembled with bolts to form a belt around the pipe with pressure plate under each bolt head and nut. After seal assembly is positioned, tightening of bolts will provide watertight seal. Determine the required inside diameter of each individual sleeve before ordering, fabricating or installing. The inside diameter of each sleeve shall be sized as recommended by the manufacturer to fit the pipe and to assure a watertight joint.
- E. Sleeves through walls shall terminate flush with face of wall. Sleeves through floor walls shall terminate one (1) inch above finished floor.
- F. Required fire resistance of floors and walls shall be maintained where penetrations occur. Fire stopping at sleeves shall be installed per manufacturer recommendations. Fire stopping material shall be UL listed for the service and fire rating. Provide asbestos-free fire stopping material capable of maintaining an effective barrier against flame, gases, and temperature. Provide noncombustible fire stopping that is nontoxic to human beings during installation or during fire conditions. Devices and equipment for fire stopping service shall be UL FRD listed or FM P7825 approved for use with applicable construction, and penetrating items.
1. Fire Hazard Classification:
 - a. Material shall have a flame spread of 25 or less, a smoke developed rating of 50 or less when tested in accordance with UL 723 or UL listed and accepted.
 2. Fire Stopping Rating:
 - a. Fire stopping materials shall be UL FRD listed or FM P7825 approved for "F" and "T" ratings at least equal to fire-rating of fire wall or floor in which penetrated openings are to be protected, except that "F" and "T" ratings may be three (3) hours for fire stopping in through-penetrations of 4-hour fire rated wall or floor.
- G. Escutcheons shall be provided with a set screw to properly hold escutcheon in place and provided at all exposed floor and wall penetrations. Escutcheons on C.P. piping shall be chrome plated.

2.4 INSULATION

- A. General: The pipe covering specified herein for piping systems shall be provided in strict accordance with the manufacturer's printed instructions, the best practice of the trade and to the full intent of this specification.
1. The sealers, tapes, adhesives and mastics used in conjunction with the installation of the pipe covering specified herein shall possess the maximum possible fire safe qualities available and shall be of a type approved by Factory Mutual, Factory Insurance Association or National Fire Protection Association.

2. Valves, fittings, flanges and accessories shall have the same thickness of pipe covering applied as the adjacent pipe. Pipe covering for these items shall be factory PVC molded type.
3. Longitudinal seams and butt joint shall be sealed with a fire-retardant, vapor barrier adhesive.
4. Insulation at hangers shall be protected with sheet metal saddles.

B. Interior Cold Water System Piping

1. All interior cold water piping shall be insulated with a preformed fiberglass insulation which meets the property requirements of ASTM C547, "Standard Specification for Mineral Fiber Pipe Insulation". Pipe insulation shall have a white, factory applied, fire retardant, reinforced vapor barrier jacket.
2. Insulation shall be continuous through sleeves and have a thickness of 1-inch. Insulation thickness is based on conductivity "K" factor range of 0.22 - 0.28 BTU-in/hr-ft²-°F. @ 100°F mean temperature rating. For minimum thickness of alternative insulation types outside the stated conductivity range, see test method for steady state heat transfer properties of horizontal pipe insulations, ASTM C 335-95 and the State Energy Code.
3. Ends of insulation at termination points shall be sealed to the pipe with a pre-molded PVC type fitting. Pipe fittings and valves shall be provided with pre-molded PVC covers with fiberglass inserts.
4. Pipe insulation within 6 feet-0 inches of finished floor, in exposed installations, shall be provided with 20 mil. PVC continuous covers in addition to the vapor barrier jacket. Fittings and seams shall be solvent welded.
5. Insulation shall be manufactured by Owens-Corning Fiberglas Corp., Knauf Fiberglass, Certainteed or equal.

2.5 BACKFLOW PREVENTERS

- A. Reduced pressure principal backflow preventer shall be Lead Free, complete with, ball valves and strainer on sizes up to two (2) inch, OS&Y gate valves on 2 ½ inches and larger, air gap fitting, bronze construction for sizes up to 2" and epoxy coated cast iron or stainless steel for sizes 2 ½ inches and larger. Reduced pressure principal backflow preventer shall be by Ames, Conbraco, Febco, Watts or approved equal.
- B. Atmospheric type vacuum breakers shall be provided at all hose end valves and outlets. Where vacuum breaker is not integral with fixture, provide an all brass, threaded type with manual drain feature. Provide pressure type for all outlets subject to back pressure or static line pressure. Atmospheric type vacuum breakers shall be by Apollo, Conbraco, Febco, Watts or approved equal.
- C. Installation of all backflow preventers shall be in accordance with State Plumbing Code and Department of Environmental Protection Regulations. "Cross Connections".
- D. Provide repair kits for each reduced pressure backflow preventer.
- E. Reduced Pressure Assemblies shall be located in the horizontal plane only, with the bottom of the unit between three (3) and four (4) feet above the floor and a minimum of twelve (12) inch clearance from the outside of the unit to the face of the wall.

2.6 GAUGES

- A. Pressure Gauges:

1. Gauges shall be installed with suitable "T" handle gauge cocks to permit servicing. Unless otherwise specified herein, all gauges shall be not less than five (5) inch diameter, dial type, stainless steel case with black flange, aluminum peaked ring, phosphor bronze, bourdon tube, 1/4 inch brass N.P.T. male socket connection with wrench flats, white lithographed steel dial with black numbers and gradation. Dial gradations reading in "PSIG" shall be such that the normal operating pressure shall be indicated near the middle of the scale.
2. Gauges shall be installed at outgoing side of water meter, incoming and outgoing sides of reduced pressure backflow preventer.

B. The accuracy of all gauges and thermometers shall be within 1% of the scale range.

2.7 PRESSURE REDUCING VALVE – PRV

A. Pressure Reducing Valve (Single)

1. Provide a direct acting water pressure reducing valve with bronze body construction, replaceable seat module, integral stainless steel strainer and a thermal expansion bypass feature.
2. The pressure reducing valve shall be rated for 300 PSI and capable of being adjusted from 10 PSI to 75 PSI.
3. Valve shall be Apollo 36LF, Watts LF-223S or equal by Wilkins Regulator, A.W. Cash Valve Manufacturing Corporation, or CLA-VAL.

PART 3 - EXECUTION

3.1 DEMOLITION

A. Refer to the drawings for demolition scope applicable to the project.

3.2 IDENTIFICATION

A. General

1. All piping, and valves furnished and/or installed under this section of the specifications and shall be marked for ease of identification.
2. Marking shall be done using self-adhering (screw or rivets for equipment) labels applied to clean, smooth surfaces. All lettering shall have sharply contrasting background for ease of identification. Colors shall be in accordance with ANSI A13.1 Standards. Samples of stickers together with color schedules shall be submitted for approval.

B. Pipe Identification

Provide color-coded pipe identification markers on all piping in the building installed under this section.

1. All pipe markers shall be as manufactured by W.H. Brady, Westline Products, Seton Nameplate Company or approved equal. Stenciling of the piping will not be permitted. Pipe markers, bands and flow arrows shall be pressure adhesive, snap-on, acrylic or vinyl type.
2. Furnish and affix approved adhesive bands identifying the service and direction of flow of each piping system installed under this section of the specifications.

3. Name of the service, taken from drawing legend, shall be printed in black letters; not less than 1 ¼ inches high for piping, including covering, three (3) inches and larger and ¼ inch in height for piping 2-1/2 inches and smaller.
4. Arrows and color band background shall conform to State Plumbing Code for all domestic and protected water systems. Legends, arrows and colors shall conform to ANSI Standard A13.1 covering "Identification of Piping Systems" for all other systems.
5. Identification shall be provided on all piping that is exposed as well as all in concealed locations such as shafts, and above removable ceilings in which piping may be viewed.
6. Each set shall consist of one (1) band on which the name of the service is printed and one (1) band on which is printed a black directional arrow.
7. Bands shall be applied where they can be easily read from the finished floor below, with their long dimension parallel to the axis of the pipe.
8. Bands shall be applied only after any finish painting is completed.
9. In general, the piping of each system shall be identified in the following locations and the piping designation shall be taken from the legend as indicated on the drawings.
 - a. Pipe mains and branches – every twenty-five (25) feet in all accessible open areas and ten (10) feet apart in congested areas.
 - b. At each side of valves and pipe tees.
 - c. Each wall penetration (both sides).
 - d. At each piece of equipment.
 - e. At each floor, above and below ceilings, on exposed risers and drops.
10. The following color coding shall be used with names in black letters on backgrounds indicated:

SCHEDULE OF PIPING IDENTIFICATION		
Service	Legend	Background Color
Cold Water	Cold Water	Green
Gas	Natural Gas	Yellow
Non Potable Water	Non Potable Water	Yellow
Make Up Water	Make Up Water	Green

- C. The Following Areas shall require all insulated piping to be protected along the entire pipe length with PVC jacketed covers (Ceel-Co plastic jacket):
 1. Mechanical Room
 2. Main Pipe Corridor Adjacent to the Main Plumbing Mechanical Room
 3. Other areas without hung ceilings
 4. Color pattern and system identification legend shall be as in the above schedule for pipe code.
 5. This plastic jacket shall include fitting covers and piping covers.
 6. Piping to be covered with this plastic jacket shall be insulated and finished as herein specified and then the plastic jacket shall be applied.
- D. Valve Tags
 1. All valves on pipes of every description shall have numbering tags. The valve numbers shall correspond with numbers indicated for valves and controls on two-printed Valve Lists prepared using electronic database by the HVAC subcontractor. These printed lists shall state the numbers and locations of each valve and the fixture or group of fixtures which it controls, and other necessary information, such as requiring the opening or closing of another valve when one valve is to be opened or closed.

2. Provide flow diagrams showing all valves. Use the Valve List for callouts of all valves on the flow diagrams, prepared in a form to meet the approval of the Architect. Include this info in the operating and maintenance (O&M) manuals, and, for all mechanical rooms, provide the information laminated, mounted and framed under glass at the direction of the Owner. All valve interior diameters shall be shown in the O&M manuals and on the final Record Drawings.
3. Valve tags shall have neat circular black and white laminated fibre-engraved white showing through tags of at least 1 ½ inches in diameter, attached with a brass hook to each valve stem. Stamp on these valves tags in letters, as large as practical, the number of the valve and the service such as indicated on the "Valve List". The numbers on each service shall be consecutive. All valves on tanks and pumps shall be numbered by three (3) inch black and white laminated fibre-engraved white showing through discs with white numbers two (2) inches secured to stem of valves by means of brass hooks or small solid link brass chain.

3.3 TESTING

A. General

1. All labor, materials, instruments, devices and power required for testing shall be provided by this Contractor. The tests shall be performed in the presence and to the satisfaction of the Architect and such other parties, as may have legal jurisdiction. No piping in any location shall be closed up, furred in, or covered before testing.
2. Where portions of piping systems are to be covered or concealed before completion of the project, those portions shall be tested separately in the manner specified herein for the respective entire system.
3. Any piping or equipment that has been left unprotected and subject to mechanical or other injury in the opinion of the Architect shall be retested in part or in whole as directed.
4. The Architect retains the right to request a recheck or resetting of any pump or instrument by this Contractor during the guarantee period at no additional cost to the Contractor.
5. Repair, or if directed by the Architect, replace any defective work with new work without extra charge to the Contract. Repeat tests as directed, until the work is proven to meet the requirements specified herein.
6. Restore to its finished condition any work, damaged or disturbed, provided by other Contractors and engage the original Contractor to do the work of restoration to the damaged or disturbed work.
7. The fixtures shall be tested for stability of support and satisfactory operation. The piping shall be tested when directed by the Engineer for stability.
8. After the fixtures are set and connected, and the piping systems to same have been tested, this Contractor shall turn water onto the fixtures, and equipment, fill the traps, etc., and the proper operation of all items shall be demonstrated by him in the presence of and to the satisfaction of the Architect/Engineer or their designated representatives.
9. Caulking of screwed joints or holes in piping will not be acceptable.
10. Notify the Architect and any inspectors having jurisdiction, a minimum of forty-eight (48) hours in advance of making any required tests so that arrangements may be made for their presence to witness the scheduled tests.

B. Specific:

1. Cold Water Piping Systems:

- a. Upon completion of the roughing in and before setting fixtures and final connection to all equipment, all water piping systems shall be tested to a minimum hydrostatic pressure of 125 PSIG.
- b. Each system's test shall be maintained for eight (8) hours without a drop in pressure.
- c. After testing, provide complete adjustment of all parts of each water system until design distribution or balancing is obtained throughout.

2. Gas Systems

- a. Before any system of gas piping is put into service, it shall be carefully tested in the presence of, and with the approval of, the gas inspector to insure that it is gastight. Where any part of the system is to be enclosed or concealed, this test shall precede the work of closing in the piping. The test medium shall be air or inert gas (e.g. nitrogen, carbon dioxide). Oxygen shall never be used.
- b. Gas piping systems, not in excess of ½ PSIG or fourteen (14) inches water column, extending from the outlet of the meter set assembly to the closed shutoff valve of each appliance, shall withstand a pressure of at least six (6) inches mercury or three (3) pounds gauge for a period of not less than ten (10) minutes without showing any drop in pressure. Pressure shall be measured with a mercury manometer or slope gauge, or an equivalent device so calibrated as to be read in increments of not greater than 1/10 pound. The source of pressure shall be isolated before the pressure tests are made.
- c. After the test of piping for tightness as described herein, gas may be turned on and appliances tested at normal operating pressure by means of a soap bubble test, or other non-corrosive foaming agent test.

3.4 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. Prior to completion of the Contract, provide field operating instructions to the Owner's designated representative with respect to operation functions and maintenance procedures for the equipment and systems installed.
- B. All equipment provided under this section of the specifications shall be placed in operation and shall function continuously in an operation test for a period of one (1) week, without shut down due to mechanical failure.
- C. Prior to scheduling the project final inspection and after completion of the entire installation period, provide all work required to adjust all controls, hot water systems balancing and all maintenance to place the systems in operation to meet the requirements of this section of the specifications and Contract Documents.
- D. Provide to the Owner through the Engineer, six (6) complete sets of operating, service, maintenance instruction manuals containing replacement data for the equipment which will require operating, maintenance or replacement and one (1) copy of this literature shall be available during the instruction of the operating personnel while the others are checked for completeness by the Architect.
- E. Sufficient advance notice shall be given to the Owner's designated operating personnel for the specific instruction period. Upon completion of instruction, obtain from the representative(s) written verification that the above mentioned instruction has been performed. Such verification shall be forwarded to the Owner through the Architect.

- F. Each copy of the approved operating and maintenance manual shall contain copies of approved shop drawings, equipment literature, cuts, bulletins performance charts, pump curves, details, equipment and engineering data sheets and typewritten instructions relative to the care and maintenance for the operation of the equipment, all properly indexed and bound in a hard-back three ring binder. Flysheets shall be placed before instructions covering each section. The instruction sheets shall be in 8-1/2 inches by eleven (11) inches with large sheets of drawings folded in neatly. Each manual shall have the following minimum contents:

1. Table of Contents
2. Maintenance
 - a. Maintenance and lubricating instructions
 - b. Replacement charts
 - c. Preventive maintenance recommendations
 - d. Trouble shooting charts for equipment components
 - e. Testing instructions for each typical components
 - f. System draining and filling instructions
 - g. Two typed sets of charts indicating equipment tag number, location of equipment, specific equipment service, greasing and lubricating requirements as recommended lubricant type and intervals of lubrication.
 - h. Two type sets of instructions for ordering spare parts. Each set shall include name, telephone number and address of where they may be obtained.
3. Manufacturer's Literature
 - a. The equipment for which shop drawings have been submitted and approved.
 - b. Wiring diagrams
 - c. Installation drawings
 - d. Manufacturer's representative and contract information
 - e. Guarantees

3.5 SPECIAL TOOLS

- A. Provide any and all special tools, recommended by the manufacturer of items furnished, noted as not being commonly available.

3.6 CERTIFICATES OF APPROVAL

- A. Upon completion of the work, furnish to the Owner through the Architect, in duplicate, certificates of inspection and/or approval from state and local inspection authorities having jurisdiction indicating the installed systems compliance to their requirements.

3.7 SYSTEMS

- A. Cold Water Piping
1. Vacuum breakers and/or backflow preventers shall be installed on supplies to each piece of equipment, and valved connection, as required, to prevent back-siphonage and backflow.
 2. Branch lines from water service or main lines shall be taken off the top or bottom of main, using such crossover fittings as may be required by structural or installation conditions. All water service pipes, fittings, and valves shall be kept a

- sufficient distance from other work and not less than one (1) inch between coverings on the different services.
3. Water piping shall be run parallel and graded evenly to the drainage points. There shall be a minimum ½ inch hose-end drain valve with hose-end vacuum breaker provided for each low point in the piping, so that all parts of each water system can be drawn off. Piping two (2) inches and larger shall have a ¾ inch size drain valve.
 4. Provide suitable means of thermal expansion for the hot water piping using swing joints, expansion loops and long turn offsets as required to suit building conditions.
 5. All piping connections to equipment shall be provided with unions or flanges to permit convenient disassemble for alterations and repairs.
 6. No piping shall be installed in a manner to permit back siphonage or backflow of any flow of water from the waste non-potable or process system into the domestic water systems or their distribution piping under any conditions. Approved backflow preventers shall be installed where cross-connections are required.
 7. Where flanges are installed in the water systems, install red rubber gaskets between each pair of flanges.
 8. Heating and/or bending of copper tubing to eliminate the installation of fittings will not be permitted (exception: flexible risers between fixture stop and kitchen/lavatory faucet).
 9. Piping systems shall be kept clean during all phases of work. Open ends of incomplete piping shall be protected to prevent the entrance of foreign materials.
 10. Pipe shall be cut accurately to measurements established at the site and shall be worked into place without springing or forcing.
 11. Provide copper plated friction clamps on the cold water supplies to each water closet and urinal flushometer. Friction clamp shall be firmly clamped to the pipe and shall be firmly attached to the adjacent wall structure.

B. Natural Gas Systems

1. All piping shall be cut accurately to measurements obtained at the site and shall be installed without springing or forcing due to inaccurate measurements or improper hanger installation.
2. Every branch line from a main shall be furnished with a branch valve (no exceptions) and shall be taken off the top of main using such fittings as may be required by structural obstructions or other installation conditions. All service pipes, fittings, and valves shall be kept at sufficient distance from other work to permit not less than one (1) inch between finished coverings on other service piping.
3. All piping shall be supported independently and securely fastened to the building structure with appropriate anchors and pipe hangers. In general, all lines shall be installed above ceilings in finished spaces.
4. All piping shall be cut true and threaded or welded. Cap all open ends of piping to prevent the entrance of debris when work on this system is complete or the work day has ended.
5. All pipes shall be run parallel and graded evenly to low points. A serviceable drip leg of at least six (6) inches in length shall be provided at each low point, at every connection to a piece of equipment, and at the base of each riser.
6. All exterior gas piping, valves and fittings shall be protected and covered with Tapecoat H35 Gray corrosion protection tape with integral primer and adhesive. All fittings and joints shall be wrapped with similar protective tape.
7. For gas installations of over 5,000,000 (five million) BTU/HR, submit a plan of the proposed piping system and equipment for approval to the local Gas Inspector. A letter from the servicing gas supplier indicating that the fuel supply is available

shall accompany the submission. Gas utilization equipment over 12,500,000 BTU/HR, water tube boilers having outputs of 10,000 pounds of steam per hour or more, gas booster installations, cogeneration systems, and kilns, shall be submitted to and approved by the Board of State Examiners of Plumbers and Gas Fitters.

8. Provide valved pressure gauge assemblies at each main gas service entrance, at each water heater, boiler, emergency or standby generator, incinerators, HVAC rooftop units and all other major pieces of equipment utilizing gas. Each pressure gauge assembly shall be individually valved, include a snubber and shall have a dial range that would locate the system pressure as close to the approximate mid-point on the dial range as possible. Assembly shall be similar to TRERICE Model 760B, 2-1/2 inch diameter gauge, 735-2 valve and 872-1 snubber.
9. Piping system shall be purged with 100 PSI compressed air to remove dirt and debris.
10. Pressure test gas piping system with air, carbon dioxide or nitrogen pressure test at not less than 10 PSI gage for a period of twenty-four (24) hours with no decrease in pressure. For welded piping and for piping carrying gas at pressures exceeding 14-inches of water column pressure, the test pressure shall be at least 60 PSIG for a period of twenty-four (24) hours with no decrease in pressure. If a decrease in pressure is detected, soap or bubble test joints for leaks, repair or replace as required, and retest.
11. Gas piping connections to all equipment shall include a gas shutoff valve, drip leg, union fitting and pressure gauge as well as a swing joint consisting of at least two (2) 90 degree elbows at all HVAC equipment.

3.8 PATCHING, REPLACEMENT AND MODIFICATION OF EXISTING WORK

- A. After installation of pipe lines, neatly patch, repair, and replace existing work where damaged, removed or altered for pipe line installation. This work shall be similar and equal in quality to the work removed or damaged, unless otherwise shown or specified. Such work shall include replacement of existing lines at points of connections to new lines, patching of masonry work, and wherever any such patching work is indicated on drawings or otherwise required.

3.9 GENERAL INSTALLATION REQUIREMENTS

A. Piping Installation

1. Install piping approximately as shown on the drawings and as directed during installation by the General Contractor or the Architect.
2. Piping shall be installed as straight and direct as possible forming right angles or parallel lines with building walls, other piping and neatly spaced.
3. The horizontal runs of piping, except where concealed in partitions, shall be installed as high as possible.
4. Piping or other apparatus shall not be installed in such a manner so as to interfere with the full swing of the doors and access to other equipment.
5. The arrangement, positions and connections of pipes, fixtures, drains, valves, and the like, indicated on the drawings shall be followed as closely as possible, but the right is reserved by the General Contractor or the Architect to change locations and elevations to accommodate the work, without additional compensation for such change.
6. It shall be possible to drain the water from all sections of each cold water piping system. Pitch piping back to drain valves.

7. Screwed piping of brass or chrome plated brass shall be made up with special care to avoid marring or damaging pipe and fitting exterior and interior surfaces.
8. Small fittings shall be screwed up close to the shoulders of male threads. Lampwick, cord, wool, or any other similar material shall not be used to make up thread joints.
9. Screwed pipe and copper tubing shall be reamed smooth before installation.
10. Reducing fittings, unless otherwise approved in special cases, shall be provided in making reduction in size of pipe. Bushings will not be allowed unless specifically approved.
11. Remove and replace with new materials, any copper or brass piping (chrome plated or unplated) and valves showing visible tool marks.
12. Vertical risers shall be firmly supported by riser clamps, properly installed to relieve all weight from the fittings.
13. Any piece of pipe six (6) inches or less in length shall be considered a nipple.
14. All water service piping shall be kept a sufficient distance from other work to permit finished covering to be not less than one (1) inch from other work.
15. The pipe and fittings shall be manufactured in the United States of America and in accordance with the Commercial Standards, American National Standards Institute and American Society of Testing Materials.

B. Specialty Installation

1. Install air-gap fittings on draining-type backflow preventers and on indirect-waste piping discharge into sanitary drainage system.

3.10 GAS SERVICE, METER, VENTS AND PIPING

- A. Gas meter and piping to meter from gas main will be provided by Gas Company. Gas meter and utility regulator are intended to be existing to remain. Pay charges associated with Gas Company modifications if needed. Gas piping provided under this Section (not by gas company), shall begin at building side of gas meter or regulator. No work is intended to be performed exterior to the building.
- B. Piping shall be done by licensed gas fitter (as required by Code).
- C. Gas piping shall pitch to drain and shall have drip pockets at least six (6) inches long with removable caps at low points. Branch connections shall be taken from top or side of horizontal running main. Provide gas cock or valve on connections to fixtures or equipment.
- D. Provide pressure reducing valve between meter and building piping, as required by Gas Company, piped and vented to outside of building. Note that the Dover location has no exterior service gas regulator. Confirm Dover location service is satisfactory.
- E. Provide individual vents from regulators, pressure switches and reliefs on factory packaged equipment gas trains at all equipment located on this system. It is this contractor's responsibility to extend all vents to atmosphere terminal at a safe location in conjunction with the fuel gas code.
- F. Gas piping and safety devices shall meet requirements of NFPA No. 54 and shall be subject to inspection and approval of State Gas Regulatory Board.
- G. Provide a gas cock valve at each branch run out from main or riser serving gas outlets. This shall include all branches from the gas main and further branches from gas sub-

mains. These requirements will be strictly enforced by the local plumbing inspector. This requirement shall take precedent over general arrangement drawings. Therefore the following is called for:

1. Provide a gas shutoff valve at each Tee on both outlets of the Tee in a run of piping
 2. Provide a gas shutoff valve at each piece of equipment
 3. Gas valves or cocks shall not be concealed and shall be readily accessible for inspection and repair
 4. Provide union connection between shut-off cock and equipment to permit disconnection of equipment
- H. Piping shall be securely fastened, separately hung and shall not support any other weight or piping. Piping dropping in concrete block walls shall be factory wrapped for corrosion protection.
- I. Welded piping shall conform to the latest requirements of the Fuel Gas Code.

3.11 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements for pipe hanger, support products, and installation.
1. Vertical Piping: MSS Type 8 or 42, clamps.
 2. Individual, Straight, Horizontal Piping Runs:
 - a. One hundred (100) feet and less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer than one hundred (100) feet: MSS Type 43, adjustable roller hangers.
 - c. Longer than one hundred (100) feet if Indicated: MSS Type 49, spring cushion rolls.
 3. Multiple, Straight, Horizontal Piping runs one hundred (100) feet or longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Support vertical piping and tubing at base and at each floor.
- C. Rod diameter may be reduced one (1) size for double-rod hangers, to a minimum of 3/8 inch.
- D. Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.
- E. Hanger Installation
1. All piping shall be supported from the building structure by means of approved hangers and supports, to maintain proper grading and pitching of lines, to prevent vibration and to secure piping in place, and shall be so arranged as to provide for expansion and contraction.

2. Maximum spacing of hangers on runs of pipe (vertical and horizontal) having no concentration of weight shall be as follows:

SCHEDULE			
MATERIAL	Steel	Copper	PVC
Pipe Size (Inches)	Hanger Spacing in Feet/Pipe		
.50	6	6	3
.75	8	6	3
1.00	10	6	3
1.25	10	10	3
1.50	10	10	3
2.00	10	10	4
2.50	10	10	4
3.00	10	10	4
3.50	10	10	4
4.00	10	10	4
5.00	10		4
6.00	10		4
8.00	10		

3. Maximum spacing of hangers on soil pipe shall be five (5) feet or at each fitting on straight lengths to maximum of 10' and hangers shall be provided at either side of all changes in direction. Vertical Hanger rods to support piping from the structure or supplementary steel shall not exceed four (4) feet in total length vertically, provide factory fabricated channels and all associated accessories.
4. Friction clamps shall be installed at the base of the plumbing risers and at each floor (above or below floor slabs). Friction clamps installed above floor slabs shall not be supported from or rest on floor sleeves.
5. Provide hangers at a maximum distance of two (2) feet from both sides of all changes in direction (horizontal and vertical), on both sides of concentrated loads (equipment) and at valves.
6. Hangers, in general, for all horizontal piping shall be A Band type hangers for piping up to four (4) inch size and Clevis type for piping five (5) inches and larger. These hangers shall be sized to fit the outside diameter of the pipe insulation protectors (sheet metal shields) specified herein. Gang type hangers may be used for supply piping up to three (3) inch size where applicable and in conformance with manufacturer's recommendations.
7. All vertical drops and runouts including insulated pipes shall be supported by split ring hangers with extension rods and wall plates or stamped type up to two (2) inch size only.
8. Provide on all horizontal insulated lines, pipe covering protectors (shields) at each hanger. Each protector shall be sized to fit the outside diameter of the Pipe insulation.
9. Lock nuts or retaining straps shall be provided with all beam clamps.
10. All supplementary steel including factory fabricated channels and associated accessories, including twelve (12) inch long sheet metal shields, throughout both

- suspended and floor mounted shall be provided by this Contractor and shall be subject to the approval of the Architect.
11. Hangers shall not pierce the insulation on any insulated pipe except when prior approval is given.
 12. Wire, tape or wood fastenings for shims or support of any pipe or tubing shall not be used.
 13. Remove all rust from the ferrous hanger equipment (hangers, rods, and bolts) and apply one (1) coat of red lead immediately after erection.
 14. Piping at all equipment and each control valve shall be supported to prevent strains or distortions in the connected equipment and control valves. Piping and equipment shall be supported to allow for removal of equipment, valves and accessories with a minimum of dismantling and without requiring additional support after these items are removed.
 15. All piping shall be independently supported from the building structure and not from the piping, ductwork, conduit or ceiling suspension systems of other systems.
 16. Installation of hangers which permit wide lateral motion of any pipe will not be acceptable.
 17. All hangers in contact with uninsulated piping shall be compatible with piping material.

F. Pipe Covering Installation

1. Before pipe covering is applied, all pressure tests shall have been performed and approved.
2. Pipe covering shall be applied over clean, dry surfaces.
3. Pipe covering shall be continuous and shall be carefully fitted with side and end joints butted firmly and tightly together finished as specified herein.
4. Pipe covering and auxiliaries shall be kept dry during storage and application.
5. Adhesives, cements and coatings shall not be applied when the ambient temperature is below 40°F.
6. Valve bodies shall have covering applied up to the stem.
7. It is the intent of this specification that all vapor barriers be sealed and be continuous throughout. Staples shall not be used on vapor barrier jackets.
8. Where pipe-covering ends occur at equipment or fixtures, end caps on the covering shall be provided.
9. Adequate operating clearances shall be provided at control mechanisms.
10. Pipe covering for flanges shall overlap the adjoining pipe by a minimum of three (3) inches on each side.
11. Pipe covering shall be provided on all piping passing through ceilings and through the interior above ground sleeves (wall and floor).
12. All voids and or seams in insulation shall be filled with insulating cement and finished as specified herein.
13. In the event staples are used, they shall be coated with a vapor barrier mastic after insulation and taped. These staples shall not be visible on finished installation.
14. End joints of each section of the installed pipe covering shall be tightly butted.

G. Installation of Sleeves, Inserts and Escutcheons

1. Sleeves in floors shall set one (1) inch above the finished floor surface or as indicated on the Architectural Drawings.
2. Sleeves through interior masonry or non-masonry walls or partitions shall be set flush with the finished surfaces of the wall or partition.
3. Provide field drilling for inserts required for work under this section of the specifications.

4. Each interior wall or floor sleeve shall be fire stopped to provide equivalent fire resistance to floor or wall penetration.
5. Escutcheons shall be installed around all exposed insulated or bare pipe, passing through a finished floor, wall or ceiling. Escutcheons shall fit snugly around the bare or insulated pipe.

H. Valve Installation

1. Location of Valves: There shall be valves where indicated on the drawings and where specified as follows:
 - a. Each fixture supply shall have a separate angle stop or straight stop finished like the pipe it services.
 - b. Each piece of equipment shall have isolation valves for each service connected or at inlet and outlet of equipment with single service.
 - c. At the low points of each water system including trapped sections, provide a tee with 1/2 inch branch and ball valve with 3/4 inch hose end vacuum breaker and attached chain with cap.
 - d. Valves shall be located to permit easy operation, replacement or repairs.

I. Installation of Gauges

1. Pressure gauges in the domestic water system shall be installed at outlet side of the reduced pressure backflow preventer and at inlet.

3.12 VALVE INSTALLATION

- A. General valve installation requirements are specified in 22.00.00.
- B. Shutoff Valves:
 1. Install full-port ball valve for piping NPS 2 and smaller.

3.13 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.
- C. Make connections according to the following unless otherwise indicated:
 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.

END OF SECTION 22 00 00

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SECTION 23 00 00**HEATING, VENTILATING AND AIR CONDITIONING****PART 1 - GENERAL****1.0 GENERAL PROVISIONS**

- A. The General Requirements, Division 01, and Bidding And Contract Requirements, and Division 00 are hereby made a part of this Specification Section.
- B. Examine all drawings and all sections of the specifications and requirements and provisions affecting the work of this section.

1.1 SCOPE OF WORK

- A. This project includes the replacement of two (2) gas fired boilers.
- B. The work under this section shall include the furnishing of all materials, labor, equipment and supplies and the performance of all operations to provide complete working systems, in general, to include the following items:
 - 1. Equipment Nameplates
 - 2. Boilers
 - 3. Pumps
 - 4. Insulation
 - 5. Breeching
 - 6. Operating and maintenance instructions and manuals
 - 7. Shop drawings
 - 8. Cleaning, Testing, Adjusting, & Balancing of all Ducted Systems and Equipment
 - 9. Record (as-built) Drawings
 - 10. HVAC Control Systems
 - 11. Training of Owners Personnel on Equipment, Systems, and Controls
- C. The work to be done under this section is generally shown on the Mechanical HVAC Drawings.

1.2 RELATED WORK

- A. Principal classes of Work related to the Work of this section are listed below, and are specified to be performed under the indicated sections of these specifications. Refer to the indicated sections for description of the extent and nature of the indicated Work, and for coordination with related trades. This listing may not include all related Work items. It is the responsibility of the Contractor to coordinate the Work of this section with that of all other trades.
- B. The following work is not included in this section and will be provided under other sections, except as specified herein:
 - 1. Electrical power wiring for all HVAC equipment and to junction box(es) in mechanical areas. Power wiring from these box(es) to all control equipment

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(control panels, etc.) and all controls/interlock wiring shall be provided by the controls Contractor. Control wiring shall be from standby power source (if available).

1.3 DEFINITIONS

A. As used in this section, the following terms shall be understood to have the following meaning:

1. "Contractor," or "Subcontractor," unless otherwise qualified, shall mean the installer of the work specified under this section; and shall be responsible for coordination of this work with the work of the ATC Contractor.
2. "Furnish" shall mean purchase and deliver to the project site, complete with every necessary appurtenance and product support.
3. "Install" shall mean unload at the delivery point at the site and perform all work necessary to establish secure mounting and proper operation at the proper location in the project.
4. "Provide" shall mean furnish and install.
5. "Work" shall mean all labor, materials, equipment, apparatus, controls, accessories and all other items required for a proper and complete installation.
6. "Concealed" shall mean hidden from sight in chases, furred in spaces, shafts, embedded in construction, in a crawl space, and above hung ceilings.
7. "Exposed" shall mean not installed underground or concealed as defined above.
8. "Furnished by others" shall mean materials or equipment purchased under other sections of the general contract and installed by this section of the specifications by this trade Contractor.
9. "Owner's Representative" shall be the party responsible to make decisions regarding all contractual obligations in reference to the Scope of Work for the Owner.
10. "Date of Substantial Completion" shall indicate the date where the work has been formally accepted as evidenced by completed final punchlist or where the work has reached the stage that the Owner obtains beneficial use and commences utilization of the installed systems for business or occupancy purposes. The General Requirements, Division 01, shall supersede this definition where specifically defined.
11. "Piping" shall mean, in addition to pipe or tubing, all fittings, flanges, unions, valves, strainers, drains, hangers and other accessories relative to such piping.
12. "ATC" shall mean Automatic Temperature Controls, and shall be interchangeable with "BAS" (Building Automation System).

1.4 CODES, REFERENCES AND PERMITS

A. Materials, installation of systems and equipment provided under this section shall be done in strict accordance with the latest governing edition of the following standards, codes, specifications, requirements, and regulations, and any other Codes and Regulations having jurisdiction including but not limited to:

1. All Applicable NFPA Standards
2. State and Local Building Mechanical, Electrical, and Energy Codes
3. American Society of Mechanical Engineers (ASME)
4. American Society of Testing and Materials (ASTM)
5. American National Standards Institute (ANSI)
6. Underwriters' Laboratories, Inc. (UL)
7. Occupational Safety and Health Administration (OSHA)

8. Any other local codes or authorities having jurisdiction.
- B. Heating systems shall be installed by Contractors and personnel appropriately licensed in the State (Installing Contractor).
- C. All pressure vessels shall conform to ASME and State codes and regulations.
- D. All equipment shall meet the more efficient requirement:
 1. As shown on bid documents,
- E. Unless otherwise specified or indicated, materials, workmanship and equipment performance shall conform with the latest governing edition of the following standards, codes, specifications, requirements, and regulations, except when more rigid requirements are specified or are required by applicable codes but not limited to:
 1. Air Conditioning and Refrigeration Institute (ARI)
 2. Air Diffusion Council (ADC)
 3. Air Movement and Control Association (AMCA)
 4. American Society of Heating, Refrigeration and Air Conditioning (ASHRAE)
 5. American Society of Mechanical Engineers (ASME)
 6. American Society of Testing and Materials (ASTM)
 7. American Welding Society, Inc. (AWS)
 8. Associated Air Balance Council (AABC)
 9. Institute of Electrical and Electronics Engineers (IEEE)
 10. Manufacturer's Standardization Society of the Valve & Fitting Industry (MSS)
 11. National Electric Manufacturers Association (NEMA)
 12. National Environmental Balancing Bureau (NEBB)
 13. North American Insulation Manufacturer's Association (NAIMA)
 14. Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACNA)
 15. Thermal Insulation Manufacturer's Association (TIMA)
- F. Codes, laws and standards provide a basis for the minimum installation criteria acceptable. The drawings and specifications illustrate the scope required for this project, which may exceed minimum codes, laws and standards.
- G. The date of the code or standard is that in effect at the Bid date.
- H. Give all notices, file all plans, obtain all permits and licenses, and obtain all necessary approvals from authorities having jurisdiction. Deliver all certificates of inspection to the authorities having jurisdiction. No work shall be covered before examination and approval by the Owner's Representative, inspectors, and authorities having jurisdiction. Replace imperfect or condemned work to conform to requirements, satisfactory to Owner's Representative, and without extra cost to the Owner. If work is covered before inspection and approval, this Contractor shall pay costs of uncovering and reinstalling the covering, whether it meets contract requirements or not.

1.5 GENERAL REQUIREMENTS

- A. Nameplates
 1. Each item of equipment shall have a nameplate bearing the manufacturer's name, address, type or style, model number, catalog number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

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B. Maintenance Information

1. Systems and equipment which require periodic maintenance to maintain efficient operation shall be furnished with complete necessary maintenance information. Required routine maintenance actions, as specified by the manufacturer, shall be stated clearly and incorporated on a readily accessible label on the equipment. Such label may be limited to identifying, by title or publication number, the operation and maintenance manual for that particular model and type of product.

1.6 MATERIAL AND EQUIPMENT STANDARDS

- A. Where equipment or materials are specified with the name of a manufacturer, such specification shall be deemed to be used for the purpose of establishing a standard for that particular item. No equipment or material shall be used unless previously approved by the Owner's Representative.
- B. Substitutions (approved equals) may be offered for review provided the material, equipment or process offered for consideration is equal in every respect to that indicated or specified. In order for Requests for substitution to be considered, all must be submitted for pre-approval of manufacturer within thirty (30) days of award of contract. All requests must be accompanied by a list of minimum five (5)-year-old successful installations of similar scope (with Owner contact and phone number), complete specifications together with drawings or samples to properly appraise the materials, equipment or process. Allow thirty (30) days for Owner's Representative's review.
- C. If a substitution of materials or equipment in whole or in part is made, this Contractor shall bear the cost of any changes necessitated by any other trade as a result of said substitution.
- D. All materials, equipment and accessories provided under this section shall be new and unused products of recognized manufacturers as approved.

1.7 SUBMITTALS

- A. Conform to the requirements of Division 01, General Conditions, for schedule and form of all submittals unless specifically noted otherwise in this section. Coordinate this submittal with submittals for all other finishes. Shop drawings and design layouts shall be prepared by licensed installing Contractors and shall note the name(s), license number(s) and license expiration date(s) of the Contractor(s) installing the heating, refrigeration systems.
- B. Definitions:
 1. Shop Drawings are information prepared by the Contractor to illustrate portions of the work in more detail than indicated in the Contract Documents.
 2. Acceptable Manufacturers: The mechanical design for each product is based on the single manufacturer listed in the schedule or shown on the drawings. In Part 2 of the specifications certain Alternate Manufacturers are listed as being acceptable. In addition, the MATERIAL AND EQUIPMENT STANDARDS paragraph potentially allows for substitutions as being acceptable. These are acceptable only if, as a minimum, they:
 - a. Meet all performance criteria listed in the schedules and outlined in the specifications. For example, to be acceptable, an air handling unit must deliver equal CFM against equal external static pressure (with the

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allowed pressure drop of dirty filters) using equal or less horsepower as the air handler listed in the schedules.

- b. Fit within the available space it was designed for, including space for maintenance and component removal, with no modification to either the space or the product. Clearances to walls, ceilings, and other equipment will be at least equal to those shown on the design drawings. The fact that a manufacturer's name appears as acceptable shall not be taken to mean the Engineer has determined that the manufacturer's products will fit within the available space – this determination is solely the responsibility of the Contractor.
- c. For rooftop mounted equipment and equipment mounted in areas where structural matters are a concern, the products must have a weight no greater than the product listed in the schedules or specifications.

C. Submittal Procedures, Format and Requirements

1. Review submittal packages for compliance with Contract Documents and then submit to Owner's Representative for review. Submit enough sets of shop drawings such that, after review, two (2) sets will be kept by the reviewer, with only the remaining sets returned with reviewer's marks and comments.
2. Each Shop Drawing shall indicate in title block, and each Product Data package shall indicate on cover sheet, the following information:
 - a. Title.
 - b. Equipment number.
 - c. Name and location of project.
 - d. Names of Owner, Engineer and Seller.
 - e. Names of manufacturers, suppliers, vendors, etc.
 - f. Date of submittal.
 - g. Whether original submittal or resubmitted.
3. Shop drawings showing manufacturer's product data shall contain detailed dimensional drawings (minimum ¼ inch = one (1) foot scale) including plans and sections (where physical clearance could be an issue). Provide larger scale details as necessary. Sheet metal drawings shall show elements of Architect's reflected ceiling plan, exposed ductwork, walls and partitions (highlighting fire walls and smoke partitions), diffusers, registers, grilles, all dampers (fire, smoke, balancing, backdraft, and control dampers), sleeves and other aspects of construction as necessary for coordination.
4. Submit accurate and complete description of materials of construction, manufacturer's published performance characteristics, sizes, weights, capacity ratings (performance data, alone, is not acceptable), electrical requirements, starting characteristics, wiring diagrams, and acoustical performance for complete assemblies. Drawings shall clearly indicate location (terminal block or wire number), voltage and function for all field terminations, and other information necessary to demonstrate compliance with all requirements of Contract Documents.
5. Provide shop drawings showing details of piping connections to all equipment. If connection details are not submitted and connections are found to be installed incorrectly, this Contractor shall reinstall them within the original contract price.
 - a. Alternate pipe joining methods such as grooved and permanent push-to-connect systems shall be shown on drawings and product submittals, and be specifically identified with the applicable manufacturer's style or series number. Installation shall include any additional hangers required for the alternate system.

6. Provide complete data for all auxiliary services and utilities required by submitted equipment. This shall include power, cooling water and compressed air requirements and points of connection.
7. Provide a complete description of all controls and instrumentation required including electrical power connection drawing for all components and interconnection wiring to starters, detailed information on starters, control diagrams, termination diagrams, and all control interfaces with a central control system.
8. Provide installation and erection information including; lifting requirements, and any special rigging or installation requirements for all equipment.
9. The Owner's Representative shall approve all materials before commitment for materials is made.

D. Specifications, Schedule, and Control Sequence Compliance Statement

1. The manufacturer shall submit a point by point statement of compliance with each specification criteria listed in each paragraph for those submittals listed in Paragraph E: Product Data that are noted with an asterisk (*).
2. The statement of compliance shall consist of a list of all paragraphs (line by line) identified in Part 2 and applicable Part 3 of the specification and that the unit controls will provide all manufacturer's portions of the control sequences shown on the drawings for which the submitted product in the opinion of the manufacturer complies, deviates, or does not meet.
3. Where the proposed submittal complies fully, the word "comply" shall be placed opposite the paragraph number.
4. Where the proposed submittal does not comply, or accomplishes the stated function in a manner different from that described, a full description of the deviation shall be provided.
5. Verify each field of the associated schedule where associated technical data is presented and sequences are shown on the drawings. Where the submitted material does not "comply" provide the value the submitted equipment will achieve based upon the specified conditions.
6. Where a full description of a deviation is not provided, it shall be assumed that the proposed system does not comply with the paragraph in question and the product will be rejected.
7. Submissions which do not include a point by point statement of compliance as specified shall be disapproved.

E. Product Data: Submit complete manufacturer's product description and technical information including:

1. Piping and Fittings (all services, types, and joining methods)
2. Sleeves, Fire stopping
3. Vibration Isolation
4. Boilers and Pumps
5. Operating and maintenance instructions and manuals
6. HVAC Control Systems (*)
7. Testing, Adjusting, & Balancing Qualifications, Plan, and Reports
8. Identification, labels and tags
9. O&M manual table of contents
10. O&M manual

F. Submit shop drawings and product data grouped to include complete submittals of related systems, products and accessories in an individual (combined) submittal.

1. Access panel shop drawings shall be submitted to the Construction Supervisor for approval.

2. Do not submit multiple product information in a single bound manual.
3. Three-ring binders shall not be accepted.

G. Deviations

1. Concerning deviations other than substitutions, proposed deviations from Contract Documents shall be requested individually in writing whether deviations result from field conditions, standard shop practice, or other cause. Submit letter with transmittal of Shop Drawings which flags the deviation to the attention of the Owner's Representative.
2. Without letters flagging the deviation to the Owner's Representative, it is possible that the Engineer may not notice such deviation or may not realize its ramifications. Therefore, if such letters are not submitted to the Owner's Representative, the Seller shall hold the Engineers, his consultants and the Owner harmless for any and all adverse consequences resulting from the deviations being implemented. This shall apply regardless of whether the Engineer has reviewed or approved shop drawings containing the deviation, and will be strictly enforced.
3. Approval of proposed deviations, if any, will be made at discretion of Engineer.

H. Schedule: Incorporate shop drawing review period into construction schedule so that Work is not delayed. This Contractor shall assume full responsibility for delays caused by not incorporating the following shop drawing review time requirements into his project schedule: Allow at least ten (10) working days, exclusive of transmittal time, for review each time shop drawing is submitted or resubmitted with the exception that twenty (20) working days, exclusive of transmittal time are required for the following:

1. HVAC temperature control submittals
2. O&M manuals
3. As built drawings
4. If more than five (5) shop drawings of a single trade are received in one (1) calendar week.

I. Responsibility

1. Intent of Submittal review is to check for capacity, rating, and certain construction features. HVAC Contractor shall 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 of this and other sections. Work shall comply with approved submittals to extent that they agree with Contract Documents. Submittal review shall not diminish responsibility under this Contract for dimensional coordination, quantities, installation, wiring, supports and access for service, nor the shop drawing errors or deviations from requirements of Contract Documents. The Engineer's noting of some errors while overlooking others will not excuse the HVAC Contractor from proceeding in error and will not absolve the Contractor from meeting the full design intent of the associated system(s). Contract Documents requirements are not limited, waived nor superseded in any way by review.
2. Inform Contractors, manufacturers, suppliers, etc. of scope and limited nature of review process and enforce compliance with contract documents.

J. In the event that the HVAC Subcontractor fails to provide Shop Drawings for any of the products specified herein:

1. The HVAC Subcontractor shall furnish and install all materials and equipment herein specified in complete accordance with these specifications.

2. If the HVAC Subcontractor furnishes and installs material and/or equipment that is not in complete accordance with these specifications, he shall be responsible for the removal of this material and/or equipment. He shall also be responsible for the replacement of this material and/or equipment with material and/or equipment that is in complete accordance with these specifications, at the direction of the Owner's Representative.
 3. Removal and replacement of materials and/or equipment that is not in complete compliance with these specifications shall be done at no extra cost to the Owner.
 4. Removal and replacement of materials and/or equipment that is not in complete compliance with these specifications shall not be allowed as a basis for a claim of delay of completion of the Work.
- K. Mark dimensions and values in units to match those specified.
- L. Submit Material Safety Data Sheets (MSD) on each applicable product with submittal.

1.8 OPERATION AND MAINTENANCE DATA

- A. Commence preparation of the Operating and Maintenance (O&M) Manuals immediately upon receipt of "Approved" or "Approved as Noted" shop drawings and submit each section within one (1) month. The final submission shall be no later than two (2) months prior to the projected date of Substantial Completion of the Project.
- B. Each O&M document shall include the manufacturer's web address for equipment - specific O&M information for Internet access by the Owner.
- C. The manual shall consist of (3) sets of manuals and include (3) sets of CDs, which shall contain the scanned content of the entire manual. The manual shall highlight the actual equipment used and not be a master catalog of all similar products of the manufacturer. The manual shall be submitted for review prior to creation of the CDs.
- D. The Manual shall contain the following:
 1. Operations Manual
 - a. Systems description including all relevant information needed for day-to-day operations and management including:
 - 1) Start-up requirements and procedures, including Water Treatment systems.
 - 2) Shut-down requirements and procedures, including Water Treatment systems.
 - 3) Trouble-shooting checklist (i.e., common alarms with possible cause & effect, etc.).
 - b. Wiring diagrams, schematics, logic diagrams and sequence of operations that accurately depict the controls system.
 - c. Depiction of each interface screen where programmable logic and visual displays are provided. Descriptors shall be provided to define displayed data, alarms, etc.
 - d. A single sheet (for ease of removal) of all access codes and passwords necessary to access all levels of control and programming.
 2. Maintenance Manual

- a. Define all maintenance activities required to ensure system operation within manufacturers specified parameters. Maintenance documentation shall include:
 - 1) Data retrieval sheet
 - 2) Special instructions (i.e., lockout/tag-out, etc.)
 - 3) Special tools (i.e., key, allen wrench, etc.)
 - 4) Tasks
 - 5) Frequency
 - 6) Required materials, lubricants, etc.
 - b. Provide table of all required activities plotted vs. interval with adequate fill-in-space for "activity completion date" and "comments". Where multiple instrument readings are required, provide data sheet formatted to accommodate activity.
 - c. Provide as part of each package, lubricating charts indicating equipment tag number, location, equipment service, greasing and lubricating requirements, lubricants, and intervals.
 - d. Provide as part of each package, a valve and system chart that corresponds to the valve tags. Provide directions for normal positions and positions for equipment failure modes.
 - e. The HVAC Subcontractor shall furnish spare-parts data for each different item of equipment furnished. The data shall include a complete list of parts and supplies, with current unit prices, lead time, and source of supply; a list of parts and supplies that are either normally furnished at no extra cost with the purchase of the equipment, or specified hereinafter to be furnished as part of the contract; and a list of additional items recommended by the manufacturer to assure efficient operation for a period of 360 days at the particular installation. The foregoing shall not relieve the HVAC Subcontractor of any responsibilities under the guarantees specified herein.
 - f. Provide copy of all warranty information including extended warranties where specified with associated date of substantial completion (commencement of warranty) and end date of coverage. Define all components/subsystems specifically included and excluded.
- E. Provide O&M manuals for each of the following as a minimum:
1. Boilers and Pumps
 2. HVAC Control Systems

1.9 RECORD DRAWINGS

- A. Refer to Division 01, General Conditions, for record drawings and procedures to be provided under this section, unless specifically noted otherwise in this section.
- B. Record Drawings (red-line drawings) will be updated by this Contractor daily for review with the monthly requisition. The record drawing shall be an accurate depiction of the systems as completed, including dimensions (vertical/horizontal) of concealed components off fixed building elements.
- C. The HVAC Foreman shall maintain complete and separate set of prints of Contract Drawings at job site at all times and shall record work completed and all changes from original Contract Drawings clearly and accurately including work installed as a modification or addition to the original design.

- D. At completion of work the HVAC Contractor shall prepare a complete set of record drawings on AutoCAD showing all systems as actually installed. The Architectural background AutoCAD files will be made available for the Contractor's copying, at his expense, to serve as backgrounds for the drawings. The HVAC Contractor shall transfer changes from field drawings onto AutoCAD drawings and submit copy of files and three (3) sets of prints to Owner's Representative for comments as to compliance with this section. CADD layering as established by the A & E design team shall be maintained with any and all changes done by the Contractor.
- E. The Engineer are not granting to the Contractor any Ownership or property interest in the CADD Drawings by the delivery of the CADD Disks to the Contractor. The Contractor's rights to use the CADD disks and the CADD Drawings are limited to use for the sole purpose of assisting in the Contractor's performance of its contractual obligations under its contract with respect to the Project. The Architect and Engineer are granting no further rights. Any reuse or other use by the Contractor will be at the Contractor's sole risk and without liability to the Architect and Engineer. The Contractor hereby waives and releases any losses, claims, damages, liabilities of any nature whatsoever, and costs (including attorney fees) arising out of, resulting from, or otherwise related to the use of the CADD Disks and CADD Drawings by the Contractor. The Contractor, to the maximum extent permitted by law, hereby agrees to indemnify, defend and hold the Architect and Engineer harmless from all losses, claims, damages, liabilities, and costs (including attorney fees) arising out of, resulting from, or otherwise related to the use of the CADD Disks and CADD Drawings by the Contractor.
- F. Record Drawings, shall show "as-built" condition of all plans, mechanical room part plans, details, sections, piping diagrams, control diagram and sequence changes and corrections to schedules. Schedules shall show actual manufacturer model numbers and capacities of final installed equipment.
- G. The HVAC Contractor shall submit the record set for approval a minimum of three (3) weeks prior to seeking the permanent certificate of occupancy.

1.10 WARRANTIES

- A. Submit manufacturer's standard replacement warranties for material and equipment furnished under this section. Such warranties shall be in addition to and not in lieu of all liabilities which the manufacturer and the HVAC Subcontractor may have by law or by provisions of the Contract Documents.
- B. All materials, equipment and work furnished under this section shall be guaranteed against all defects in materials and workmanship for a minimum period of one (1) year commencing with the Date of Substantial Completion. Where individual equipment sections specify longer warranties, provide the longer warranty. Any failure due to defective material, equipment or workmanship which may develop, shall be corrected at no expense to the Owner including all damage to areas, materials and other systems resulting from such failures.
- C. Guarantee that all elements of each system meet the specified performance requirements as set forth herein or as indicated on the drawings.
- D. Upon receipt of notice from the Owner of the failure of any part of the systems during the guarantee period, the affected parts shall be replaced. Any equipment requiring excessive service shall be considered defective and shall be replaced.

1.11 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

- A. It is the intention of the specifications and drawings to call for complete, finished work, tested and ready for continuous operation. Any apparatus, appliance, material or work not shown on the drawings, but mentioned in the specifications or vice versa, or any incidental accessories necessary to make the work complete in all respects and ready for operation, even if not particularly specified, shall be provided by the HVAC Subcontractor or his/her Sub Subcontractors, without additional expense to the Owner.
- B. The drawings are generally diagrammatic. The locations of all items that are not definitely fixed by dimensions are approximate only. The exact locations must be determined at the site and shall have the approval of the Architect before being installed. The HVAC Subcontractor shall follow drawings, including shop drawings, in laying out work and shall check the drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions. Where space conditions appear inadequate, notify the Architect before proceeding with the installation. The HVAC Subcontractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work.
- C. Any requests for information (RFI) for resolving an apparent conflict or unclarity, or a request for additional detail, shall include a sketch or equivalent description of Contractor's proposed solution.
- D. Sizes of ducts and pipes and routing are shown, but it is not intended to show every offset and fitting, nor every structural difficulty that may be encountered. To carry out the intent and purpose of the drawings, all necessary parts to make complete approved working systems ready for use, shall be furnished without extra charge.

1.12 INSPECTION OF SITE CONDITIONS

- A. Prior to submission of bid, visit the site and review the related construction documents to determine the conditions under which the Work has to be performed. Send a report, in writing, to the Owner's Representative, noting any conditions which might adversely affect the Work of this section of the specifications.

1.13 SURVEY AND MEASUREMENTS

- A. Base all required measurements, horizontal and vertical, from referenced points established with the Owner's Representative and be responsible for correctly laying out the Work required under this section of the specification.
- B. In the event of discrepancy between actual measurements and those indicated, notify the Owner's Representative in writing and do not proceed with the related work until instructions have been issued.

1.14 DELIVERY, STORAGE AND HANDLING

- A. No materials shall be delivered or stored on site until Shop Drawings have been approved.

- B. All manufactured materials shall delivered to the site in original packages or containers bearing the manufacturer's labels and product identification.
- C. -Protect materials against dampness. Store off floors, under cover, and adequately protected from damage.
- D. Inspect all equipment and materials, upon receipt at the job site, for damage and conformance to approved shop drawings.

1.15 PROTECTION OF WORK AND PROPERTY

- A. This Contractor shall be responsible for the care and protection of all work included under this section until the completion and final acceptance of this Contract.
- B. Protect all equipment and materials from damage from all causes including, but not limited to, fire, vandalism and theft. All materials and equipment damaged or stolen shall be repaired or replaced with equal material or equipment at no additional cost to the Owner.
- C. Protect all equipment, outlets and openings with temporary plugs, caps and covers. Protect work and materials of other trades from damage that might be caused by work or workmen under this section and make good damage thus caused.
- D. Damaged materials are to be removed from the site; no site storage of damaged materials will be allowed.

1.16 SUPERVISION

- A. Provide a competent Supervisor with a minimum of 5 years of experience in HVAC Construction Supervision who shall be in charge of the HVAC work at the site.

1.17 SAFETY PRECAUTIONS

- A. Life safety and accident prevention shall be a primary consideration. Comply with all of the safety requirements of the Owner and OSHA throughout the entire construction period of the project.
- B. Furnish, place and maintain proper guards and any other necessary construction required to secure safety of life and property.

1.18 SCHEDULE

- A. Construct work in sequence under provisions of Division 01 and as coordinated with the Owner's Representative.

1.19 HOISTING, SCAFFOLDING AND PLANKING

- A. The work to be done under this section of the specifications shall include the furnishing, set-up and maintenance of all derricks, hoisting machinery, cranes, helicopters, scaffolds, staging and planking as required for the work.

1.20 CUTTING AND PATCHING

- A. Include all coring, cutting, patching, and fireproofing necessary for the execution of the work of this section. Structural elements shall not be cut without written approval of the Architect. This Contractor shall be responsible for taking all precautions required to identify hidden piping, conduits, etc. before any core drilling and/or cutting of slabs commences, including X-raying the affected slabs. Provide fire stopping to maintain the fire rating of the fire resistance-rated assembly. All penetrations and associated fire stopping shall be installed in accordance with the fire stopping manufacturer's listed installation details and be listed by UL or FM.
- B. All work shall be fully coordinated with all phases of construction, in order to minimize the requirements for cutting and patching.
- C. Form all chases or openings for the installation of the work of this section of the specifications, or cut the same in existing work and see that all sleeves or forms are in the work and properly set in ample time to prevent delays. Be responsible that all such chases, openings, and sleeves are located accurately and are of the proper size and shape and consult with the Owner's Representative and all trades concerned in reference to this work. Confine the cutting to the smallest extent possible consistent with the work to be done. In no case shall piers or structural members be cut without the approval of the Owner's Representative.
- D. Fit around, close up, repair, patch, and point around the work specified herein to match the existing adjacent surfaces and to the satisfaction of the Owner's Representative.
- E. Fill and patch all openings or holes left in the existing structures by the removal of existing equipment that is part of this section of the specifications.
- F. All of this work shall be carefully done by workmen qualified to do such work and with the proper and smallest tools applicable.
- G. Any cost caused by defective or ill-timed work required by this section of the specifications shall be borne by the Subcontractor.
- H. When, in order to accommodate the work required under this section of the specifications, finished materials of other trades must be cut or fitted, furnish the necessary drawings and information to the trades whose materials must be cut or fitted.

1.21 SUPPLEMENTARY STEEL, CHANNELS AND SUPPORTS

- A. Provide all supplementary steel, factory fabricated channels and supports required for proper installation, mounting and support of all equipment and systems provided under this section of the specification.
- B. Supplementary steel and factory fabricated channels shall be firmly connected to building construction in a manner approved by the Owner's Representative, as shown on the drawings, or hereinafter specified.
- C. The type and size of the supporting channels and supplementary steel provided under this section of the specifications shall be determined by the Subcontractor and shall be of sufficient strength and size to allow only a minimum deflection in conformance with the manufacturer's requirements for loading.

- D. All supplementary steel and factory fabricated channels shall be installed in a neat and workmanlike manner parallel to the walls, floors and ceiling construction. All turns shall be made with 90 degree and 45 degree fittings, as required to suit the construction and installation conditions.
- E. All supplementary steel including factory fabricated channels, supports and fittings shall be galvanized steel, aluminum, or stainless steel where exposed or subject to rust producing atmosphere and shall be manufactured by Unistrut, H-strut, Powerstrut, ERICO or approved equal.

1.22 HAZARDOUS MATERIALS

- A. Dispose of all hazardous materials in accordance with Federal and State laws. All handling shall conform to EPA requirements. A uniform hazardous waste manifest shall be prepared for all disposals and returned with all applicable signoffs prior to application for final payment. Provide breakout cost for this scope.
- B. Recovered refrigerant shall be recycled by a licensed facility approved by the Owner's Representative.
- C. Removed equipment or fluids containing any hazardous materials such as ethylene glycol, oil, mercury or chromate shall be recycled by a licensed facility approved by the Owner's Representative.
- D. Where it has been identified that asbestos-containing material exists within the scope limits, refer to the Asbestos Abatement specification section for requirements. Where insulation is removed, provide new insulation (types and thicknesses as specified in this section). Where scope is not defined, provide unit prices with bid for all pipe and duct sizes involved.

1.23 ACCESSIBILITY

- A. All work provided under this section of the specification shall be installed so that parts requiring periodic inspection, maintenance and repair are readily accessible. Work of this trade shall not infringe upon clearances required by equipment of other trades, especially code required clearances to electrical gear. Minor deviations from the drawings may be made to accomplish this, but changes of substantial magnitude shall not be made prior to written approval from the Owner's Representative.

1.24 WELDING QUALIFICATIONS

- A. Piping shall be welded in accordance with qualified procedures using performance qualified welders and welding operators. Procedures and welders shall be qualified in accordance with ASME BPV IX. Welding procedures qualified by others, and welders and welding operators qualified by another employer may be accepted as permitted by ASME B31.9 (or B31.1 for steam boiler piping over 15 PSIG and all steam and condensate piping over 150 PSIG). The Owner's Representative shall be notified twenty-four (24) hours in advance of tests and the tests shall be performed at the work site if practicable. The welder or welding operator shall apply his assigned symbol near each weld he makes as a permanent record. Structural members shall be welded in accordance with Division 01.

- B. A fire watchman with an approved fire extinguisher shall be posted at the site of the welding work, during that work, and for a minimum of thirty (30) minutes after the work is completed, to see that sparks or drops of hot metal do not start fires.

1.25 ELECTRICAL WORK

- A. All electrical apparatus and controls furnished, and the installation thereof, as a part of the HVAC work, equipment, and controls shall conform to applicable NEC and local/State electrical codes.

1.26 PROJECT CLOSEOUT

A. Certificates Of Approval

1. Upon completion of all work, provide certificates of inspections from the following equipment manufacturers stating that the authorized factory representatives have inspected and tested the operation of their respective equipment and found the equipment to be in satisfactory operating condition and installed per the manufacturers installation instructions and requirements.
 - a. Boilers and Pumps
 - b. Automatic Temperature Controls

B. Construction Observations By The Engineer

1. The engineer shall make progress site visits during construction and one (1) substantial completion (punch list) site visit for determining substantial completion.
2. The Trade Contractors and the General Contractor are required to inspect their own work and make any corrections to the work to comply with the specifications and the contract documents. It is not the responsibility of the engineer to develop lists of incomplete work items.
3. Progress Site Visits
 - a. The purpose of the progress site visit by the engineer is to observe if the work is proceeding in accordance with the contract documents.
 - b. The engineer will prepare a field report which will note in general the work completed since the last observation visit, work found not to be in accordance with the contract documents and work not corrected since the previous observation visit.

C. Substantial Completion

1. When the Contractor considers the Work under this section is substantially complete, the Contractor shall submit written notice, through the General Contractor, with a detailed list of items remaining to be completed or corrected and a schedule of when each remaining work item will be completed. Should the engineer determine the list of remaining work does not constitute substantial completion the engineer will notify the Architect and/or Owner and he will not make a substantial completion site visit.
2. The following items shall be completed prior to the written request for substantial completion site visit:
 - a. Certification of successful operation of all systems.
 - b. Training of the Owner's personnel in the operation of the systems.
 - c. Record Drawings in accordance with the contract specifications.

- d. Operation and Maintenance manuals.
 - e. Testing reports.
 - f. Balancing reports.
 - g. Manufacturers certificates of approvals.
 - h. Emergency contact list for reporting of malfunctioning equipment during the warranty period.
 - i. Contractors Project Completion certificate in accordance with the building code requirements.
3. Should the Engineer, during the substantial completion visit, observe that the Work is substantially complete, s/he will provide a written listing of the observed deficiencies referred herein as the Punch List. The Punchlist will provide for a place for the Contractor and General Contractor to sign off and date each item individually indicating that the observed deficiency item has been corrected.
 4. Should the Engineer, during the substantial completion site visit, observe that the Work is not substantially complete, s/he will provide, a written list of the major deficiencies and a reason for the work not being considered substantially complete.
 5. If the work is found not to be substantially complete then the engineer shall be reimbursed for his time to reobserve the work. A re-observation fee shall be charged to the Contractor through the contractual agreement for any further observations by the engineer.
 6. The Contractor shall remedy all deficiencies listed in the punchlist within the time frame required by the contract.

D. Engineer's Construction Completion Certification

1. Where required by the applicable code, the Engineer's Construction Completion Certification will be issued by NV5 when all life safety and health related issues are complete, all required functional tests are complete and all reports are complete. The following is a minimum listing of the required systems to be tested with reports generated indicating they are complete and ready for use:
 - a. Water Balancing
2. There shall be NO outstanding items identified on the punchlist for scope within any of these categories.

E. Final Completion

1. The following items shall be submitted prior to the written request for Final completion:
 - a. Revised Substantial Completion items to be resubmitted in accordance with the review process comments.
 - b. Warranties commencing the date of Substantial completion
 - c. Individual Signed and dated Punchlist acknowledging completion of all punchlist items
2. When the Contractor considers all of the punchlist work items complete, the Contractor shall submit written notice through the General Contractor that all Punchlist items are complete and resolved and the work is ready for final observation site visit. The signature lines for completion of each punchlist item shall be signed by the Contractor indicating the work is complete and signed by the General Contractor indicating s/he has inspected the work and found it to be complete. Should the Engineer find the work to be finally complete and all Punchlist items are complete the Engineer will make a recommendation to the Architect or Owner. If the Engineer has found the punchlist work to be incomplete

during final inspection a written listing of the observed deficiencies will be prepared by the Engineer.

PART 2 - PRODUCTS

2.0 FIRE STOPPING

- A. Provide asbestos-free fire stopping material capable of maintaining an effective barrier against flame, gases, and temperature. Provide noncombustible fire stopping that is nontoxic to human beings during installation or during fire conditions. Devices and equipment for fire stopping service shall be UL FRD listed or FM P7825 approved for use with applicable construction, and penetrating items.
1. Fire Hazard Classification: Material shall have a flame spread of 25 or less, a smoke developed rating of 50 or less when tested in accordance with UL 723 or UL listed and accepted.
- Fire stopping Rating: Fire stopping materials shall be UL FRD listed or FM P7825 approved for "F" and "T" ratings at least equal to fire-rating of fire wall or floor in which penetrated openings are to be protected, except that "F" and "T" ratings may be three (3) hours for fire stopping in through-penetrations of 4-hour fire rated wall or floor.

2.1 PIPING, DUCTWORK, EQUIPMENT, PANEL AND VALVE IDENTIFICATION

- A. All piping, ductwork, equipment, panels and valves furnished and/or installed under this section of the specifications including automatic temperature controls shall be identified with pipe markers, valve tags, ductwork markers, and equipment name plates. Refer to Part 3 – Identification for materials and methods of installation.

2.2 MOTORS, DRIVES AND STARTERS

- A. All equipment shall be provided complete with motors and drives, unless otherwise indicated.
- B. Motors shall be Premium Efficiency (as available by size/speed/horsepower) and shall conform to NEMA Standards and shall be suitable for load, duty service and location. Motors shall have nameplates giving manufacturer's name, serial number, horsepower, efficiency, speed and current characteristics. Motors shall be Century "E+3", General Electric "Energy Saver Premium", Reliance "Premium Energy Efficient" Series, Baldor "Super Premium Efficiency", or approved equal. Motors shall have a minimum manufacturer's warranty of 3 years.
- C. Motors shall be tested in accordance with the standards of ANSI C50 and conform therewith for insulation resistance and electric strength. Minimum efficiency levels shall be as listed in latest edition of ANSI/ASHRAE Standard 90.1 or the state's energy code, whichever is higher. All motors shall be tested in accordance with IEEE Standard 112, Test Method B. Provide on nameplate the type of bearing grease to use.
- D. Electronically Commutated Motors (ECM): Motors shall be equal to General Electric ECM, variable-speed, DC, brushless motors specifically designed for use with single phase, 277 V (or 120 V), 60 Hz electrical input. For motors 1 HP and larger efficiency shall meet or exceed the minimum efficiencies listed in the governing energy code, or the

efficiencies listed above, whichever is higher. Motors shall be complete with and operated by a single-phase integrated controller/inverter that operates the wound stator and senses rotor position to electronically commutate the stator. All motors shall be designed for synchronous rotation. Motor rotor shall be permanent magnet type with near zero rotor losses. Motor shall have built-in soft start and soft speed change ramps. Motor shall be able to be mounted with shaft in horizontal or vertical orientation. Motors shall maintain a minimum of 70% efficiency over their entire operating range. Provide motor speed control, either integral to the motor or by remote input by the control system (0-10 VDC signal), as indicated on the drawings and by the control sequences) for field adjustment between 20% and 100% of motor speed. Inductors shall be provided to minimize harmonic distortion and line noise. Motors shall be designed to overcome reverse rotation and not affect life expectancy. Motors shall have a minimum manufacturer's warranty of 3 years.

2.3 INSULATION

- A. Scope: Provide all labor, equipment, materials and accessories, and perform all operations required, for the correct installation of insulation on the following systems and all other necessary items connected into the systems subject to condensation, loss of heat, or personnel protection (above 120°F):
1. Piping insulation (other than pre-insulated underground piping), jackets and accessories (including all valves and fittings with easily removable sections for maintenance of strainers, balance valves, and unions).
 2. Ductwork insulation, jackets, and lining (including all fittings).
- B. Environmental Requirements: Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
- C. Quality Assurance: Insulation materials must be asbestos free, UL listed, and manufactured at facilities certified and registered to conform to ISO 9000 Quality Standard. All insulating products and jackets shall carry a 25/50-flame spread/smoke developed rating as tested in accordance with ASTM E 84.
- D. Workmanship: All insulation shall be installed by a licensed applicator and applied in accordance with the manufacturer's recommendations. All work shall comply with all applicable federal, state, and local codes including, but not limited to, OSHA. All work shall conform to industry and trade accepted standards for commercial and industrial insulations. Verify that piping, heat trace, and ductwork has been tested (including applicable pressure/leakage tests) before applying insulation materials. Surfaces to be insulated shall be cleaned free of dirt, scale, moisture, oil and grease. No vapor barrier leaks or insulation voids will be accepted. Continue insulation vapor barrier through penetrations except where prohibited by code. All fire rated walls and penetrations shall be sealed with fire stopping. Locate insulation and cover seams in least visible locations. Neatly finish insulation at supports, protrusions, and interruptions. For all systems requiring a vapor barrier seal all terminations including fittings, wall penetrations, and supports with vapor barrier mastic such as Foster 30-65, Childers CP-35 or approved equal. In addition, in brine or chilled water pipe systems vapor seal pipe terminations every four (4) pipe sections, using Foster 30-65, Childers CP-35 or approved equal. Bevel and seal ends of insulation at equipment, flanges, and unions. Where insulation is used over stainless surfaces, the material shall be chlorine free.
- E. Delivery and Storage of Materials

1. Deliver all materials to the job site and protect the insulation against dirt, water, chemical and mechanical damage before, during and after installation. Do not install damaged insulation and remove it from the job site.
 2. Deliver insulation, coverings, cements, adhesives coatings etc. to the site in factory-fabricated containers with the manufacturer's stamp or label affixed showing fire hazard ratings of the products, name of manufacturer and brand.
 3. Installed insulation that has not been weatherproofed shall be protected from inclement weather by an approved waterproof sheeting installed by the Contractor. Any water-damaged insulation shall be removed and replaced by the Contractor at no additional cost.
- F. Manufacturers: Johns Manville (JM), CertainTeed, Owens-Corning, 3M, Armstrong, Knauf, Armacell, or approved equal. Note that the listed manufacturers may not be able to supply all the insulation products required for the project. Unless otherwise noted, JM insulation products are listed to provide the minimum standards required for each type of insulation.
- G. Pipe Insulation: Provide the following products depending on temperature of each system. Insulation shall be marked to show the locations of all unions, break flanges, strainers, check and balancing valves.
1. For piping with a service temperature between 40°F and 600°F such as chilled water, hot water, dual temperature water, make-up and feed water, blow-down, all outdoor condenser water piping, all indoor condenser water supply piping from the towers to the free cooling heat exchanger, condensate drain, glycol heat recovery (with down to 0°F minimum winter temperature), boiler feed water, heated oil, water defrost piping in refrigerated rooms, steam, and steam condensate, provide glass fiber insulation equal to JM Micro-Lok. Insulation shall be rigid molded and noncombustible, meeting ASTM C 547, Type I. K-factor shall be 0.23 at 75°F mean temperature. All purpose vapor retardant jacket shall be JM AP-T PLUS. Jacket shall be white kraft paper reinforced with glass fiber yarn and bonded to aluminum foil; secure with self-sealing longitudinal laps and butt strips or AP Jacket with outward clinch expanding staples (coated with vapor barrier mastic for all chilled water, dual temperature water and glycol heat recovery systems). A breather mastic for applications above ambient pipe service temperatures (fittings, tees, valves, etc.) shall be water based Foster 46-50 or Childers CP-10 / CP-11. A rigid, non-compressible insulation, equal to Pittsburgh-Coming FoamGlas or KingspanTarec Kooltherm shall be used at all pipe hangers and supports for all steel chilled water piping where the pipe is supported by hangers, anchors, and guide with a minimum length of eighteen (18) inches.
- H. Minimum pipe insulation thicknesses shall be as shown on the drawings.
- I. Field Applied Piping and Fitting Jackets
1. Provide covers for insulation of all pipe fittings (i.e. elbows, tees, end caps, reducers, unions, flanges, mechanical joints), strainers and valves with surface temperatures between -20°F and 150°F (all water, low pressure steam and condensate systems with glass fiber insulation and over one (1) inch foam insulation on refrigerant piping). Provide easily removable sections for cleaning and maintenance of unions, balancing valves, and strainers. Fitting covers shall be 30-mil thick white PVC equal to JM Zeston 2000 molded high impact, UV resistant covers. Attach with water-resistant pressure sensitive color matching vinyl tape to maintain vapor barrier. Insulate all fittings per manufacturer's recommendations to prevent surface temperature from exceeding the 150°F limit.

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2.4 HYDRONIC PIPING AND FITTINGS**A. General Requirements for Pipe**

1. Pipe material shall be indicated in the Schedule of Pipe and Fittings for each type of service.
2. Steel pipe shall conform to ASTM A53 Grade B or ASTM A106 Grade B (A106 is required for systems with temperatures that could go over 750°F) black steel. Pipe thickness (schedule) shall be as specified for the service.
3. Copper tubing shall conform to ASTM B75 or ASTM B88, seamless. Thickness (type) shall be as required for the service with a minimum safety factor of 4:1. Tubing for compressed air tubing shall conform to ASTM B251.

B. General Requirements for Fittings

1. Pipe fittings shall be indicated in the Schedule of Pipe and Fittings for each type of service. Fittings shall be rated to match the larger of the pipe pressure rating in the Schedule or the valve rating listed in the valve tables in the Part 2 Valve and Strainer section of this specification.
2. All fittings shall be installed per code requirements and the manufacturer's best recommendations.
3. The steel pipe joining methods below are only allowed when they are specifically listed in the Schedule of Pipe and Fittings:
 - a. Type S1: Welded fittings shall conform to ASTM A234 with WPA marking. Butt-welded fittings shall conform to ASME B16.9, and socket welded fittings shall conform to ASME B16.11. Make fusion welded joints as required by ANSI/ASME B31.1.
 - b. Type S2: Steel flanged fittings including flanges, bolts, nuts, bolt patterns, etc. shall be in accordance with ASME B16.5 for the class required (Class 150 minimum). Flange material shall conform to ASTM A53 Grade B. Blind flange material shall conform to ASTM A516 for cold service and ASTM A515 for hot service. Bolts shall be high strength or intermediate (Class 150 only) strength with material conforming to ASTM A193.
4. Fittings for copper tubing shall be wrought copper and bronze fittings conforming to ASME B16.22 and ASTM B75 or cast copper alloy fittings conforming to ASME B16.18. Copper may be used up to two (2) inch tubing size. Adapters may be used for connecting tubing to flanges and threaded ends of valves and equipment. The copper tubing/pipe joining methods below are only allowed when they are specifically listed in the Schedule of Pipe and Fittings:
 - a. Type C1: Soldered copper fittings shall use either 95/5 (Tin/Antimony), silver solder (for systems up to 250°F and 175 PSI), or shall be brazed (for higher temperature/pressure systems – Contractor shall submit brazing material and pressure/temperature rating of joint). Solder shall conform to ASTM B32. Solder and flux shall be lead free. Silver solder shall conform to FS QQ-B-654. Brazing alloys shall be B-Ag alloy (or equivalent strength alloy) having a melting point above 1,000°F.
 - b. Type C2: Copper and copper alloy press fittings equal to Viega ProPress may be used (in exposed, accessible areas only) and shall conform to

material requirements of ASME B16.18 or ASME B16.22 and performance criteria of IAPMO PS 117. Sealing elements for press fittings shall be EPDM. Sealing elements shall be factory installed or an alternative supplied by fitting manufacturer and shall be suitable for, and limited to, water systems with operating temperatures up to 210°F and maximum pressure rating up to 200 PSIG. Press ends shall have a design feature to assure leakage of liquids and/or gases from inside the system past the sealing element of an un-pressed connection. The function of this feature is to provide the installer quick and easy identification of connections which have not been pressed prior to putting the system into operation.

5. Unions shall conform to FS WW-U-531 or FS WW-U-516, type to match adjacent piping.
6. Adapters for copper tubing shall be brass or bronze for soldered and brazed fittings.
7. Flexible pipe connectors shall be as specified in Vibration Isolation paragraph.

C. Schedules of Pipe and Fittings

1. As used in the pipe and fitting schedule tables, closed loop systems have expansion tanks and are not open to the atmosphere, examples are chilled, hot, dual temperature and closed heat pump condenser water systems. Open loop systems are open to the atmosphere with open condenser water system being the most common.
2. Relief valve piping shall have the same pressure/temperature ratings as the fluid being relieved. Exposed outdoor piping shall be stainless steel

WATER AND GLYCOL SERVICES: UP TO 230 PSIG AT 250°F, OR 275 PSIG AT 100°F (pressures are based on relief valve setting plus the shutoff head of the pump) (Some joint types or materials may have lower pressure and/or temperature limits and Contractor shall ensure they are only used where those limits will NOT be exceeded.)				
Service	Pipe Material & Min. Schedule or Type	Joint Types Allowed	Fitting Material	Min. Pressure Class (PSIG) & / or Schedule
Closed loop piping up to 2"	Copper / Type L	C1, C2, C3, or SC1	Copper, Bronze	150
Closed loop piping up to 2"	Steel / Schedule 40	S5, S6, or SC1	CI, DI	250 / Standard Weight
Closed loop piping 2.5"-24"	Steel / Standard Weight	S1, S2, S3, S4, S7, or SC1	Steel, CI, DI, SS	150 / Standard Weight
Condensate gravity drain	Copper / Type M or DWV	C1, C2, C3, or SC1	Copper, Bronze, SS	125
Cold water make-up	Copper / Type L	C1 (silver soldered or brazed only), C2, C3, or SC1	Copper, Bronze, SS	150

2.5 PIPE HANGERS AND SUPPORTS

- A. Hangers shall be as manufactured by Carpenter & Patterson, Inc., Grinnell Corporation, B-Line Systems, ERICO, or equal. Hangers shall transmit the load exclusively to the structure of the building. All hangers and supports to conform to MSS standards SP-58 and SP-69 and ANSI B 31.1.
- B. Hangers for all water piping up 210°F four (4) inches and all systems with temperatures above 210°F (including steam, steam condensate, generator exhaust) two (2) inches and above shall be adjustable roll type. Hangers for water piping smaller than listed shall be clevis type. Hangers for piping in tunnels on strut support frames shall be roller type, similar to Fig. B379 by B-Line Systems. Additionally, the first five (5) pipe hangers on both sides of all pump piping (suction and discharge) to be pre-compressed spring and double-deflection neoprene style, with 30° hanging rod swing capability, similar and equal in all respects to Mason Industries Model PC 30N, selected by manufacturer for anticipated loading and deflection.
- C. Provide all additional structural steel required for proper installation of hangers, anchors, guides and supports; hangers shall be arranged to maintain the required grading and pitch of piping, to prevent vibration and to provide for expansion and contraction. Outdoor mounted piping supports shall be designed for both seismic and wind loads for the location installed. - see specification 230000 Vibration Isolation and Seismic Restraints paragraph.
- D. Maximum spacing of hanger and supports for steel pipe:

<u>Pipe Size (inches)</u>	<u>Horizontal</u>	<u>Vertical</u>
Up to 1	6 feet	10 feet
1¼-2½	9 feet	15 feet
3-and up	12 feet	15 feet

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- E. Reduce steel pipe spacing to a maximum of ten (10) feet, regardless of pipe, as necessary for fittings, valves, and other concentrated loads.
- F. Horizontal copper tubing shall have maximum hanger spacing of five (5) feet for tubing up to 1-¼ inch and eight (8) feet for 1½ inch and larger. Vertical copper tubing shall have maximum hanger and support spacing of ten (10) feet. Maximum spacing for PVC pipe hangers and supports shall be four (4) feet (horizontal), and ten (10) feet (vertical) with mid-story guides.
- G. Steel or stainless steel tubing shall have maximum hanger and support spacing of eight (8) feet (horizontal) or ten (10) feet (vertical).
- H. If any other piping material is used, the maximum hanger and support spacing shall be the lesser of manufacturer's recommendation or the listed spacing in the mechanical code (adopted edition of IMC Table 305.4).
- I. Branch piping and runouts of over 5 feet shall have at least one (1) hanger or support.
- J. At all copper piping, provide pipe supports with copper finish to eliminate the possibility of galvanic action.
- K. Furnish additional hangers or supports at vertical or horizontal changes of direction and at locations of concentrated loads due to valves, fittings, strainers, and accessories.
- L. Hangers and supports shall provide for two (2) inches of vertical adjustments.
- M. Hanger rods shall be steel, threaded and furnished with two (2) removable nuts at each end of positioning rod and hanger and locking each in place.
- N. Except as otherwise noted, hanger rods shall be of the following sizes:

SCHEDULE OF PIPE HANGER ROD SIZES		
Pipe Sizes (inches)	Single Rod Diameter (inches)	Double Rod Diameter (inches)
½-2	3/8	3/8
2½-3	½	3/8
4 & 5	5/8	½
6	¾	5/8

- O. Pipe covering protection saddles shall not be loaded to more than 80% of maximum loading as rated by the manufacturer.
- P. Insulated piping insulation shields:
- Up to three (3) inch pipe size: 18 gauge galvanized steel, located outside the vapor barrier, minimum 180° arc, twelve (12) inches long, or pipe covering protection saddles.
 - 4" pipe size and larger: pipe covering protection saddles.

2.6 VALVES AND STRAINERS

A. General

1. Valves and strainers shall be constructed of the materials shown in the tables for each system and be rated by the manufacturer for the appropriate pressure class required for the listed pressure and temperature limits and for the fluid used and per the valve tables.
2. The manufacturers and model numbers indicated below are to be used as a means of identifying the type, quality, materials and workmanship required. Note that some of the manufacturers listed for a type of valve do not make valves for all pressure/temperature limits and/or all sizes. All valves of each type (400 PSIG ball, 150 PSIG globe, etc.) for the project shall be by the same manufacturer.
3. All valves shall be located and oriented as to valve stem direction to permit proper and easy operation, and access to valve for maintenance of packing, seat and disc. Valve stems shall not be tilted down unless approved by the manufacturer. Where valves are more than seven (7) feet above the floor, stems shall be horizontal and all valves 2-1/2 inch and above shall have chain wheel and "endless link" style chain for operation from floor; where impact wheel is required, it shall be provided. Packing and gaskets shall not contain asbestos. Provide unions adjacent to equipment end of all threaded and soldered or permanent push-to-connect end valves. Provide grooved joint couplings adjacent to equipment end of all grooved end valves.

B. Service:

1. Shutoff or Isolation Valves shall be provided in all branch connections to mains and where shown on piping diagrams.
 - a. In general, for piping smaller than 2½ inch use threaded, sweat, permanent push-to-connect or press/crimped water system connections; full port ball valves for water, fuel oil, and glycol systems or gate valves for steam and condensate systems.

- C: Ball Valves: Valves shall meet FS WW-V-35C, Type II, and have the appropriate trim to meet the required pressure/temperature ratings listed in the tables. Valves shall have locking handles to allow servicing and removal of piping or equipment. Valves on insulated piping shall have stem extension assemblies equal to the insulation thickness. Valves shall have 100% tight shut-off (no seat leakage). Valves used for isolation (all 2-position applications) shall be full port. Valves shall be as manufactured by Conbraco Industries (Apollo), Watts, Stockham, Nibco, Hammond, or Milwaukee. Ball valves for modulating control service may be reduced port and shall have characterized disc where available to provide equal percentage flow characteristics and extended rangeability. Modulating ball valves shall be Bray VCB series or Belimo B series.

2.7 CENTRIFUGAL PUMPS

A. General Requirements

1. Provide, where shown on drawings, centrifugal pumps, of capacities types, motor sizes, and configurations shown on schedules. Acceptable manufacturers shall be:
 - a. Armstrong
 - b. Bell and Gossett
 - c. Grundfos
 - d. Taco

2. Provided that they meet the requirements of this specification and the performance requirements shown on the schedules (with equal or less horsepower requirement than the pump shown on the schedules). Pumps, other than the scheduled model, may also be rejected, which operate in an inappropriate portion of their performance curves, including but not limited to, operating in the rightmost third of the curve.
 3. Pumps shall be designed specifically for intended classes of service, with non-overloading characteristics throughout the design curve (motors shall not operate in their service factor). Impeller shall be statically and dynamically balanced. Impeller size shall be no more than 90 percent of casing size. Pump shall be factory tested at operating conditions, thoroughly cleaned, and painted with one coat of machinery enamel prior to shipment. Installation instructions shall be included with pump at time of shipment.
 4. Coordinate with manufacturer of water treatment to ensure that normal life of pumps and components shall not be foreshortened by water treatment.
 5. Provide, under the work of the mechanical section, flexible connections (if shown on details) and vibration isolation components for all pumps. See the vibration isolation paragraph of these specifications for specific requirements.
 6. Provide steel channel base for each pump.
 7. Motors shall meet the requirements of section 23 00 00 specification "Motors, Drives and Starters" paragraph, be non-overloading throughout pump curve, premium efficiency, VFD duty rated and labeled with shaft grounding rings (where shown on drawings as using VFD's), meet NEMA specifications, and shall be size, voltage and enclosure called for on the drawings.
 8. For all types of pumps listed below, bearing frame and pump internals shall be serviceable without disturbing motor or connected piping.
 9. For all types of pumps listed below, provide mechanical seals with carbon rings and ceramic faces, stainless or brass metal parts, stainless springs and synthetic rubber bellows. Seals and pump shall be designed to operate continuously between 35 and 225 degrees F.
 10. Each pump over 2 HP shall be fitted with a factory installed flush line. Supply, for field installation in the flush line to the mechanical seal, a 50 micron cartridge filter and floating ball type sight flow indicator suitable for the working pressure encountered. Separator materials and pressure ratings shall be suitable for intended class of service and maximum working pressure of the pump. Provide sheet metal guard to protect separator tubing from damage do not use poly tubing for separator. Provide shut off cocks with manual valved bypass line to allow separator to be removed for cleaning while seals continue to be flushed. The HVAC Subcontractor shall change the filters after the system has been flushed and on a regular basis until the pumps are turned over to the Owner.
 11. Unless otherwise stated in the schedules, all pumps shall be single stage.
 12. Provide tappings for pressure gauges at inlet and discharge of all in line and split case pumps.
 13. All couplings for variable speed pumps shall be capable of operating under all conditions without fatigue.
 14. All clean water pumps (In-Line Mounted Centrifugal type, End Suction type, Multi-stage In-Line type, and Submersible Vertical Turbine type up to 6" bowls) from 1 HP up to and including 200 HP, shall meet or exceed the Energy Conservation Standards set forth by the U.S. Department of Energy and comply with the Pump Efficiency Index (PEI) labeling program. PEI rating shall not exceed 1.00. Testing shall be done for pump with motor for constant speed pumps or for pump with motor and VFD for variable speed pumps.
- B. In-Line Mounted Centrifugal Pump (Up to 50 HP): Provide pumps with capacities as shown on the drawings. Pumps shall be in-line type, close-coupled, single stage design,

for installation in vertical or horizontal piping. Pump must be capable of being serviced without disturbing piping connections.

1. Pump volute shall be cast iron, bronze or S.S. and impeller shall be synthetic (up to two (2) inch flanges), bronze/brass S.S. or cadmium plated steel, enclosed type dynamically balanced, keyed to the shaft and secured by locking capscrew or nut.
2. Pumps shall be rated 125 PSI minimum (up to four (4) inch flanges) and a minimum of 175 PSI working pressure (for larger pumps), with gauge ports at nozzles, and with vent and drain ports.
3. Pump shall be suitable for continuous operation between 35 and 225°F.
4. Bearings shall be non-lubricated bronze type with S.S. shafts. Seal shall be mechanical type.
5. Each pump shall be factory tested and painted with at least one (1) coat of high-grade machinery enamel prior to shipment.

2.8 BOILERS –STAINLESS STEEL CONDENSING

A. Manufacturers

1. Manufacturers: Subject to compliance with requirements, provide product lines as scheduled by one of the following:
 - a. Lochinvar Corporation – FTX series.
 - b. Aerco Corporation – Benchmark series.
 - c. Cleaver-Brooks - ClearFire CE series.

B. Manufactured Units

1. Description: Factory-fabricated, assembled, and tested, fire-tube condensing boiler with heat exchanger sealed pressure tight, built on a steel base; including insulated jacket; flue-gas vent; combustion-air intake connections; water supply, return, and condensate drain connections; and controls. Water and glycol/water heating services only. Boilers shall be capable of operating with variable speed primary only pumps with a large enough boiler water volume to operate with minimum flow of 20 gpm. Manufacturer must state minimum required flow in the boiler submittal.
2. Boiler and burner design and installation shall comply with ASME CSD 1 safety code requirements.
3. Boiler and burner design and installation shall comply with ASME CSD 1 safety code requirements.
4. Heat Exchanger: Stainless steel tubes/ combustion chamber Type 316 (316L where condensation is expected) or equally corrosion resistant grade.
5. Pressure Vessel: Carbon steel with welded heads and tube connections.
6. "Near condensing" copper fin designs, watertube, cast iron, cast aluminum, or "add-on" secondary condensing exchangers will not be considered. Boilers with minimum flow requirements over 25 gpm or requiring dedicated primary pumps also will not be considered.
7. Burner: Natural gas, forced draft.
8. Blower: Centrifugal fan to operate during each burner firing sequence and to pre purge and post purge the combustion chamber.
 - a. Motors: Comply with requirements specified in Section 23 00 00 paragraph titled "Motors, Drives and Starters"
 - 1) Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
9. Gas Train: Combination gas valve with manual shutoff and pressure regulator. Gas train shall be vent less.

10. Ignition: Spark ignition with 100 percent main-valve shutoff with electronic flame supervision.
11. Casing:
 - a. Jacket: Sheet metal with snap-in or interlocking closures.
 - b. Control Compartment Enclosures: NEMA 250, Type 1A.
 - c. Finish: Baked-enamel protective finish.
 - d. Insulation: Minimum 2-inch- (50-mm-) thick, mineral-fiber insulation surrounding the heat exchanger.
 - e. Combustion-Air Connections: Inlet and vent duct collars.
 - f. Mounting base to secure boiler.
12. Characteristics and Capacities: Refer to Drawings.
 - a. Heating Medium: Hot water.
 - b. Design Water Pressure Rating: minimum 150 psig.
 - c. Safety Relief Valve Setting: As listed on the drawings, no lower than 50 psig.

C. Trim

1. Include devices sized to comply with ANSI B31.9, "Building Services Piping."
2. Aquastat Controllers: Operating, firing rate, and high limit.
3. Safety Relief Valve: ASME rated.
4. Pressure and Temperature Gage: Minimum 3-1/2-inch diameter, combination water-pressure and -temperature gage. Gages shall have operating-pressure and -temperature ranges so normal operating range is about 50 percent of full range.
5. Boiler Air Vent: Automatic.
6. Drain Valve: Minimum NPS 3/4 hose-end gate valve.

D. Controls

1. Boiler operating controls shall include the following devices and features:
 - a. Control transformer.
 - b. Set-Point Adjust: Set points shall be adjustable.
 - c. Sequence of Operation: Electric, factory-fabricated and field-installed panel to control burner firing rate to reset supply-water temperature inversely with outside-air temperature. At 0 deg F outside-air temperature, set supply-water temperature at 160 deg F; at 60 deg F outside-air temperature, set supply-water temperature at 100 deg F.
 - 1) Include automatic, alternating-firing sequence for multiple boilers to ensure maximum system efficiency throughout the load range and to provide equal runtime for boilers.
2. Burner Operating Controls: To maintain safe operating conditions, burner safety controls limit burner operation.
 - a. High Cutoff: Automatic reset stops burner if operating conditions rise above maximum boiler design temperature.
 - b. Low-Water Cutoff Switch(s): Float and electronic probe shall prevent burner operation on low water. Cutoff switch shall be automatic-reset type. Auxiliary low cutoff shall be automatic reset.
 - c. Audible Alarm: Factory mounted on control panel with silence switch; shall sound alarm for above conditions.
3. An electrical thermal switch fused to break the ungrounded conductor in the main circuit at 165 degrees shall be installed in the main power line within six feet over the top of the Burner. If the ceiling above the Burner exceeds 12 ft. in height, an additional thermal switch shall be installed on the ceiling and series connected with the lower switch. Fuse protection for the control circuit shall be provided.
4. Provide contacts for a safe boiler/burner shut down by a manually operated remote heating plant shutdown switch furnished by Division 26 and installed just

outside Boiler room door and shall be marked for easy identification. If there is more than one (1) Boiler room door, there shall be a labeled switch located at each door. Shutdown switch(es) must be wired to disconnect all power to the Boiler controls. Division 26 will also install a CO detection and alarm system in each boiler room with gas fired burners.

5. Building Management System Interface: Factory install hardware and software to enable building management system to monitor, control, and display boiler status and alarms.

a. Hardwired Points:

- 1) Monitoring: On/off status, common trouble alarm and low water level alarm.
- 2) Control: On/off operation and hot water supply temperature set-point adjustment

b. A BACnet communication interface with building management system shall enable building management system operator to remotely control and monitor the boiler from an operator workstation. Control features available, and monitoring points displayed, locally at boiler control panel shall be available through building management system.

E. Electrical Power

1. Single-Point Field Power Connection: Factory-installed and -wired switches, motor controllers, transformers, and other electrical devices necessary shall provide a single-point field power connection to boiler.

- a. House in NEMA 250, Type 1 enclosure.
- b. Wiring shall be numbered and color-coded to match wiring diagram.
- c. Install factory wiring outside of an enclosure in a metal raceway.
- d. Field power interface shall be to non-fused disconnect switch.
- e. Provide branch power circuit to each motor and to controls with a circuit breaker.
- f. Provide each motor with overcurrent protection.

F. Source Quality Control

1. Burner and Hydrostatic Test: Factory adjust burner to eliminate excess oxygen, carbon dioxide, oxides of nitrogen emissions, and carbon monoxide in flue gas and to achieve combustion efficiency; perform hydrostatic test.
2. Test and inspect factory-assembled boilers, before shipping, according to ASME Boiler and Pressure Vessel Code with ASME "H" stamp for the specified pressure.
3. Allow Owner access to source quality-control testing of boilers. Notify Architect 14 days in advance of testing.

G. Condensate Neutralization Kits

1. Provide condensate neutralization kit and condensate pump as required and pipe condensate to nearest floor drain.

- H. Provide Outdoor Temperature Sensor for use in resetting the hot water supply temperature.

PART 3 - EXECUTION

3.0 DEMOLITION

- A. Refer to the drawings for demolition scope applicable to the project.

3.1 GENERAL

- A. Install all items specified under PART 2 - PRODUCTS, according to the manufacturer's requirements and best quality recommendations, shop drawings, the details as shown on the drawings and as specified in this specification section.
- B. Install all work so that parts requiring inspection, replacements, maintenance and repair shall be readily accessible. Minor deviations from the drawings may be made to accomplish this, but any substantial change shall not be made without prior written approval from the Owner.
- C. Equipment bases mounted on concrete slabs and pads, or mounted on stands, gratings, platforms, or other, shall not be set in any manner, except on the finished and permanent support.
- D. Support of equipment on studs or other means, and the placing or building of the supporting slab, pad, pier, stand, grating, or other "to the equipment", is prohibited.
- E. All welding done under this section shall be performed by experienced welders in a neat and workmanlike manner. All welding done on piping, pressure vessels and structural steel under this section shall be performed only by persons who are currently qualified in accordance with ANSI Code B31.9 and B31.1 for Pressure Piping and certified by the AWS, ASME or an approved independent testing laboratory, and each such welder shall present certificate attesting his/her qualifications to the Architect's representative whenever requested to do so on the job.
- F. All pipe welding shall be oxyacetylene or electric arc. High test welding rods suitable for the material to be welded shall be used throughout. All special fittings shall be carefully laid out and joints shall accurately match intersections. Care shall be exercised to prevent the occurrence of protruded weld metal into the pipe. All welds shall be of sound metal free from laps, cold shots, gas pockets, oxide inclusions and similar defects.
- G. All necessary precautions shall be taken to prevent fire or damage occurring as the result of welding operations.
- H. Care shall be taken when working on the roof. Protect the roof from damage.

3.2 PIPING

- A. General
 - 1. Piping shall be cut accurately to measurements established at the jobsite, shall be installed without cold springing, and shall properly clear windows, doors and other openings and electrical gear. Cutting or other weakening of the building structure to facilitate piping installation will not be permitted. Piping shall be free of burrs, oil, grease, and other foreign matter. Piping shall be installed to permit free expansion and contraction without damaging building structure, pipe, joints, or hangers. Changes in direction shall be made with fittings. Vent pipes shall be carried through the roof and shall be properly flashed.
- B. Water Piping:
 - 1. Unless otherwise indicated, horizontal water piping shall pitch down in the direction of flow with a grade of not less than one (1) inch in 40 feet and condensate drain piping shall pitch down in direction of flow with a grade of not

- less than one (1) inch in ten (10) feet. Unless otherwise detailed, horizontal reducers shall be the eccentric type, flat on bottom (FOB), to allow for complete drainage. Open ends of pipelines and equipment shall be properly capped or plugged during installation to keep dirt or other foreign materials out of the systems. Pipe not otherwise specified shall be uncoated.
2. Unless otherwise allowed in Part 2 Piping and Fittings, or shown on the drawings, connections to equipment shall be made with malleable-iron unions or flanges for steel pipe two (2) inches or less in diameter and with flanges or grooved joint couplings for pipe 2-1/2 inches or more in diameter. Unions for copper pipe or tubing shall be brass or bronze. Connections between ferrous piping and copper piping shall be electrically isolated from each other with dielectric waterway as specified in the Part 2 Piping and Fittings section of this specification. Where the temperature or pressure of the system is beyond the waterway limits, dielectric couplings or other approved methods shall be used. Reducing fittings shall be used for changes in pipe sizes.
 3. Pipe joints between sections of pipe shall be as listed in the Part 2 Piping and Fittings section in the Schedules for Piping and Fittings tables. Exceptions are pipe and fittings installed in inaccessible conduits or trenches beneath concrete floor slabs or in difficult to access locations such as shafts which shall be welded, soldered or brazed. Some joint types or materials listed may have lower pressure and/or temperature limits and Contractor shall ensure they are only used where those limits will NOT be exceeded.
 4. Viega ProPress press fittings may be used where allowed in the Part 2 Piping and Fittings section of these specifications. Prepare copper tube and install in strict accordance with manufacturer's installation instructions. Pipe ends shall be cleaned, free from indentations, projections, burrs and foreign matter. Use a tube preparation tool as supplied by manufacturer to clean and make installation mark. Push copper tube into fittings to installation depth mark, per manufacturer's installation instructions. Keep fittings free of dirt and oil. Prior to putting the system into operation, Contractor shall verify all connections have been properly pressed.

3.3 CONNECTIONS TO EQUIPMENT

- A. Supply and return connections shall be provided by the Contractor unless otherwise indicated. Valves and traps shall be installed in accordance with the manufacturer's recommendations. Unless otherwise indicated, the size of the supply and return pipes to each piece of equipment shall be not smaller than the connections on the equipment. No bushed connections shall be permitted. Change in sizes shall be made with reducers or increasers only.

3.4 VALVES AND EQUIPMENT ACCESSORIES

- A. Valves shall be of the type and construction specified for the service and installed at the locations shown or specified, and where required for the proper functioning of the system as directed. Valves shall be installed with their stems horizontal to or above the main body of the valve. Valves used with ferrous piping shall have threaded or flanged ends and threaded or sweat-type connections for copper tubing. Non-flanged valves shall have unions for ease of maintenance.

3.5 AIR SYSTEMS BALANCING

A. General Requirements

1. The Contractor shall select AABC MN-1, NEBB-01, SMACNA-07 or ASHRAE 111 as the standard for providing testing, adjusting and balancing (TAB) of air and hydronic systems. The selected standard shall be used throughout the project. Testing, adjusting, and balancing shall be accomplished by a firm certified for testing and balancing by Associated Air Balance Council (AABC), Testing, Adjusting, and Balancing Bureau (TABB), National Environmental Balancing Bureau (NEBB), or National Balancing Council (NBC).

- B. Prior to testing, adjusting, and balancing, the Contractor shall verify that the systems have been installed and are operating as specified. Approved detail drawings and all other data required for each system and/or component to be tested shall be attached to system flow diagram documentation.

- C. The Contractor shall verify that all balancing devices required during the field coordination phase and confirm during the construction phase that they are properly installed to permit testing, adjusting and balancing and that all duct leakage tests have been completed prior to testing, adjusting and balancing. The dampers used for balancing shall be remote from the diffusers and registers, unless the registers are directly attached to the mains. The Owner's Representative shall be notified in writing of all equipment, components, or balancing devices, that are damaged, incorrectly installed, or missing, as well as any design deficiencies that will prevent proper testing, adjusting, and balancing. Testing, adjusting, and balancing shall not commence until approved by the Owner's Representative. Instrumentation accuracy shall be in accordance with the standard selected in this paragraph.

1. The HVAC Subcontractor as a part of his contract shall provide all materials, labor and service of all Subcontractors for fulfillment of air and water balancing of all systems. The TAB Sub Subcontractor shall inform the HVAC Subcontractor of all requirements ahead of time.
2. Provide additional sheaves and belts required to reach design CFM levels.
3. In addition to the procedures outlined in this specification section, the procedures used for air, hydronic and temperature balancing shall also be in conformance with the "Procedural Standards for Testing, Adjusting, Balancing of Environmental System", seventh (2005) edition published by the National Environmental Balancing Bureau, the "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems", fifth edition published by the Associated Air Balance Council or the Practical Standards and Procedures published by Testing, Adjusting, and Balancing Bureau or the National Balancing Institute.
4. A copy of the standards must be maintained on site by the Balancing Subcontractor at all times. The test report forms shall comply with the formats listed in these standards.

D. Instrument Accuracy Requirements

1. All instrumentation shall be checked for accuracy before beginning testing, adjusting and balancing procedures. Instrument accuracy shall be in accordance with the standard selected in Paragraph A. General Requirements, immediately above. Checks may be carried out against similar equipment maintained specifically for checking purposes or by the manufacturer or a recognized testing facility. All instrumentation used for testing shall be calibrated within six (6) months of use. Pitot tubes and U-tube manometers do not require checking. In no case shall the instrumentation accuracy be less than specified by the instrument manufacturer. Any instrument falling out of calibration during the process of balancing and testing shall be recalibrated or removed from the site

and replaced by a properly calibrated instrument. No instruments shall be allowed to remain on-site that are not in calibration.

- E. Integral with the TAB standard followed, the TAB Contractor shall submit in the submittal phase the following documents:
1. Qualification data shall be submitted, sixty (60) days prior to testing and balancing operations. The test and balance firm shall be certified by the Associated Air Balance Council (AABC), the National Environmental Balancing Bureau (NEBB), Testing, Adjusting, and Balancing Bureau (TABB), or the National Balancing Council (NBC). The lead balancing technician shall be qualified by AABC, NEBB or NBC and his qualification data shall include past experience on at least five (5) similar projects. Provide proof of certification
 2. TAB Plan and preliminary timeline.
 3. Individual system one-line flow diagrams with pertinent data (i.e., static pressure, velocities, CFM, GPM, etc.) indicated on the applicable flow diagram for all components. Diagrams shall be made for each individual air and hydronic system.
 4. Six (6) copies of a preliminary TAB report, thirty (30) days before balancing commences. The report shall be organized by specific systems and shall clearly identify each item of equipment to be tested, adjusted, and balanced. The appropriate test procedures and measurements to be taken for each item of equipment shall be listed. Instrument calibration records shall be provided on forms shown in AABC MN-1 or SMACNA-07. Manufacturer's specified accuracy shall be shown. The report shall include floor plan drawings showing all dimensions of ductwork, piping and their related measurement locations and types of measurements to be made. All related data necessary for testing, balancing, and adjusting, including fan and pump curves, actual and nameplate speeds, voltage and amp draw (each leg) shall be included. A system readiness checklist, similar to that shown in SMACNA-07, shall be included. The report shall contain a listing of the deficiencies of all systems to be tested, adjusted and balanced and the corrective action taken. The report shall contain a schedule for the final testing and balancing.
 5. Six (6) copies of the final TAB report on forms shown in AABC MN-1, SMACNA-07, or equivalent forms from NEBB or NBC, within 2 weeks after completion of the test and balance operation. Data shall be in a hard bound cover identifying the project name, location, date of submittal, name of Contractor, and a general title indicating the specific area and type of work, and shall be signed by a registered professional engineer, employed by the test and balance firm, who has a minimum of two (2) years' experience in testing, adjusting and balancing work. The final report shall include a summary of the preliminary report describing test methods, test results, and major corrective actions taken. The report shall include as-tested floor plans showing all measurement locations and types of measurements made. The air handling unit data shall include a static pressure profile diagram, and pitot tube traverses where possible. The VAV terminal data shall include maximum and minimum air flows, for design and actual conditions, and shall be supported with summaries which show the air outlet totals for each VAV terminal and the VAV terminal totals for each air handling unit. Air distribution data shall include coded drawings which show the exact location of each air outlet. Pump data shall include pump efficiency. Data for chillers, heating and cooling coils, and heat exchangers, shall include heat balance calculations.
 6. All instruments that are recalibrated and brought back onto the jobsite after being found to be out of calibration shall have recalibration records submitted on forms shown in AABC MN-1 or SMACNA-07.

3.6 MISCELLANEOUS IRON AND STEEL

- A. All work shall be cut, assembled, welded and finished by skilled mechanics. Welds shall be ground smooth. Stands, brackets, and framework shall be properly sized and firmly constructed.
- B. Measurements shall be taken on the job and worked out to suit adjoining and connecting work. All work shall be by experienced metal working mechanics. Members shall be straight and true and accurately fitted. Scale, rust, and burrs shall be removed. Welded joints shall be ground smooth where exposed. Drilling, cutting and fitting shall be done as required to properly install the work and accommodate the work of other trades as directed by them.
- C. Members shall be generally welded, except that bolting may be used for field assembly where welding would be impractical.
- D. All shop fabricated iron and steel work shall be cleaned and dried and given a shop coat of paint on all surfaces and in all openings and crevices.

3.7 PLACING IN SERVICE

- A. At the completion of performance tests and following approval of test result, recheck all equipment to see that each item is adequately lubricated and functioning correctly.
- B. Furnish upon completion of all work, certificates of inspections from the manufacturers stating that authorized factory engineers have inspected and tested the operation of their respective equipment and found same to be in satisfactory operating conditions.

3.8 CLEANING AND ADJUSTING

- A. During the progress of the work, clean up and remove all oil, grease, and other debris caused by the work performed under this section.
- B. At the conclusion of the project, clean and repair all areas and finishes as installed or affected by this installation of work under this section.
- C. Pipes shall be cleaned free of scale and thoroughly flushed of all foreign matter. A temporary bypass shall be provided for all water coils to prevent flushing water from passing through coils. Strainers and valves shall be thoroughly cleaned. Prior to testing and balancing, air shall be removed from all water systems by operating the air vents. Temporary measures, such as piping the overflow from vents to a collecting vessel shall be taken to avoid water damage during the venting process. Air vents shall be plugged or capped after the system has been vented.
- D. Equipment shall be wiped clean, with all traces of oil, dust, dirt, or paint spots removed. Temporary filters shall be provided for all fans that are operated during construction, and new filters shall be installed after all construction dirt has been removed from the building. System shall be maintained in this clean condition until final acceptance. Bearings shall be properly lubricated with oil or grease as recommended by the manufacturer. Belts shall be tightened to proper tension. Control valves and other miscellaneous equipment requiring adjustment shall be adjusted to setting indicated or directed. Fans shall be adjusted to the speed indicated by the manufacturer to meet specified conditions.

- E. Variable frequency drives (VFD) shall be adjusted and set-up to lock out any frequencies that cause a resonance or vibration. To test for this, slowly increase and decrease the speed between minimum and maximum while noting all frequencies that cause problems.

3.9 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. All operating equipment installed under this section shall be placed in operation and shall function continuously in an operating test for a period of one (1) week without shutdown due to mechanical failure or necessity of adjustment. Prior to scheduling the Project Final Inspection and after completion of all installation and running adjustments, the HVAC Subcontractor shall perform all work required to place the equipment in complete operating condition to meet all requirements under this specification.
- B. During this running test period, the HVAC Subcontractor shall deliver to the designated representative of the Owner, through the Architect, six (6) complete sets of operating, service and replacement data for all equipment which will require operating maintenance or replacement and one (1) copy of this literature shall be available during the instruction of the operating personnel while the other is checked for completeness by the Architect.

3.10 TRAINING

- A. Conduct a training course for the maintenance and operating staff. The training shall start after the system is functionally complete but before the final acceptance tests. The training shall include all of the items contained in the operating and maintenance instructions as well as demonstrations of routine maintenance operations. The Owner's Representative shall be given at least two (2) weeks advance notice of such training.
- B. During all working hours of the one (1) week operating test, the HVAC Subcontractor's instruction personnel shall be available for and provide thorough and detailed training to the Owner's operating and maintenance personnel in operation, maintenance and adjustment of all equipment installed. The instructions shall be videotaped by the Subcontractor. The master tape and one (1) copy shall be turned over to the Owner not more than ten (10) days following the completion of the training.
- C. Give sufficient notice to the designated operating personnel of the Owner in advance of this period. Upon completion of instruction, obtain from such representatives written verification on that which the above mentioned instruction has been performed, such verification to be forwarded to the Architect.
- D. Provide instruction time of sixteen (16) hours for systems and an additional sixteen (16) hours for ATC.

END OF SECTION 23 00 00

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SECTION 26 00 00**ELECTRICAL****PART 1 - GENERAL****1.0 GENERAL PROVISIONS**

A. The GENERAL REQUIREMENTS, DIVISION 1, and BIDDING AND CONTRACT REQUIREMENTS, DIVISION 0, are hereby made a part of this Specification Section.

B. Examine all drawings and all sections of the specifications and requirements and provisions affecting the work of this section.

C. The work listed in the following sections shall be made part of this Specification Section:

26 30 12 Fire Alarm Modification

1.1 SCOPE OF WORK

A. This project includes mechanical equipment upgrades. Selective demolition of existing systems shall be required.

B. Refer to the specific requirements for this project included in the "Narrative Report for Compliance with the Fire Protection and Life Safety Systems Section of the Massachusetts State Building Code (780CMR) – Fire Protection Construction Documents", which shall be considered part of these specifications. Include all associated testing and certifications necessary for compliance and any required remedial actions and retest due to failure.

C. The work under this section shall include the furnishing of all materials, labor, equipment and supplies and the performance of all operations to provide complete working systems, in general, to include the following items:

1. Identification
2. Raceways and Conduit
3. Wire and Cable (600V)
4. Wiring Devices and Plates
5. Outlet Boxes
6. Junction Boxes, Pull Boxes and Wireways
7. Safety Disconnect Switches
8. Light Fixtures
9. Lighting Controls
10. Sleeving
11. Fire Seal and Fireproof Sealant
12. Supervision and Approval
13. Electrical Connections to HVAC Equipment.
14. Relocation of removal and disposal of obsolete components.
Testing
15. Shop drawings
16. Record (as-built) drawings

- D. Work of this section is generally shown on the Electrical Drawings.

1.2 RELATED WORK

- A. Principal classes of Work related to the Work of this section are listed in the Specification Table of Contents, and are specified to be performed under the indicated sections of the specifications. Refer to the indicated sections for description of the extent and nature of the indicated Work, and for coordination with related trades. This listing may not include all related Work items: It is the responsibility of the Contractor to coordinate and schedule the Work of this section with that of all other trades.
- B. The following work is not included in this section and will be provided under other sections:
1. Furnishing and installation of motors.
 2. Structural supports necessary to distribute loading from equipment to roof or floor except as specified.
 3. Temporary light, power, water, heat, gas and sanitary facilities for use during construction and testing. Refer to Division 1, General Conditions.
 4. Telephone system, wire, cable, equipment and instruments.
 5. Automatic Temperature Control and Direct Digital Communication wiring except as noted on drawings.
 6. Painting, except as specified herein.

1.3 DEFINITIONS

- A. As used in this section, the following items are understood to have the following meaning:
1. "Contractor or Subcontractor", unless otherwise qualified, shall mean the installer of the work specified under this section.
 2. "Furnish" shall mean purchase and deliver to the project site, complete with every necessary appurtenance.
 3. "Install" shall mean unload at the delivery point at the site and perform all work necessary to establish secure mounting and proper operation at the proper location in the project.
 4. "Provide" shall mean "Furnish" and "Install".
 5. "Work" shall mean all labor, materials, equipment, apparatus, controls, accessories and all other items required for a proper and complete installation.
 6. "Concealed" shall mean hidden from sight in chases, furred-in spaces, shafts, hung ceilings, embedded in construction or in a crawl space. Areas to be concealed as part of tenant alterations to the building shall also be considered in this definition.
 7. "Exposed" shall mean not installed underground or concealed as defined above.
 8. "Furnished by Others" shall mean materials or equipment purchased under other sections of the general contract and installed by this section of the specifications by this trade Contractor.
 9. "Owners Representative" shall be the party responsible to make decisions regarding all contractual obligations in reference to the Scope of Work for the Owner.
 10. "Date of Substantial Completion" shall indicate the date where the work has been formally accepted as evidenced by completed final punch list or where the work has reached the stage that the Owner obtains beneficial use and commences utilization of the installed systems for business or occupancy purposes. The GENERAL REQUIREMENTS, DIVISION-1, shall supersede this definition where specifically defined.

1.4 CODES, REFERENCES AND PERMITS

- A. Materials, installation of systems and equipment provided under this section shall be done in strict accordance with the Department of Public Safety, Department of Environmental Protection, State Building Code and any other Codes and Regulations having jurisdiction including but not limited to:
1. All Applicable NFPA Standards
 2. National Electrical Code (NEC).
 3. Occupational Safety and Health Administration (OSHA)
 4. State and Local Building Codes
 5. Underwriters' Laboratories, Inc. (UL)
- B. Unless otherwise specified or indicated, materials, workmanship and equipment performance shall conform with the latest governing edition of the following standards, codes, specifications, requirements, and regulations, except when more rigid requirements are specified or are required by applicable codes but not limited to:
1. American National Standards Institute (ANSI)
 2. American Society of Mechanical Engineers (ASME).
 3. American Society of Testing and Materials (ASTM)
 4. Illuminating Engineering Society (IES)
 5. Institute of Electrical and Electronics Engineers (IEEE)
 6. Insulated Cable Engineers Association (ICEA)
 7. National Electrical Contractors Association (NECA)
 8. National Electric Manufacturers Association (NEMA)
 9. Thermal Insulation Manufacturers Association (TIMA)
- C. Codes, laws and standards provide a basis for the minimum installation criteria acceptable. The drawings and specifications illustrate the scope required for this project, which may exceed minimum codes, laws and standards.
- D. Give all notices, file all plans, obtain all permits and licenses, and obtain all necessary approvals from authorities having jurisdiction. Deliver all certificates of inspection to the authorities having jurisdiction. No work shall be covered before examination and approval by the Owner's Representative, inspectors, and authorities having jurisdiction. Replace imperfect or condemned work to conform to requirements, satisfactory to Owner's Representative, and without extra cost to the Owner. If work is covered before inspection and approval, this Contractor shall pay costs of uncovering and reinstalling the covering, whether it meets contract requirements or not.

1.5 GENERAL REQUIREMENTS

- A. Nameplates
1. Each major component of equipment shall have the manufacturer's name, address, type or style, model or serial number, and catalog number on a plate secured to the equipment.
- B. Equipment Guards
1. Belts, pulleys, chains, gears, couplings, projecting setscrews, keys, and other rotating parts so located that any person may come in close proximity thereto shall be completely enclosed or guarded. High-temperature equipment and piping so located as to endanger personnel or create a fire hazard shall be guarded or covered with insulation of type specified for service.

1.6 MATERIAL AND EQUIPMENT STANDARDS.

- A. Where equipment or materials are specified with the name of a manufacturer, such specification shall be deemed to be used for the purpose of establishing a standard for that particular item. No equipment or material shall be used unless previously approved by the Owner's Representative.
- B. Substitutions may be offered for review provided the material, equipment or process offered for consideration is equal in every respect to that indicated or specified. The request for each substitution must be accompanied by complete specifications together with drawings or samples to properly appraise the materials, equipment or process. The Contractor shall highlight and list all applicable specification requirements which the substituted material deviates from.
- C. If a substitution of materials or equipment in whole or in part is made, this Contractor shall bear the cost of any changes necessitated by any other trade as a result of said substitution.
- D. All materials, equipment and accessories provided under this section shall be new and unused products of recognized manufacturers as approved.

1.7 SUBMITTALS

- A. Conform to the requirements of Division 1; General Conditions, for schedule and form of all submittals unless specifically noted otherwise in this section. Coordinate this submittal with submittals for all other finishes. Shop drawings and design layouts shall be prepared by licensed installing Contractor s and shall note the name(s), license number(s) and license expiration date(s) of the Contractor (s) installing electrical systems.
- B. Definitions:
 - 1. Shop Drawings are information prepared by the Contractor to illustrate portions of the work in more detail than indicated in the Contract Documents.
 - 2. Acceptable Manufacturers: The mechanical design for each product is based on the single manufacturer listed in the schedule or shown on the drawings. In Part 2 of the specifications, certain Alternate Manufacturers are listed as being acceptable. In addition, the MATERIAL AND EQUIPMENT STANDARDS paragraph potentially allows for substitutions as being acceptable. These are acceptable only if, as a minimum, they:
 - a. Meet all performance criteria listed in the schedules and outlined in the specifications. For example, to be acceptable, an emergency generator must deliver equal kW / KVA at equal or greater efficiency using equal or less fuel as the emergency generator listed in the schedules.
 - b. Fit within the available space it was designed for, including space for maintenance and component removal, with no modification to either the space or the product. Clearances to walls, ceilings, and other equipment will be at least equal to those shown on the design drawings. The fact that a manufacturer's name appears as acceptable shall not be taken to mean the Engineer has determined that the manufacturer's products will fit within the available space – this determination is solely the responsibility of the Contractor.
 - c. Products must adhere to all considerations including, but not limited to; being of the same color as the product scheduled or specified, fitting within the enclosures and details, and for lighting – being the same size

and of the same physical appearance as scheduled or specified products.

C. Submittal Procedures, Format and Requirements

1. Review submittal packages for compliance with Contract Documents and then submit to Owner's Representative for review. Submit enough sets of shop drawings such that, after review, two (2) sets will be kept by the reviewer, with only the remaining sets returned with reviewer's marks and comments.
2. Each Shop Drawing shall indicate in title block, and each Product Data package shall indicate on cover sheet, the following information:
 - a. Title
 - b. Equipment number
 - c. Name and location of project
 - d. Names of Owner, Engineer and Seller
 - e. Names of manufacturers, suppliers, vendors, etc.
 - f. Date of submittal
 - g. Whether original submittal or resubmitted
3. Shop Drawings showing manufacturer's product data shall contain detailed dimensional drawings (minimum ¼ inch – 1 foot scale) including plans and sections (where physical clearance could be an issue). Provide larger scale details as necessary.
4. Submit accurate and complete description of materials of construction, manufacturer's published performance characteristics, sizes, weights, capacity ratings (performance data, alone, is not acceptable), electrical requirements, starting characteristics, wiring diagrams, and acoustical performance for complete assemblies. Drawings shall clearly indicate location (terminal block or wire number), voltage and function for all field terminations, and other information necessary to demonstrate compliance with all requirements of Contract Documents.
5. Provide Shop Drawings showing details of piping connections to all equipment. If connection details are not submitted and connections are found to be installed incorrectly, this Contractor shall reinstall them within the original contract price.
6. Provide complete data for all auxiliary services and utilities required by submitted equipment. This shall include fuel, cooling and exhaust requirements and points of connections.
7. Provide a complete description of all controls and instrumentation required including electrical power connection drawing for all components and interconnection wiring to starters, detailed information on starters, control diagrams, termination diagrams, and all control interfaces with a central control system.
8. Provide installation and erection information including; lifting requirements, and any special rigging or installation requirements for all equipment.
9. The Owner's Representative shall approve all materials before commitment for materials is made.

D. Specifications and Schedule Compliance Statement

1. The manufacturer shall submit a point by point statement of compliance with each specification criteria listed in each paragraph for those submittals listed in Paragraph E: Product Data that are noted with an asterisk (*).
2. The statement of compliance shall consist of a list of all paragraphs (line by line) identified in Part 2 and applicable Part 3 of the specification for which the submitted product in the opinion of the manufacturer complies, deviates, or does not meet.

3. Where the proposed submittal complies fully, the word "comply" shall be placed opposite the paragraph number.
 4. Where the proposed submittal does not comply, or accomplishes the stated function in a manner different from that described, a full description of the deviation shall be provided.
 5. Verify each field of the associated schedule where associated technical data is presented on the drawings. Where the submitted material does not "comply" provide the value the submitted equipment will achieve based upon the specified conditions.
 6. Where a full description of a deviation is not provided, it shall be assumed that the proposed system does not comply with the paragraph in question and the product will be rejected.
 7. Submissions which do not include a point by point statement of compliance as specified shall be disapproved.
- E. **Product Data:** Submit complete manufacturer's product description and technical information including:
1. Identification
 2. Raceways and Conduit
 3. Wire and Cable (600V)
 4. Wiring Devices and Plates
 5. Outlet Boxes
 6. Junction Boxes, Pull Boxes and Wireways
 7. Safety Disconnect Switches
 8. Light Fixtures
 9. Lighting Controls
- F. Submit shop drawings and product data grouped to include complete submittals of related systems, products and accessories in a single submittal.
1. Access panel shop drawings shall be submitted to the Construction Supervisor for approval.
 2. Do not submit multiple product information in a single bound manual.
 3. Three-ring binders shall not be accepted.
- G. **Deviations:**
1. Concerning deviations other than substitutions, proposed deviations from Contract Documents shall be requested individually in writing whether deviations result from field conditions, standard shop practice, or other cause. Submit letter with transmittal of Shop Drawings which flags the deviation to the attention of the Owner's Representative.
 2. Without letters flagging the deviation to the Owner's Representative, it is possible that the Engineer may not notice such deviation or may not realize its ramifications. Therefore, if such letters are not submitted to the Owner's Representative, the Seller shall hold the Engineers, his consultants and the Owner harmless for any and all adverse consequences resulting from the deviations being implemented. This shall apply regardless of whether the Engineer has reviewed or approved shop drawings containing the deviation, and will be strictly enforced.
 3. Approval of proposed deviations, if any, will be made at discretion of Engineer.
- H. **Schedule:** Incorporate shop drawing review period into construction schedule so that Work is not delayed. This Contractor shall assume full responsibility for delays caused by not incorporating the following shop drawing review time requirements into his project

schedule. Allow at least ten (10) working days, exclusive of transmittal time, for review each time shop drawing is submitted or resubmitted.

I. Responsibility

1. Intent of Submittal review is to check for capacity, rating, and certain construction features. The Contractor shall 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 of this and other sections. Work shall comply with approved submittals to extent that they agree with Contract Documents. Submittal review shall not diminish responsibility under this Contract for dimensional coordination, quantities, installation, wiring, supports and access for service, nor the shop drawing errors or deviations from requirements of Contract Documents. The Engineer's noting of some errors while overlooking others will not excuse the Contractor from proceeding in error. Contract Documents requirements are not limited, waived nor superseded in any way by review.
2. Inform Contractor, manufacturers, suppliers, etc. of scope and limited nature of review process and enforce compliance with contract documents.

J. In the event that the Contractor fails to provide Shop Drawings for any of the products specified herein:

1. The Contractor shall furnish and install all materials and equipment herein specified in complete accordance with these specifications.
2. If the Contractor furnishes and installs material and/or equipment that is not in complete accordance with these specifications, he shall be responsible for the removal of this material and/or equipment. He shall also be responsible for the replacement of this material and/or equipment with material and/or equipment that is in complete accordance with these specifications, at the direction of the Owner's Representative.
3. Removal and replacement of materials and/or equipment that is not in complete compliance with these specifications shall be done at no extra cost to the Owner.
4. Removal and replacement of materials and/or equipment that is not in complete compliance with these specifications shall not be allowed as a basis for a claim of delay of completion of the Work.

K. Mark dimensions and values in units to match those specified.

L. Submit Material Safety Data Sheets (MSD) on each applicable product with submittal.

1.8 COORDINATION

- A. Refer to Division 1, General Conditions, for coordination requirements applicable to this section, unless specifically noted otherwise in this section.
- B. Materials and apparatus shall be installed as fast as conditions of the building will permit and must be installed promptly when and as required.
- C. Confer with all other trades relative to location of all apparatus and equipment to be installed and select locations so as not to conflict with work of other sections. Any conflicts shall be referred immediately to the Owner's Representative for decision to prevent delay in installation of work. All work and materials placed in violation of this clause shall be readjusted to the Owner's Representative's satisfaction at no expense to the Owner.

- D. Where work of this section will be installed in close proximity to work of other sections or where there is evidence that the work of this section may interfere with work of other sections, assist in working out space conditions to make satisfactory adjustment. Prepare and submit for approval 3/8" scale or larger working drawings and sections, clearly showing how the work is to be installed in relation to the work of other sections. If the work of this section is installed before coordinating with other trades or so as to cause interference with work of other trades, make changes necessary to protect conditions without extra charge.
- E. Keep fully informed as to the shape, size and position of all openings required for all apparatus, conduit, cable, sleeves, etc., and give information in advance to allow construction of required openings. Furnish all sleeves, pockets, supports and incidentals, and coordinate with the General Contractor for the proper setting of same.
- F. All distribution systems which require pitch or slope such as condensate drains and water piping shall have the right of way over those which do not. Confer with other trades as to the location of pipes, ducts, lights and apparatus and install work to avoid interferences.
- G. Make reasonable modifications in the work as required by structural interferences, or by interference with work of other trades, or for proper execution of the work without extra charge.

1.9 RECORD DRAWINGS

- A. Refer to DIVISION 1, General Conditions, for record drawings and procedures to be provided under this section, unless specifically noted otherwise in this section.
- B. Record Drawings (red-line drawings) will be updated by this Contractor daily for review with the monthly requisition. The record drawing shall be an accurate depiction of the systems as completed, including dimensions (vertical/horizontal) of concealed components off fixed building elements.
- C. The Electrical Foreman shall maintain complete and separate set of prints of Contract Drawings at job site at all times and shall record work completed and all changes from original Contract Drawings clearly and accurately including work installed as a modification or addition to the original design.
- D. At completion of work the Electrical Contractor shall prepare a complete set of record drawings on AutoCAD showing all systems as actually installed. The background AutoCAD files will be made available for the Contractor's copying, at his expense, to serve as backgrounds for the drawings. The Electrical Contractor shall transfer changes from field drawings onto AutoCAD drawings and submit copy of files and three sets of prints to Owner's Representative for comments as to compliance with this section. CADD layering as established by the design team shall be maintained with any and all changes done by the Contractor.
- E. The Engineer is not granting to the Contractor any ownership or property interest in the CADD Drawings by the delivery of the CADD Disks to the Contractor. The Contractor's rights to use the CADD disks and the CADD Drawings are limited to use for the sole purpose of assisting in the Contractor's performance of its contractual obligations under its contract with respect to the Project. The Engineer is granting no further rights. Any reuse or other use by the Contractor will be at the Contractor's sole risk and without liability to the Engineer. The Contractor hereby waives and releases any losses, claims, damages, liabilities of any nature whatsoever, and costs (including attorney fees) arising

out of, resulting from, or otherwise related to the use of the CADD Disks and CADD Drawings by the Contractor. The Contractor, to the maximum extent permitted by law, hereby agrees to indemnify, defend and hold the Engineer harmless from all losses, claims, damages, liabilities, and costs (including attorney fees) arising out of, resulting from, or otherwise related to the use of the CADD Disks and CADD Drawings by the Contractor.

- F. Record Drawings, shall show "as-built" condition of details, sections, riser diagrams, control changes and corrections to schedules. Schedules shall show actual manufacturer and model numbers of final equipment installation.
- G. The Electrical Contractor shall submit the record set for approval by the engineer a minimum of four (4) weeks prior to seeking the permanent certificate of occupancy.

1.10 WARRANTIES

- A. Submit manufacturer's standard replacement warranties for material and equipment furnished under this section. Such warranties shall be in addition to and not in lieu of all liabilities which the manufacturer and the Electrical Contractor may have by law or by provisions of the Contract Documents.
- B. All materials, equipment and work furnished under this section shall be guaranteed against all defects in materials and workmanship for a minimum period of one-year (1) commencing with the Date of Substantial Completion. Where individual equipment sections specify longer warranties, provide the longer warranty. Any failure due to defective material, equipment or workmanship which may develop, shall be corrected at no expense to the Owner including all damage to areas, materials and other systems resulting from such failures.
- C. Guarantee that all elements of each system meet the specified performance requirements as set forth herein or as indicated on the drawings.
- D. Upon receipt of notice from the Owner of the failure of any part of the systems during the warranty period, the affected parts shall be replaced. Any equipment requiring excessive service shall be considered defective and shall be replaced.

1.11 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

- A. It is the intention of the specifications and drawings to call for complete, finished work, tested and ready for continuous operation. Any apparatus, appliance, material or work, not shown on the drawings, but mentioned in the specifications or vice-versa, or any incidental accessories necessary to make the work complete in all respects and ready for operation, even if not particularly specified, shall be provided by this Contractor without additional expense to the Owner.
- B. The drawings are generally diagrammatic. The locations of all items that are not definitely fixed by dimensions are approximate only. The exact locations must be determined at the project and shall have the approval of the Owner's Representative before being installed. This Contractor shall follow drawings, including his shop drawings, in laying out work and shall check the drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions. Where space conditions appear inadequate, notify the Owner's Representative before proceeding with the installation. This Contractor shall, without extra charge, make

reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work.

- C. Any requests for information (RFI) for resolving an apparent conflict or unclarity, or a request for additional detail, shall include a sketch or equivalent description of Contractor's proposed solution.
- D. Size of conduits, cable trays, raceways and methods of running them are shown, but it is not intended to show every offset and fitting, nor every structural difficulty that may be encountered. To carry out the true intent and purpose of the drawings, all necessary parts to make complete approved working systems ready for use, shall be furnished without extra charge. All work shall be installed in an approved workmanlike manner.

1.12 INSPECTION OF SITE CONDITIONS

- A. Prior to submission of bid, visit the site and review the related construction documents to determine the conditions under which the Work has to be performed and send a report, in writing, to the Owner's Representative, noting any conditions which might adversely affect the Work of this section of the specifications.

1.13 SURVEY AND MEASUREMENTS

- A. Base all required measurements, horizontal and vertical, from referenced points established WITH the Owner's Representative. The Electrical Contractor shall be responsible for correctly laying out the Work required under this section of the specifications.
- B. In the event of discrepancy between actual measurements and those indicated, notify the Owner's Representative in writing and do not proceed with the related work until instructions have been issued.

1.14 DELIVERY, STORAGE AND HANDLING

- A. No materials shall be delivered or stored on site until corresponding Shop Drawings have been approved.
- B. All manufactured materials shall be delivered to the site in original packages or containers bearing the manufacturer's labels and product identification.
- C. Protect materials against dampness. Store off floors, under cover and adequately protected from damage.
- D. Inspect all equipment and materials, upon receipt at the job site, for damage and conformance to approved shop drawings.

1.15 PROTECTION OF WORK AND PROPERTY

- A. This Contractor shall be responsible for the care and protection of all work included under this section until the completion and final acceptance of this Contract.

- B. Protect all equipment and materials from damage from all causes including, but not limited to, fire, vandalism and theft. All materials and equipment damaged or stolen shall be repaired or replaced with equal material or equipment at no additional cost to the Owner.
- C. Protect all equipment, outlets and openings with temporary plugs, caps and covers. Protect work and materials of other trades from damage that might be caused by work or workmen under this section and make good damage thus caused.
- D. Damaged materials are to be removed from the site; no site storage of damaged materials will be allowed.

1.16 SUPERVISION

- A. Supply the service of a competent Supervisor with a minimum of five (5) years of experience in Electrical construction supervision who shall be in charge of the Electrical work at the site.

1.17 SAFETY PRECAUTIONS

- A. Life safety and accident prevention shall be a primary consideration. Comply with all of the safety requirements of the Owner and OSHA throughout the entire construction period of the project.
- B. Furnish, place and maintain proper guards and any other necessary construction required to secure safety of life and/or property.

1.18 SCHEDULE

- A. Construct work in sequence under provisions of Division 1 and as coordinated with the Owner's Representative.

1.19 HOISTING, SCAFFOLDING AND PLANKING

- A. The work to be done under this section of the specifications shall include the furnishing, set-up and maintenance of all derricks, hoisting machinery, cranes, helicopters, scaffolds, staging and planking as required for the work.

1.20 CUTTING AND PATCHING

- A. Include all coring, cutting, patching, and fireproofing necessary for the execution of the work of this section. Structural elements shall not be cut without written approval of the Architect. This Contractor shall be responsible for taking all precautions required to identify hidden piping, conduits, etc. before any core drilling and/or cutting of slabs commences, including X-raying the affected slabs. Provide fire stopping to maintain the fire rating of the fire resistance-rated assembly. All penetrations and associated fire stopping shall be installed in accordance with the fire stopping manufacturer's listed installation details and be listed by UL or FM.

- B. All work shall be fully coordinated with all phases of construction, in order to minimize the requirements for cutting and patching.
- C. Form all chases or openings for the installation of the work of this section of the specifications, or cut the same in existing work and see that all sleeves or forms are in the work and properly set in ample time to prevent delays. Be responsible that all such chases, openings, and sleeves are located accurately and are of the proper size and shape and consult with the Owner's Representative and all other trades concerned in reference to this work. Confine the cutting to the smallest extent possible consistent with the work to be done. In no case shall piers or structural members be cut without the approval of the Owner's Representative.
- D. Fit around, close up, repair, patch, and point around the work specified herein to match the existing adjacent surfaces and to the satisfaction of the Owner's Representative.
- E. Fill and patch all openings or holes left in the existing structures by the removal of existing equipment which is part of this section of the specifications.
- F. All of this work shall be carefully done by workmen qualified to do such work and with the proper and smallest tools applicable.
- G. Any cost caused by defective or ill-timed work required by this section of the specifications shall be borne by this Contractor.
- H. When, in order to accommodate the work required under this section of the specifications, finished materials of other trades must be cut or fitted, furnish the necessary drawings and information to the trades whose materials must be cut or fitted.

1.21 SLEEVES, INSERTS AND ANCHOR BOLTS

- A. Coordinate with other trades the location of and maintaining in proper positions, sleeves, inserts and anchor bolts to be supplied and/or set in place under this section of the specifications. In the event of incorrectly located preset sleeves, inserts and anchor bolts, etc., all required cutting and patching of finished work shall be done under this section of the specifications.
- B. All pipes passing through floors, walls, ceilings or partitions shall be provided with fire stopping to maintain the fire rating of the structure. All penetrations and associated fire stopping shall be installed in accordance with the fire stopping manufacturer's listed installation details. Provide sleeves for all penetrations where required by the listed detail, for the penetration of all mechanical room floors and where specifically required on the drawings.
- C. Field drilling (core drilling), when required, shall be performed under this section of the specifications, after receipt of approval by the Owner's Representative.
 - 1. When coring cannot be avoided, provide ¼ inch pilot hole prior to coring. When coring through floor or slab, verify location of core on floor below and protect and piping, ductwork, wiring, furniture, personnel, etc., below the location of the core.

1.22 SUPPLEMENTARY STEEL, CHANNELS AND SUPPORTS

- A. Provide all supplementary steel, factory fabricated channels and supports required for the proper installation, mounting and support of all Electrical equipment, piping, etc., required by the specifications.
- B. Supplementary steel and factory fabricated channels shall be firmly connected to building construction in a manner approved by the Owner's Representative as shown on the drawings or herein specified.
- C. The type and size of the supporting channels and supplementary steel shall be determined by the Contractor and shall be of sufficient strength and size to allow only a minimum deflection in conformance with the manufacturer's requirements for loading.
- D. All supplementary steel and factory fabricated channels shall be installed in a neat and workmanlike manner parallel to the walls, floors and ceiling construction. All turns shall be made with 90 degree and 45 degree fittings, as required to suit the construction and installation conditions.
- E. All supplementary steel including factory fabricated channels, supports and fittings shall be galvanized steel, aluminum or stainless steel where exposed or subject to rust producing atmosphere. Factory fabricated channels shall be manufactured by Unistrut, H-strut, Powerstrut or approved equal.

1.23 HAZARDOUS MATERIALS

- A. Removed batteries shall be recycled by a facility approved by the Owner's Representative. A uniform hazardous waste manifest shall be prepared for all disposals and returned with all applicable signoffs prior to application for final payment.
- B. Removed fluorescent and HID lamps shall be recycled by a facility approved by the Owner's Representative. A uniform hazardous waste manifest shall be prepared for all disposals and returned with all applicable signoffs prior to application for final payment.
- C. All ballasts in lighting fixtures to be disposed shall be verified to be PCB free. All ballasts manufactured prior to 1979 and not labeled as PCB free shall be considered to contain PCB's. Provide written verification to the Owner's Representative that confirms PCB free waste. Where PCB free waste cannot be verified, ballasts shall be recycled by a facility approved by the Owner's Representative, with PCB components eliminated by a high temperature incineration. A uniform hazardous waste manifest shall be prepared for all disposals and returned with all applicable signoffs prior to application for final payment. All handling shall conform to EPA requirements. Provide breakout cost for this scope.
- D. Where it has been identified that asbestos-containing material exists within the scope limits, refer to the Asbestos Abatement specification section for requirements.

1.24 ACCESSIBILITY

- A. All work provided under this section of the specification shall be installed so that parts requiring periodic inspection, maintenance and repair are accessible. Work of this trade shall not infringe upon clearances required by equipment of other trades, especially code required clearances to electrical gear. Minor deviations from the drawings may be made

to accomplish this, but changes of substantial magnitude shall not be made prior to written approval from the Owner's Representative.

1.25 SEISMIC RESTRAINT REQUIREMENTS

- A. Submit working plans and calculations reviewed, signed and stamped by a professional engineer who is registered in the State where the project is located and has specific experience in seismic calculations, certifying that the plans meet all seismic requirements established by authorities having jurisdiction over the project.
- B. For each seismic restraint, provide certified calculations to verify adequacy to meet the following design requirements:
 - 1. Ability to accommodate relative seismic displacements of supported item between points of support.
 - 2. Ability to accommodate the required seismic forces.
- C. For each respective set of anchor bolts provide calculations to verify adequacy to meet combined seismic-induced shear and tension forces.
- D. For each weldment between structure and item subject to seismic force, provide calculations to verify adequacy.
- E. Restraints shall maintain the restrained item in a captive position without short circuiting the vibration isolation.

1.26 PROJECT CLOSEOUT

- A. Construction Observations By The Engineer
 - 1. The engineer shall make progress site visits during construction and one (1) substantial completion (punch list) site visit for determining substantial completion.
 - 2. The Trade Contractors and the General Contractor are required to inspect their own work and make any corrections to the work to comply with the specifications and the contract documents. It is not the responsibility of the engineer to develop lists of incomplete work items.
 - 3. Progress Site Visits
 - a. The purpose of the progress site visit by the engineer is to observe if the work is proceeding in accordance with the contract documents.
 - b. The engineer will prepare a field report which will note in general the work completed since the last observation visit, work found not to be in accordance with the contract documents and work not corrected since the previous observation visit.
- B. Substantial Completion
 - 1. When the Contractor considers the Work under this section is substantially complete, the Contractor shall submit written notice, through the General Contractor, with a detailed list of items remaining to be completed or corrected and a schedule of when each remaining work item will be completed. Should the engineer determine the list of remaining work does not constitute substantial completion the engineer will notify the Owner and he will not make a substantial completion site visit.

2. The following items shall be completed prior to the written request for substantial completion site visit:
 - a. Certification of successful operation of all systems.
 - b. Training of the Owner's personnel in the operation of the systems.
 - c. Record Drawings in accordance with the contract specifications.
 - d. Operation and Maintenance manuals.
 - e. Testing reports.
 - f. Manufacturer's certificates of approvals.
 - g. Emergency contact list for reporting of malfunctioning equipment during the warranty period.
 - h. Contractors Project Completion certificate.
3. Should the Engineer, during the substantial completion visit, observe that the Work is substantially complete, s/he will provide a written listing of the observed deficiencies referred herein as the Punch List. The Punch List will provide for a place for the Contractor and General Contractor to sign off and date each item individually indicating that the observed deficiency item has been corrected.
4. Should the Engineer, during the substantial completion site visit, observe that the Work is not substantially complete, s/he will provide a written list of the major deficiencies and a reason for the work not being considered substantially complete.
5. If the work is found not to be substantially complete then the engineer shall be reimbursed for his time to reobserve the work. A reobservation fee shall be charged to the Contractor through the contractual agreement for any further observations by the engineer.
6. The Contractor shall remedy all deficiencies listed in the punch list within the time frame required by the contract.

C. Engineer's Construction Completion Certification

1. Where required by the applicable code, the Engineer's Construction Completion Certification will be issued by NV5 when all life safety and health related issues are complete, all required functional tests are complete and all reports are complete.

D. Final Completion

1. The following items shall be submitted prior to the written request for Final completion:
 - a. Revised Substantial Completion items to be resubmitted in accordance with the review process comments.
 - b. Warranties commencing the date of Substantial completion
 - c. Individual Signed and dated Punch List acknowledging completion of all punch list items
2. When the Contractor considers all of the punch list work items complete, the Contractor shall submit written notice through the General Contractor that all Punch List items are complete and resolved and the work is ready for final observation site visit. The signature lines for completion of each punch list item shall be signed by the Contractor indicating the work is complete and signed by the General Contractor indicating s/he has inspected the work and found it to be complete. Should the Engineer find the work to be finally complete and all Punch List items are complete the Engineer will make a recommendation to the Owner. If the Engineer has found the punch list work to be incomplete during final inspection a written listing of the observed deficiencies will be prepared by the Engineer.

E. Contractor's Project Completion Certificate

1. Upon completion of work and prior to request for Certificate of Occupancy, each Trade Contractor and the General Contractor shall issue a certificate stating that work has been installed generally consistent with construction documents and all applicable codes. NV5 can furnish a blank Contractor's certificate form upon request. The certificate shall certify:
 - a. Execution of all work has been in accordance with the approved construction documents.
 - b. Execution and control of all methods of construction was in a safe and satisfactory manner in accordance with all applicable local, state and federal statutes and regulations.
2. The certificate shall include the following information:
 - a. Project.
 - b. Permit Number.
 - c. Location.
 - d. Construction Documents.
 - e. Date on Plans and specifications submitted for approval and issuance of the Building Permit.
 - f. Addendum(a) and Revision Dates.
3. The certificate shall be signed by the Contractor and include the following:
 - a. Signature.
 - b. Date.
 - c. Company.
 - d. License Number.
 - e. License Expiration Date.

PART 2 - PRODUCTS**2.1 NOT USED****2.2 IDENTIFICATION****A. Nameplates**

1. Nameplates shall be laminated black Bakelite with minimum ¼ inch high white recessed letters.
2. Nameplates shall be securely attached to the equipment. Utilize mechanical fasteners such as galvanized steel or brass screws for exterior applications. High strength adhesives or cements may be used for interior applications.

2.3 RACEWAYS AND CONDUIT**A. Rigid Galvanized Steel (RGS) Conduit**

1. RGS shall be zinc-coated steel that conforms to ANSI C80.1, UL Specification No. 6 and Federal Specification WW-C-581e by Allied Tube and Conduit, Republic Steel, Wheatland Tube or approved equal.
2. RGS fittings shall be threaded. Split couplings or non-threaded fittings shall not be used.

3. Nipples and Close Nipples shall be RGS, length as noted or as required to conform to field conditions.
- B. Intermediate Metal Conduit (IMC)
1. IMC shall be zinc-coated steel that conforms to ANSI C80.6, UL Standard No. 1242 and Federal Specification WW-C-581e by Allied Tube and Conduit, Wheatland Tube or approved equal.
 2. IMC fittings shall be threaded.
- C. Electrical Metallic Tubing (EMT)
1. EMT shall be zinc-coated steel that conforms to ANSI C80.3, UL Standard No. 797 and Federal Specification WW-C-563 a by Republic Steel, Allied Tube and Conduit or approved equal.
 2. EMT fittings shall be zinc plated pressed steel gland and ring compression up to two (2) inches and zinc plated pressed steel double set screw from two (2) inches and up
- D. Miscellaneous Conduit Fittings
1. Elbows shall be standard radius unless noted otherwise. Where Large Radius elbows are specified, provide forty-eight (48) inch radius unless noted otherwise.
 2. Bushings shall be threaded pressed steel hot dipped galvanized with conduit end stop and integrally molded noncombustible phenolic insulated surface rated for 150°C.
 3. Bonding bushings shall be threaded pressed steel hot dipped galvanized with conduit end stop and integrally molded noncombustible phenolic insulated surface rated for 150°C with a lay-in tin plated copper grounding lug.
 4. Exposed conduit expansion fittings shall be hot-dipped galvanized malleable iron with external bonding jumper equal to O.Z./Gedney Type EX for RGS or Type TX for EMT (four (4) inch maximum expansion).
 5. Provide water-tight gland sealing assemblies with pressure bushings equal to OZ/Gedney Type WSK for new cast-in-place installations or Type CSCM for retrofit (core drilling of existing walls) as required for below grade wall and floor penetrations.
- E. Flexible Metallic Conduit
1. Liquidtight Metal Conduit shall be UL Listed fabricated from a spiral wound strip of heavy gauge, corrosion resistant, hot dipped galvanized steel equal to Electri-flex Company Type LA. The jacket shall be flame retardant, sunlight resistant PVC extruded over the spiral wrap. Sizes through 1 ¼ inch shall have an integral copper bonding strip.
 2. Liquidtight fittings shall be UL listed zinc plated insulated throat.
 3. Flexible metal conduit shall be UL Listed non-jacketed steel fabricated from a spiral wound strip of heavy gauge, corrosion resistant, hot dipped galvanized steel equal to Electri-flex Company Type BR.
- F. Wireways shall be minimum 16-gauge steel with all straight runs having hinged spring-latched covers. Finish shall be painted over a corrosion resistant phosphate pretreatment to protect against corrosion. Interior parts shall be smooth and free of sharp edges and burrs. Provide wireway as identified on the drawings for NEMA 1, 3R or 12 service. Wireways shall be equal to Square D and UL Listed.

2.4 WIRE AND CABLE (600V)

- A. Provide single-conductor, annealed copper wire and cable with insulation rated for 600 V, of sizes specified and scheduled on drawings, by General Electric, Southwire, Okonite or approved equal, for secondary service, feeders, branch and system wiring. Wire sizes shown and specified are American Wire Gauge for copper conductors.
- B. The use of aluminum conductors is not allowed.
- C. Wire #10 and larger shall be stranded; #12 and smaller shall be solid. Wire and cable shall have THWN-THHN or XHHW insulation for branch circuit and feeder conductors.
- D. Conductor Color-coding
 - 1. Branch circuit shall be color-coded. Conductors #12 and #10 shall be colored with a factory applied solid or striped compound coating (black, red, blue, brown, orange or yellow). Neutrals and equipment grounds shall have solid compound or solid color coating (white, gray and green), except that neutrals with colored stripe shall be used where required by code. Phase conductors #8 and larger with stripes, bands or hash marks shall have background color other than white, green and gray.
 - 2. Alternative field-applied color coding methods may be used for wire #8 or larger, with color code as specified in other sections of this specification. Coloring shall be applied by the use of flame-retardant vinyl tape, equal to 3M Scotch 35.
- E. Splices and Terminations
 - 1. Ampacity and temperature rating of splices and connectors shall be equal to or greater than those of associated wires and cables.
 - 2. Make splices in branch circuit or feeder wiring from #12 to #10 with UL-listed, solderless screw on connectors rated 600 V.
 - 3. Make splices in branch circuit or feeder wiring above #10 with UL-listed 90°C, 600V, compression butt splice barrel equal to Burndy YS-L HYLINK.
 - 4. Conductor terminations shall be standard bolt-on lugs with hex screws listed for attachment of copper wire and cable to panelboards, switchboards, disconnect switches and other electrical equipment.
 - 5. Make terminations for stranded conductors on screw terminals with UL Listed 105°C, 600V PVC insulated barrel compression locking fork tongue terminal equal to Burndy TP-LF VINYLUG.
 - 6. Make bus terminations for conductors #6 and larger with UL-listed 90°C, 600V, compression standard barrel length lugs equal to Burndy YA-L for conductor sizes to #4/0. Connectors for cable 250 KCMil and larger shall be with UL-listed 90°C, 600V, compression long barrel length two hole lugs equal to Burndy YA-2N. Lugs shall be high conductivity seamless copper electro-tin plated for corrosion protection.
- F. Wire management shall be provided by self-extinguishing self-locking nylon ties with -65 to 350°F. range for bundling conductors.
- G. Cable pulling compounds shall be UL Listed and be suitable for use with the specified cable insulation system. The compound shall reduce the coefficient of friction, while not adding any long term issues to the installation such as premature aging of the insulation system, added flammability or drying in such a manner as to stick the cable in place in the raceway.

2.5 WIRING DEVICES AND PLATES

- A. Provide wiring devices by single manufacturer. Catalog designations of Cooper are specified, unless noted otherwise, to establish standards of quality for materials and performance. Colors of devices as specified below are White for standard applications. Equal products by Leviton, Pass & Seymour or Hubbell will be accepted. Provide published manufacturers cross-reference sheet highlighted with the device specified and that being submitted with all device product data for approval.
- B. Wall switches shall be of the totally enclosed tumbler type. Wiring terminals shall be spring loaded terminal screws for back or side wiring. Switches shall be rated 20-ampere 277 V for use on alternating current only. The yoke shall have a grounding terminal with a green hex head screw. Pilot lights indicated shall consist of red lighted handle, illuminated when the switch is on.
- C. Toggle Switches shall be heavy duty, UL listed, specification grade as follows:
 - 1. Single-pole shall be No. 2221W
- D. Wiring Device Plates:
 - 1. Provide 0.032 inch nominal brushed Type 430 stainless steel device plates by the manufacturer of the wiring device for all flush mounted switches and receptacles installed in dry locations and where not subjected to physical abuse. Ganged plates shall be of one-piece construction to accommodate the required number of installed devices. Oversized plates to cover wall finish blemishes adjacent to the device box shall not be used.
 - 2. Provide high-impact smooth nylon device plates by the manufacturer of the wiring device for all flush mounted switches and receptacles installed in dry locations and where not subjected to physical abuse. Fastening screws shall be color matched to the plate, plate color and to the device. Ganged plates shall be of one piece construction to accommodate the required number of installed devices. Oversized plates to cover wall finish blemishes adjacent to the device box shall not be used.

2.6 OUTLET BOXES

- A. Outlet and switch boxes on concealed work shall be at least 4 inch square, galvanized pressed steel conforming to UL 514A. Where installed in plaster, boxes shall be fitted with galvanized steel plaster covers of required depth to finish flush with finished wall or ceiling. Outlet boxes shall be by Steel City Electric Company, Appleton Electric Company, or approved equal.
- B. Outlet boxes installed in masonry walls or in concrete decking shall be UL Listed for the application.
- C. Outlet boxes for interior surface mounted locations where RGS is specified where exposed to moisture, adjacent to water or steam connections, and where indicated as weatherproof on drawings shall be cast malleable iron with an aluminum polymer enamel coating equal to Appleton Type FD. Conduit entries shall be threaded cast hubs. Device covers shall be coated malleable iron with moisture sealing gasket and stainless steel fasteners.

2.7 JUNCTION AND PULL BOXES

- A. Provide galvanized steel junction and pull boxes where indicated and as necessary to facilitate installation. Steel shall be minimum 16 gauge. Junction and pull boxes shall be of code required dimensions. Cover shall be of the same type and thickness material as the box construction.
- B. Junction and pull boxes intended for dry interior locations shall be NEMA 1 enclosures with accessible, removable screw-on covers. Covers shall be secured with corrosion-resistant screws with keyhole slots to accommodate easy removal.
- C. Junction and pull boxes intended for wet or exterior locations shall be NEMA 3R enclosures with hinged gasketed covers. Interior and exterior shall be finished with a gray enamel powder coat over the galvanized metal. Hinge shall be galvanized steel with stainless steel pin. Covers shall be secured with corrosion-resistant zinc plated lockable pull catches.
- D. Custom fabricated medium to large junction and pull boxes shall have internal structural steel bracing welded to form a rigid assembly adequate to maintain alignment and shape in shipment and installation.

2.8 SAFETY DISCONNECT SWITCHES

- A. Switches shall be three-pole heavy-duty type rated for 600V in NEMA 1 (interior dry applications) and NEMA 3R (exterior applications) enclosures unless noted otherwise on the drawings. All switches shall be horsepower rated and suitable for service entrance use. Provide with solid neutral where four wire circuits are indicated and with 200% solid neutral where neutrals are sized for 200% full load ampacity.
 - 1. Operating mechanisms shall be quick-make/quick-break. Current-carrying parts shall be high-conductivity copper. Contacts shall be silver-tungsten or plated. Provide positive pressure fuse clips and switch operating mechanism suitable for continuous use at rated capacity without auxiliary springs in current path. Switches shall withstand available fault current or let-through current before operating, without damage or rating change.
 - 2. Terminations shall be suitable for copper or aluminum conductors 60°/75° C rated. Clear shielding shall prevent accidental contact with energized line terminals.
 - 3. The cover shall be mechanically interlocked to prevent access unless the disconnect is in the OFF position. A defeater shall be provided to bypass this interlock. With the door open, an interlock shall be provided to prevent inadvertent closing of the disconnect. Padlocking facilities shall be provided to positively lock the disconnect in the OFF position with from one (1) to three padlocks with the door open or closed.
 - 4. The enclosure shall be given a phosphatizing pretreatment. The paint finish shall be manufacturer's standard color and shall pass 600 hours of corrosion resistance testing per ASTM B 117.
- B. Fused switches shall have short circuit ratings no less than 100,000 amperes RMS, with capabilities to 200,000 amperes when used with Class J, L or R fuses at 480V from 400A to 1200A.
- C. Manual Motor Starters shall have quick make, quick break toggle mechanisms with allowance for up to 10% field adjustment in nominal overload heater values. Manual Motor Starters shall be NEMA 1 (interior dry applications) and NEMA 3R (exterior

applications) enclosed unless noted otherwise on the drawings. Provide Cutler Hammer type MS manual starters for applications up to 1 HP at 240V single phase and type B100 for up to 1 HP at 277V single phase. Permanent provisions shall be included to allow locking the disconnect in the OFF position.

2.9 LIGHTING FIXTURES

- A. Provide lighting fixtures, equipment and components where shown on drawings, as listed in fixture schedules and as specified, wired and assembled. Provide approved aligned canopies, hangers and other appurtenances as required, for a complete and functional system.
- B. Refer to the lighting fixture schedule for specific ballast requirement. In general:
 - 1. LED luminaires shall have a luminous efficacy of at least 90 lumens/watt, a color temperature of 3500 K (unless noted otherwise on the plans), a CRI of at least 80, an estimated life of at least 50,000 hours at 70% lumen maintenance, and shall include a minimum five (5) year warranty on the entire luminaire including drivers. The luminaire and LEDs shall have been tested in accordance with LM-79 and LM-80
- C. Verify ceiling constructions, and provide frames, rings and other accessories suitable for construction encountered.

PART 3 - EXECUTION

3.1 DEMOLITION

- A. General
 - 1. Refer to the drawings for demolition scope applicable to the project.

3.2 IDENTIFICATION

- A. Nameplates
 - 1. Provide nameplates on all equipment listed in other sections of this specification including but not limited to switchboards, substations, panelboards, transformers, junction and pull boxes, disconnect switches, motor starters and motor control centers, contactors, time clocks, remote control stations, fire alarm panels, smoke detector remote test/alarm stations and fire alarm annunciators.
 - 2. Nameplates shall designate equipment tag number as defined on the drawings, system voltage where applicable, circuit number, device controlled and system function. Refer to typical nameplate detail on the drawings for additional requirements.
 - 3. Submit a complete list of proposed nameplates prior to order to ensure conformance to design criteria. Submittal shall include nomenclature, size and layout of each tag.
 - 4. Samples of stickers together with color schedules shall be submitted during the submittal phase of this project.
- B. Equipment Identification

1. Equipment identification designations shall be taken from equipment schedules and coordinated with the Owner's facility group to assure designations match up with Owner's maintenance management system identification database.

3.3 RACEWAYS AND CONDUIT

A. General

1. Unless specified or shown on drawings otherwise, install raceways and conduits concealed. Raceways and conduits may be run exposed on unfinished walls and basement ceilings with exposed structure, in mechanical rooms, electric rooms, attics and roof spaces.
2. Run concealed raceways and conduits in as direct lines as possible with minimum number of bends of longest possible radius. Install exposed raceways and conduits parallel to or at right angles to building lines.
3. Raceway and conduit runs shall be mechanically and electrically continuous from supply to outlet. Conduit shall enter and be secured to metallic enclosures with lock nut and bushing inside. Provide additional exterior lock nut for RGS connections. Bushings shall be the bonding type for conduit connections to metallic enclosures with concentric or eccentric knockouts. Lock nuts and bushings will not be required where conduits are screwed into threaded hubs.
4. Size raceways and conduits as required by NEC unless oversized raceways and conduits are shown on the drawings. Raceways and conduits shall be ¼ inch minimum.
5. Install conduit systems complete before installation of conductors. Blow through and swab after plaster is finished and dry, and before conductors are installed.
6. Raceways and conduits supports shall be rigidly attached to the building structure utilizing corrosion resistant components suitable for use with the selected raceway or conduit. Refer to the seismic restraint sections of this specification for any additional requirements.
7. Field bending, cutting and threading shall be executed with the proper tools, resulting in bends and shortened conduits and raceways that are equivalent to factory fabricated and purchased components.
8. Protect all vertical conduit runs from the entrance of foreign material before installation of conductors and the final closure of the raceway system. All spare conduits (vertical and horizontal runs) shall be sealed with a bushing and appropriate insert to prohibit entrance of debris or vermin. Affix a label that indicates "Spare Conduit to _____" at each seal. Label shall be in accordance with the labeling section of this specification.

B. Rigid Galvanized Steel (RGS) Conduit

1. RGS may be used for all raceway applications outlined for EMT and PVC. RGS shall be used in locations where subject to accidental damage or abuse and for all above grade exterior applications unless other wiring methods are specified on the drawings. All circuit conductors in excess of 600 V shall be installed in RGS.
2. RGS shall not be used in corrosive environments.
3. All RGS fittings shall be threaded. Utilize Erickson couplings where joining two (2) threaded conduits that cannot be rotated.

C. Intermediate Metal Conduit (IMC) may be used in any application, with same requirements, where RGS is allowed except for circuits operating at more than 600 V.

D. Electrical Metallic Tubing (EMT)

1. EMT may be used for lighting and receptacle branch circuits, telephone, fire alarm, communications, signal and instrumentation circuits and for control circuits. EMT may be used in masonry walls, above hung ceilings, in equipment rooms, in mechanical and electrical chases and closets, in exposed locations along ceilings or walls above normal traffic level and where not subject to accidental damage or abuse.
2. EMT shall not be used in exposed applications below eight (8) feet above finished floor or in exterior or damp/wet/corrosive locations. Electrical, telephone and communications closets are considered exempt from this restriction and EMT may be installed below 8' AFF in this application only. EMT shall not be installed underground, in slabs on grade, in exterior locations, in hazardous areas, or for circuits operating at more than 600 V.

E. Miscellaneous Conduit Fittings

1. Expansion/Deflection Fittings: Raceways and conduit buried or secured rigidly on opposite sides of building expansion joints and long runs of exposed conduit subject to expansion and contraction due to variations in temperature shall have expansion fittings. Raceways and conduit shall cross building expansion joints at right angles. Provide separate external copper bonding jumper secured with grounding straps on each end of fitting. Fittings shall safely deflect and/or expand/contract to twice the distance of potential movement.
2. Penetrations of all below grade exterior walls and flooring shall require approval by the Engineer and Architect. Submit proposed penetration points, size openings and penetration methods to Engineer and Architect. Penetrations shall utilize sealing fittings appropriately sized for the application. Duct bank penetrations are excluded from this requirement.
3. Sealing Fittings shall be installed wherever conduits pass from warm to cold locations to minimize condensation within the conduit. Sealing fittings shall be installed with RGS penetration of the wall and terminate in a suitably sized junction box.
4. Refer to other specification sections for requirements pertaining to sealing for hazardous atmospheres.

F. Flexible Metallic Conduit

1. Provide flexible metallic conduits for connections to electrical equipment and to equipment furnished under other Divisions that are subject to movement, vibration or misalignment and/or where noise transmission must be eliminated or reduced.
2. Flexible metallic conduit shall be liquid-tight under the following conditions:
 - a. All mechanical equipment rooms.

- G. Wireways shall be provided where specifically shown on the drawings or where the group mounting of controllers, disconnects, enclosures, etc warrant the use for elimination of multiple short conduit runs. Wireways shall be provided complete with all required appurtenances necessary to have a totally enclosed system rated for the environment. Wireways shall not be installed in any location where subject to accidental damage or abuse.

3.4 WIRE AND CABLE (600V)

- A. Homerun designations on the drawings are diagrammatic only. Install branch circuits and feeders from the power source to the attachment point as required for a complete system. Provide slack wire for connections to equipment installed by others. Refer to

schedules and risers where specific conductor and associated raceway sizes are not indicated on the floor plans.

- B. Connect branch circuit homerun with two (2) or three (3) circuits and common neutral only where specifically shown on the drawings. Circuits with common neutrals shall not be connected to the same phase to ensure cancellation of the return current in the neutral conductor.
- C. Install wires and cable in raceways as specified. All conductor sizing is based upon no greater than three (3) current carrying conductors in a conduit. Installation of up to six (6) circuits (no greater than twelve current carrying conductors) in a single conduit will be allowed if the conductor sizing is increased to the required ampacity to accommodate derating factors required by the NEC and NFPA 70.
- D. The minimum wire size shall be #12 unless #14 specifically allowed on the drawings for wiring of controls. Branch circuits longer than 75 feet for 120 V and 175 feet for 277 V from panel to last outlet shall be increased a minimum of one (1) size above that shown on the drawings to minimize voltage drop to less than 3%.
- E. Conductors shall be identified at all accessible locations in the following manner:
1. Color code secondary service, feeders and branch circuit conductors as follows:

<u>208/120 Volts</u>	<u>Phase</u>
Black	A
Red	B
Blue	C
White	Neutral
Green	Ground

Provide nonferrous wire markers, embossed or printed to correspond with the drawings. Labels shall be permanently marked so that the source of the branch circuit or feeder may be readily identified. Hand written labels are not acceptable. Embossed tag equal to 3M Scotch Code STL-TAG or SCS-TM shall be applied with two (2) miniature cable ties or slipped through both end holes. Heat bonded tag equal to 3M Scotch Code SCS-HB shall be permanently affixed with a heat gun.
- F. Splices and Terminations
1. No more than twelve splices of current carrying conductors or six (6) circuits, whichever is greater, shall be allowed in a single enclosure or junction box.
 2. Splices and terminations shall be sized to the specified conductor. The insulation shall be cut back with the appropriate tools such that the conductors are not nicked or damaged.
 3. The compression tool shall be appropriate for the installation of the provided lug or butt splice to ensure pressure necessary for a proper connection is applied.
 4. Terminations shall not be stacked or bent unless specifically listed for the application.
- G. Cable Pulling
1. Pull cables that share conduit at same time into completely installed raceway. Conductors shall not be pulled in raceways with existing wiring.
 2. Submit cable pulling calculations for engineers' approval prior to all mechanically assisted pulls. Attach pull ropes to conductors with basket-weave grips on pulling eyes. Provide means to measure tension during entire pull. Utilize pulling

compounds to lessen friction in accordance with the manufacturer's recommendations.

3. Mechanically assisted pulls shall utilize equipment specifically designed for the purpose such as ropes, electric wench, pulleys, etc. The use of a motorized vehicle to assist in a cable pull is prohibited.

3.5 WIRING DEVICES AND PLATES

- A. Branch circuitry shall be attached to all devices using the attachment screw or utilizing back wiring chambers that utilize screws for compressing the connection on the wire. Quick stab features that do not require a positive screw on attachment for the conductor are not acceptable.

3.6 OUTLET BOXES

- A. Outlet and switch boxes shall be securely fastened to metal studs with a minimum of two (2) self-tapping screws. Boxes three (3) gang and greater shall be securely fastened to studs on both sides of the box.
- B. Fasteners for mounting boxes in damp or wet locations shall be stainless steel.

3.7 JUNCTION AND PULL BOXES

- A. Junction box covers shall be accessible. Do not install junction boxes above suspended ceilings except where ceiling is removable or where an access panel is provided.
- B. Pull boxes connected to concealed conduits shall be mounted with covers flush with finished wall or ceiling.
- C. Pull boxes exposed to rain or in damp/wet locations shall be weatherproof NEMA 3R unless noted otherwise on the drawings.
- D. No pull box shall be within two (2) feet of another.
- E. Provide clamps, grids, cable ties and other non-conductive or combustible appurtenances to secure cables. No cable shall be unsupported for more than thirty (30) inches. Cables shall not touch or be unsupported within one (1) inch of the box cover.
- F. Each junction and pull box shall have a suitable laminated plastic nameplate with white cut letters identifying power source, voltage and driven load of the associated branch circuits or feeders.
- G. Submit box sizing calculations to confirm all box dimensions are in accordance with code requirements with product data prior to installation.

3.8 SAFETY DISCONNECT SWITCHES

- A. Provide safety disconnects as required and indicated on the drawings. Each motor shall be provided with a local disconnecting means in accordance with code requirements.

- B. Manual motor starters may be used for 120, 208, 240, or 277V, single-phase motors up to 1 HP. Switches shall disconnect all ungrounded conductors. Overload heating elements shall be properly sized and coordinated for the associated motor in accordance with code and manufactures recommendations.
- C. Disconnect switches for all applications with available fault current in excess of 10,000 amperes RMS symmetrical shall be fusible. Fuses shall be Class J, L or R and rejection clips shall be installed in the fuse holders to prohibit the installation of non-current limiting fuses.
- D. Each disconnect switch shall have a suitable laminated plastic nameplate with white cut letters identifying power source, voltage and driven load.

3.9 LIGHTING FIXTURES

A. Fixtures

1. General

- a. Do not install fixtures until work of other trades that may damage fixtures is completed.
- b. Where seismic requirements are specified herein, fixtures shall be supported as shown or specified.
- c. Handling of reflectors shall be done only with cotton gloves to avoid imprinting fingerprints on reflective surfaces.

2. Accessories

- a. Installation and support of fixtures shall as a minimum be in accordance with the NFPA 70 and manufacturer's recommendations.
- b. Accessories such as straps, mounting plates, nipples, or brackets shall be provided for proper installation.

3. Suspended and Pendant Fixtures

- a. Suspended fixtures shall be provided with adjustable swivel hangers in order to ensure a plumb installation.
- b. Single unit suspended fluorescent fixtures shall have twin-stem hangers.
- c. Provide threaded rod to rigidly support the weight of the fixture independently of the ceiling support system. Threaded rod shall be concealed where fixture installed in an area with suspended ceilings. Support luminaries on a minimum of two (2) points (one at each end) to prevent rotation. Threaded rod, pendants or factory supplied fixture accessories (such as rods or chains) four (4) feet or longer excluding fixture, shall be braced to limit swinging. Bracing shall be 3 directional, 120 degrees apart.
- d. Branch circuitry shall be routed to the outlet box utilizing the wiring methods outlined on the drawings and as described in these specifications. Flexible raceway may be installed to each fixture from an overhead junction where concealed above a ceiling. Fixture to fixture wiring installation is allowed only when fixtures are installed end to end in a continuous run.

4. Support

- a. Do not suspend or support lighting fixtures, threaded rod and safety chains from hung ceiling, conduit or duct. Support fixtures with threaded rod and safety chain from structural members only. Provide supplemental steel (factory fabricated channel equal to Unistrut) where required to span structural steel members.

- b. Provide supplemental steel below ducts where fixture locations coincide with HVAC duct or mechanical piping runs and access to structure is inhibited.
- c. Supplemental steel shall be rigidly supported from structure. Where suspension is required, support supplemental steel with threaded rods to structure. Sizing of all supplemental support components is the responsibility of the Contractor.

3.10 BASIC ACCEPTANCE TESTS

A. General Scope

1. This section covers the required field tests and inspections to assess the suitability for initial energization of electrical power distribution equipment and systems. Failed components shall be replaced and retested for no additional cost to the project.
2. The purpose of this specification is to assure that all tested electrical equipment and systems are operational and within applicable standards and manufacturer's tolerances and that the equipment and systems are installed in accordance with design specifications.
3. All testing shall be performed by the Contractor responsible for the installation of the systems or by an independent testing organization under contract with the Contractor.
4. All equipment utilized for testing shall have a valid calibration sticker. All test reports shall indicate the equipment utilized and its associated calibration due date.
5. Coordinate all required shutdowns with the Owner. Any and all testing required after the Owner has taken occupancy (temporary or permanent) shall be assumed to be conducted during premium time.
6. A written record of all tests and a final report summarizing the findings shall be submitted for approval prior to energizing any electrical power distribution equipment and systems. All equipment shall be left in clean operational condition.

B. Inspection and Test Procedures

The following tests shall be conducted using the noted section of the latest edition of NETA ATS Acceptance Testing Specifications for Electrical Power Distribution Equipment Systems as a reference:

1. Low Voltage, Molded and Insulated Case Circuit Breakers with frame size greater than 225 amperes and/or with adjustable trip units shall be tested and adjustable settings dialed to match the coordination study criteria. Perform an insulation resistance test at 1000VDC (thermal magnetic) or 500VDC (solid state) for one (1) minute from pole to pole and pole to ground, resistance values shall not be less than 100 megohms. Perform resistance test across open and closed breaker contacts of each phase. Test trip settings tolerance with primary current injection. Tabulate readings for each breaker. NETA ATS-7.6

END OF SECTION 26 00 00

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FIRE ALARM – ADDRESSABLE MODIFICATION

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SECTION 26 30 12**FIRE ALARM – ADDRESSABLE MODIFICATION****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.
- B. All criteria establish within Specification 26 00 00 shall apply to this section unless specifically noted otherwise.

1.2 SUMMARY

- A. Section Includes:
 - 1. Initiating Devices
 - 2. Notification Appliances.
 - 3. Acceptance and Reacceptance Testing
- B. Related Sections include the following:
 - 1. Division 26 00 00 Electrical

1.3 DEFINITIONS

- A. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.

1.4 ACTION SUBMITTALS

- A. Product Data: For each required component provide manufacturer's standard cut sheet containing technical details, listings and general information illustrating compliance with these specification requirements.
- B. Provide the following detailed documentation for review and evaluation:
 - 1. Point to point wiring diagrams of the entire system including all conductor quantity and sizing, labeling (numerical and color coding) and interconnections.
 - 2. Floor plans illustrating each initiating device and notification appliance with an assigned unique identification. This identification and audible notification appliance tap settings shall be illustrated on the floor plans and submitted for approval with the wiring diagrams.
 - 3. Individual device interconnection diagrams. Panel layouts shall indicate module placement and spare capacity allowance for future expansion.
 - 4. Manufacturers catalog cut sheets of all components and devices.
 - 5. Battery capacity calculations clearly indicating required and spare capacity.
 - 6. Power supply capacity calculations including each circuit load, voltage drop and spare capacity.

- C. Submission of certification records for qualifications of the technicians performing final connection and testing.
- D. Submit written test report in accordance with NFPA72 Chapter 14 for notification of successful completion of each required test and a system Record of Completion in accordance with NFPA72 Section 10.18. Provide floor plan illustrating ambient and alarm sound levels to document notification appliance testing.

1.5 CLOSEOUT SUBMITTALS

- A. Submit operations manual detailing all functions and operations of the system. User operating instructions shall be provided prominently displayed on a separate sheet located next to the control unit in accordance with UL Standard 864.
- B. Submit maintenance manuals and recommended spare parts list required to conform to NFPA maintenance guidelines. Instructions shall include but not be limited to:
 - 1. Instructions for replacing any components of the system, including internal parts.
 - 2. Instructions for periodic cleaning and adjustment of equipment with a schedule of these functions.
 - 3. A complete list of all equipment and components with information as to the address and telephone number of both the manufacturer and local supplier of each item.
- C. As-built drawings shall include all device addresses, alphanumeric descriptors assigned in the control panel, and final notification appliance tap settings with modified spare power supply capacity illustrated.

1.6 QUALITY ASSURANCE

- A. The system design and installation shall conform to the following standards
 - 1. All equipment shall be UL listed for its intended purpose.
 - 2. All applicable NFPA standards, including but not limited to: 70, 72, 90A, 92A, and 101.
 - 3. State Building Code.
 - 4. The Americans with Disabilities Act (ADA)
 - 5. All requirements of the Authority Having Jurisdiction (AHJ)
- B. The equipment supplier and the Contractor shall demonstrate a minimum five (5) years' experience in the successful design and installation of addressable fire alarm systems similar in size and scope to that required for this project.

1.7 WARRANTY

- A. The installer and manufacturer's warranty shall be for a minimum period of one (1) year from the date of the final acceptance test approval.
- B. Include as part of their base bid the cost of a one-year test and inspection contract, to be held by the company which shall certify the completed installation. The contract shall provide for quarterly inspections in accordance with NFPA72 and local requirements. Any equipment found to be defective during the warrantee period shall be replaced by the

Contractor at no additional charge to the Owner.

1.8 COORDINATION

- A. Coordinate sizes and locations actual equipment provided.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide the illustrated changes to the existing addressable fire detection, alarm and control system with signaling devices in compliance with all applicable codes and authorities having jurisdiction.
- B. Provide automatic and manual, closed circuit, multiplex fire alarm communications according to the following Specifications and as shown on the Drawings, wired, connected and left in first class operating condition.
1. System shall operate from 3 wire AC supply with emergency generator backup on failure of normal system and integral standby battery source backup on failure of the emergency generator.
 2. Equipment shall be UL listed for use with the existing FACP.

2.2 SEQUENCE OF OPERATION

- A. Refer to Sequence of Operation Matrix on the plans and the Fire Protection Narrative for the intended system operation.

2.3 CONTROL

A. General Requirements

1. Standby batteries shall support the system in the event of a loss of primary power for twenty-four (24) hours of full supervisory operation followed by fifteen (15) minutes of alarm.
2. Addressable loop wiring (Signaling Line Circuits - SLC) shall be wired in a Class Class A method. Each circuit shall allow for a minimum of 25% additional devices.
3. Communication circuits between networked fire alarm control panels shall be Class A.
4. Isolation Modules shall be provided to maintain circuit integrity in the event of an open, short or ground fault. Each addressable loop shall have a minimum of one (1) isolation module for every twenty (20) devices or one (1) per floor, whichever is greater.
5. Non-addressable loop wiring (Initiating Device Circuits - IDC) shall be wired in a Class A method.
6. Audible and visual circuits (Notification Appliance Circuits - NAC) shall be wired in a Class A method. Each circuit shall allow for a minimum of 25% additional devices. Provide a minimum of two (2) circuits per floor or area, alternately wiring adjacent notification appliances between circuits.

2.4 INITIATING DEVICES AND ACCESSORIES

- A. Provide addressable detectors as shown on the drawings. Detectors shall be connected to the addressable loop with two (2) wires. All detectors shall incorporate built-in identification for the system to automatically identify various types of sensors. Detectors shall utilize a flashing LED which denotes normal operation, and latched LED which indicates an alarm condition. All common types of analog detectors shall be interchangeable with common twist-lock bases. The standard base shall have a supervised LED output and optional relay and isolator bases shall be available.
- B. Analog sensors shall provide indication to the control panel that a detector requires maintenance, and shall operate in stand-alone mode in the event of an addressable loop communications failure.
- C. Analog Photoelectric Smoke Detectors shall be continually monitored to measure any change in their sensitivity because of the environment (dirt, air temperature, humidity, etc.), and shall allow changes in sensitivity levels within the UL approved sensor's range. The photoelectric detector shall consist of a dust resistant, field cleanable photo chamber with microprocessor based solid state electronics.
- D. Monitor Modules shall be provided to monitor and connect conventional initiating devices onto the addressable loop.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All interconnections shall be installed in accordance with the manufacturer's system wiring diagrams.
- B. Final connections, program editing, and testing shall be conducted by qualified personnel with one of the following qualifications:
 - 1. Factory trained and certified by the equipment manufacturer.
 - 2. National Institute of Certification in Engineering Technologies (NICET) or IMSA fire alarm certified.
 - 3. Trained and qualified by an organization listed by a national testing laboratory for the servicing of fire alarm systems.
- C. Wiring
 - 1. Wiring for the fire alarm system shall not be installed in conduits, junction boxes, or outlet boxes with conductors of lighting and power systems.
 - 2. Wiring for the fire alarm system shall be installed in conduit with limitations as outlined in 26 00 00. Exposed plenum rated wire/cable and/or fire alarm low energy cable will not be accepted.
 - 3. Minimum wire sizes shall be as follows:
 - a. Addressable loop wiring shall utilize minimum #16 AWG.
 - b. All junction boxes shall be sprayed red and labeled "Fire Alarm". Conduit couplings shall be spray painted red prior to installation.
 - c. Connections and splices shall be made using screw terminal blocks. No more than one conductor shall be installed under any screw terminal. The uses of wire nut type connectors are prohibited in the system.
 - d. All circuit conductors entering or leaving any mounting box, outlet box

- enclosure or cabinet shall be labeled in accordance with the wiring diagram. Labeling and color coding shall be consistent throughout the conductor run.
- e. Wiring within any enclosure shall be readily accessible without removing any component parts.
 - f. The fire alarm equipment manufacturer's representative shall be present for the connection of wiring to the control panel.
4. Detectors
- a. Detectors placement shall be in accordance with NFPA 72 requirements and recommendations.
 - b. Detectors shall be at least twelve (12) inches from any part of any lighting fixture and at least three (3) feet from diffusers of air handling systems.
 - c. Each detector shall be provided with appropriate mounting hardware as required by its mounting location.
 - d. Smoke detectors shall not be installed until the building has been thoroughly cleaned. Dust covers shall be installed over all smoke detectors until final testing commences. All detectors, which indicate reduced sensitivity due to dirty condition, shall be cleaned prior to commencement of final testing.
 - e. Detectors shall be provided with wire guard cages where subjected to physical abuse, such as in gymnasiums.
5. Modify the system annunciator to indicate the added devices in accordance with the drawings.

3.2 TESTING

- A. Notify the Owner's Representative ten (10) business days before the tests are to be conducted. The tests shall be performed in accordance with the approved test procedures in the presence of the Owner's Representative. Furnish all instruments and personnel required for the tests.
- B. Preliminary Tests
1. Perform insulation testing (megger), continuity and loop resistance checks on all new system conductors to determine that the system is free from grounded, shorted, or open circuits. These tests shall be conducted prior to the installation of fire alarm equipment. Loop resistance measurement shall verify that the loop resistance does not exceed the manufacturer's specified limits. Corrections shall be made and the system shall be retested to assure if deficiencies are found.
 2. Perform complete functional and operational performance tests. Testing shall include verification that the circuits and components are electrically supervised and operate as intended. Coordinate functional testing with HVAC Contractors where applicable to verify function of all control interfaces such as elevator recall and air handling unit shutdowns.
 3. Reacceptance testing shall be performed in accordance with NFPA 72 14.4.1.2 where applicable (testing of 10% of existing devices not affected by scope of work, etc.).
 4. A written report detailing the results of the preliminary tests shall accompany the request for Final Acceptance Test. The written Preliminary Test Report shall be submitted with:
 - a. Copy of FACP printer output verifying proper operation of each device in

- alarm or trouble, time stamped throughout the testing process.
- b. The Operations and Maintenance Manual for the system.
- c. The record (as-built) drawings.

C. Final Acceptance Test

1. The Fire Alarm System, other systems and equipment associated with the fire alarm system and accessory equipment shall be tested in accordance with NFPA 72. Verification of system completion shall be documented with a fully executed copy of the Record of Completion per NFPA 72 Figure 10.18.2.1.1. The listed tests in NFPA 72 Table 14.4.2.2 shall be conducted and documented with an executed copy of Figure 14.6.2.4 as well as manufacturer and job specific procedures to verify that the circuits and components are electrically supervised and operate as intended. The test shall include but shall not be limited to the following:
 - a. Visual inspection of all wiring connections.
 - b. Test of each function of the control panel.
 - c. Test of each circuit in both trouble and normal modes.
 - d. Tests of each alarm initiating device in both normal and trouble conditions. Remove each device from its base to test the supervisory feature.
 - e. Tests of each control circuit and device.
 - f. Tests of each alarm notification appliance. Open the wiring at the midpoint of the circuit to test the wiring supervisory feature. Provide copy of FACP printer output verifying proper operation. Verify each device's audible and visual output.
 - g. Tests of the primary and secondary power supplies and associated loss of each.
 - h. Complete operational tests under emergency power supply.
 - i. Ground fault monitoring circuit function.

END OF SECTION 26 30 12

STATE OF NEW HAMPSHIRE

Department of Administrative Services
 DIVISION OF PUBLIC WORKS DESIGN & CONSTRUCTION

REBID DOVER CIRCUIT COURT BOILERS

25 ST. THOMAS ST., DOVER

DPW Project #81224 Contract C

Department of Administrative Services
 Bureau of Court Facilities



7 Hazen Drive PO Box 483 Room 250
 Concord, New Hampshire 03301
 603-271-3510 1603-271-3515

COMMISSIONER DEPARTMENT OF ADMINISTRATIVE SERVICES

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DIRECTOR DIVISION OF PUBLIC WORKS

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DATE	SYMBOL

DESCRIPTION

DATE	SYMBOL

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PROJECT NAME
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 Circuit Court Boilers

PROJECT NUMBER
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ISSUE DATE

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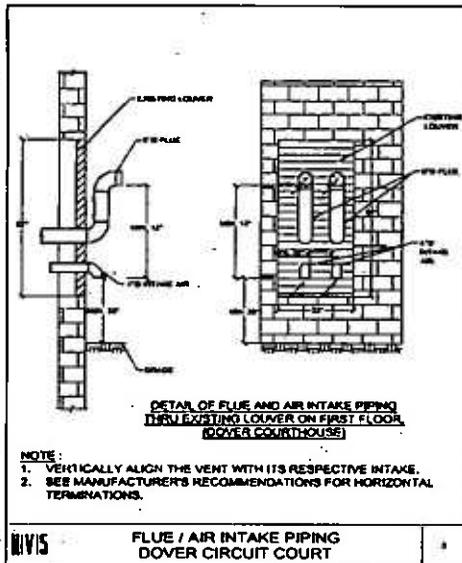


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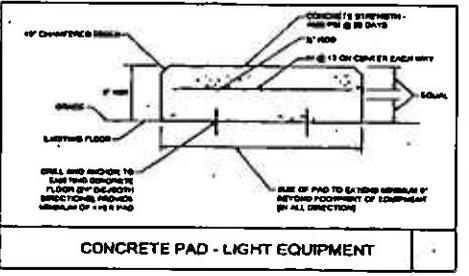
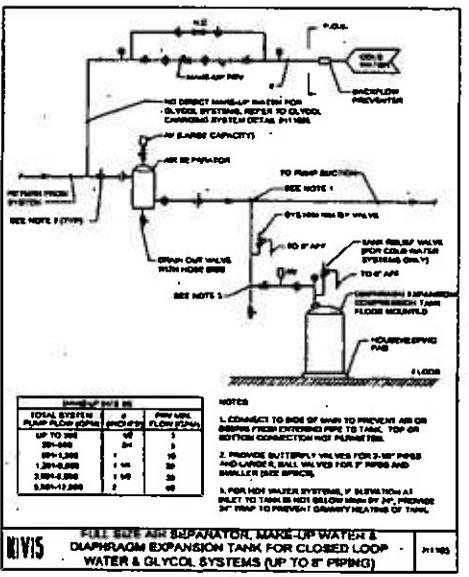
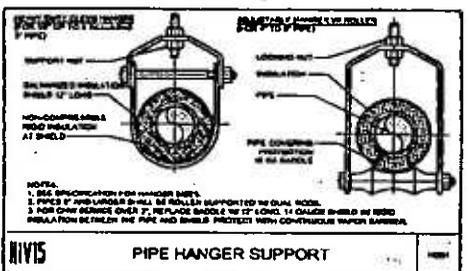


PROVIDE A SIGNAGE BE SIGN LOCATED ON OR IN THE IMMEDIATE AREA OF EACH NEUTRALIZATION SUMP IN LETTERS ONE INCH HIGH. THESE SIGNS SHALL READ

IMPORTANT

THIS NEUTRALIZATION SUMP MUST BE INSPECTED ON A REGULAR AND FREQUENT BASIS AND THE NEUTRALIZING MEDIUM OR AGENT REPLACED WHEN NECESSARY. FAILURE TO DO SO WILL RESULT IN SERIOUS DAMAGE TO THE PIPING SYSTEM

CONDENSING BOILER NEUTRALIZED CONDENSATE SIGNAGE



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DRAWING

DOVER CIRCUIT COURT
 HVAC DETAILS

MD600
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CONDENSING BOILER SCHEDULE (HOT WATER)																	
TAG	BUILDING	LOCATION	CAPACITY (GPM)		INLET (GPM)				HEIGHT				ELECTRICAL		MANUFACTURER AND MODEL NUMBER (SEE STANDARDS)	REMARKS	
			OUTPUT	MAX INPUT	MIN (24 HRS)	MAX (24 HRS)	COMBUSTION EFFICIENCY (%)	INCHES DOWN	INCHES UP	RELIEF VALVE (PSI)	CHILL (TYP)	1/2 (TYP)	3/4 (TYP)	4 (TYP)			PLA
BB-1	BOVER COURT	BOILER ROOM 005	300	775	0	14	97.5	71	4.2	20	100	71	600	1	12	LOCKHART - F1076	SEE NOTES
BB-2	BOVER COURT	BOILER ROOM 005	300	725	0	14	97.5	71	4.2	20	100	71	600	1	12	LOCKHART - F1076	SEE NOTES

NOTES:
 1. REFER TO SPECIFICATIONS, DETAILS AND CONTROL DRAWINGS FOR ADDITIONAL INFORMATION.
 2. PROVIDE BOILER WITH A 1/2 INCH AIRGAP ON THE HEAT EXCHANGER AND 1 INCH AIRGAP ON REMAINDER OF THE BOILER UNIT.
 3. PROVIDE WITH STAINLESS STEEL FIRE TUBING HEAT EXCHANGER.
 4. THE BOILER SHALL OPERATE AT A MINIMUM OF 100% EFFICIENCY.
 5. PROVIDE WITH FACTORY TEMPERATURE AND PRESSURE GAUGE, HIGH AND LOW GAS PRESSURE SWITCHES WITH MANUAL RESET, ADJUSTABLE HIGH TEMPERATURE LIMIT WITH MANUAL RESET, AND OUTLET PRESSURE RELIEF VALVE, FLUE TEMPERATURE SENSOR, OUTDOOR AIR SENSOR, LOW WATER CUT OFF WITH MANUAL RESET, SHUTOFF SWITCH, VARIABLE SPEED BOILER CIRCULATOR PER PUMP SCHEDULE BELOW AND MODULATING BURNER LOW NO. OIL FLOW.
 6. PROVIDE WITH FACTORY CONTROL SYSTEM INCLUDING OUTDOOR AIR RESET, PUMP DELAY WITH FREEZE PROTECTION.
 7. PROVIDE WITH ALARM CONTACTS FOR HOT WATER.
 8. PROVIDE WITH A LOW VOLTAGE CONNECTION AND HIGH VOLTAGE TERMINAL.
 9. THE BOILER SHALL BE INSTALLED AND VENTED WITH A DIRECT VENT SYSTEM WITH HORIZONTAL SIDEWALL TERMINATION, SEE MANUFACTURER'S RECOMMENDATIONS FOR EXHAUST BRASS AND VENTING LENGTHS. THE FLUE PIPING SHALL BE APPROVED BY THE SUBMITTER CONCERNING BOILER MANUFACTURER.
 10. THE BOILER SHALL BE CONSTRUCTED IN ACCORDANCE WITH NEW HAMPSHIRE CODE.
 11. PROVIDE WITH CORRECT GAS PRESSURE FOR THE PROPER FLOW AND LENGTH OF PIPE TO AVOID EXCESSIVE PRESSURE DROP.
 12. PROVIDE WITH FACTORY CONDENSATE TRAP AND CONDENSATE RECYCLING UNIT.
 13. BURNER IS SHALL PROVIDE A THERMAL SWITCH ABOVE THE BOILER WHICH SHALL BE WIRE WITH THE BOILER POWER CIRCUIT.

PUMP SCHEDULE															
TAG	BUILDING	SERVICE	LOCATION	PUMP TYPE	FLOW			HEAD (FEET)	MAX HORSEPOWER (HP)	MOTOR			MANUFACTURER AND MODEL NUMBER (SEE STANDARDS)	REMARKS	
					TYPE	TRIP (PSI)	SPR			SPR	HP	W			PH
BB-1	BOVER COURT	BOILER	BOILER ROOM 005	SOLENOID	NATURAL	300	71	10.1	375	2011	0.5	200	1	BOILL & GOSSETT - BOODING 10 20-10	SEE NOTES
BB-2	BOVER COURT	BOILER	BOILER ROOM 005	SOLENOID	NATURAL	300	71	10.1	375	2011	0.5	200	1	BOILL & GOSSETT - BOODING 10 20-10	SEE NOTES

NOTES:
 1. REFER TO SPECIFICATIONS, DETAILS AND CONTROL DRAWINGS FOR ADDITIONAL INFORMATION.
 2. MOTOR SHALL BE ECM WITH INTEGRAL THERMAL OVERLOAD AND OVER CURRENT PROTECTION PROVIDE ALL FRACTIONAL HP MOTORS WITH INTEGRAL RESETTABLE THERMAL OVERLOAD.
 3. DISCONNECT SHALL BE PROVIDED BY OWNER.
 4. THE PUMPS SHALL USE METROPOL BEYOND LESS TECHNOLOGY.

PIPE INSULATION (ICC - 2014-2017 AND ASHRAE 90.1 - 2013-2018 COMPLIANCE)									
MINIMUM INSULATION THICKNESS IN INCHES FOR INSULATION TYPES (SEE NOTES BELOW)									
PIPE SYSTEM TYPES	FLUID TEMP RANGE (°F)	1" P	1.5" P	2" P	3" P	4" P	6" P	8" P	12" P
LOW TEMPERATURE HEATING	141-200	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
FULLY CONDENSING BOILERS	100-140	1	1	1	1.5	1.5	1.5	1.5	1.5

NOTES:
 1. FOR MINIMUM THICKNESS OF ALTERNATIVE INSULATION TYPES OUTSIDE THE STATED CONDUCTIVITY RANGE, SEE TEST METHOD FOR STEADY STATE HEAT TRANSFER PROPERTIES OF HORIZONTAL PIPE INSULATION, ASTM C 235-06, AND THE STATE ENERGY CODE.
 2. REFER TO SPECIFICATIONS AND DETAILS FOR ADDITIONAL INFORMATION.

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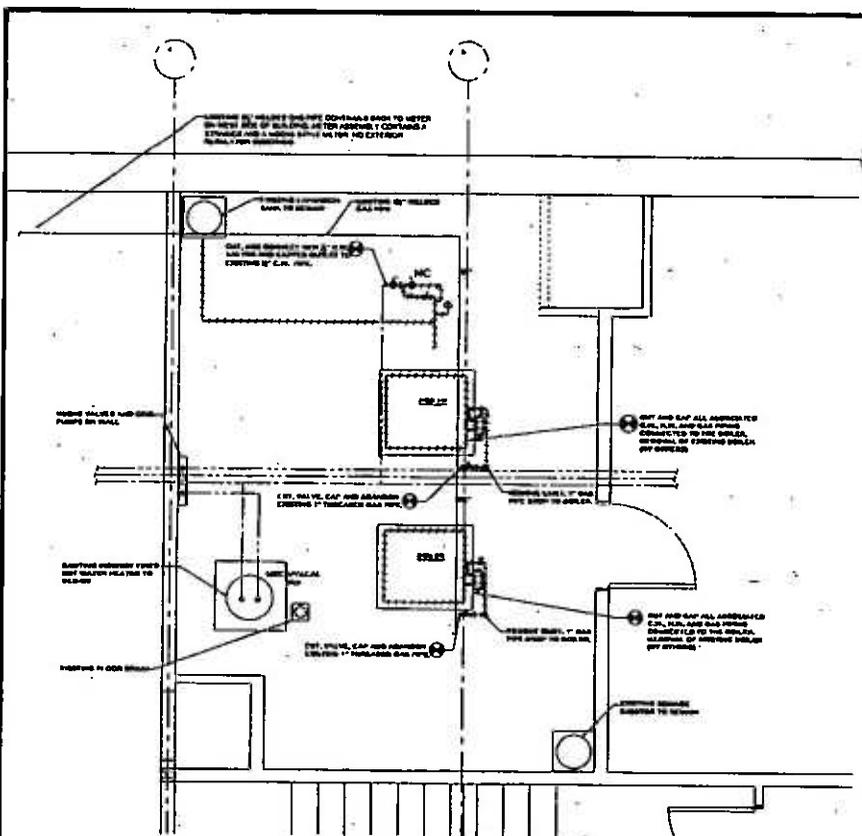
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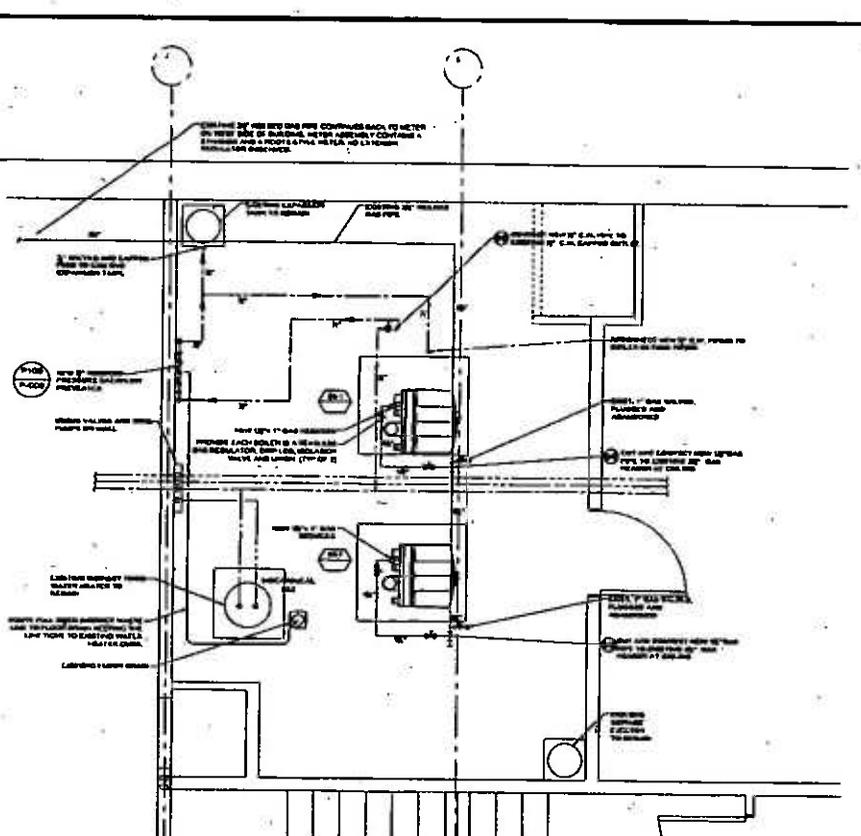
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1 PLUMBING - DEMOLITION
 BOILER ROOM - BASEMENT
 SCALE: 1/2" = 1'-0"



2 PLUMBING - NEW WORK
 BOILER ROOM - BASEMENT
 SCALE: 1/2" = 1'-0"

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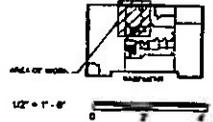


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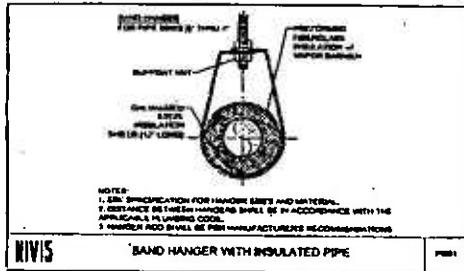
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 DOVER CIRCUIT COURT
 PLUMBING BASEMENT
 DEMOLITION AND
 NEW WORK PART PLANS

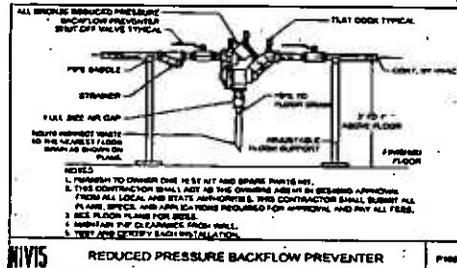


1/2" = 1'-0"
PD200
 SHEET 23 OF 28

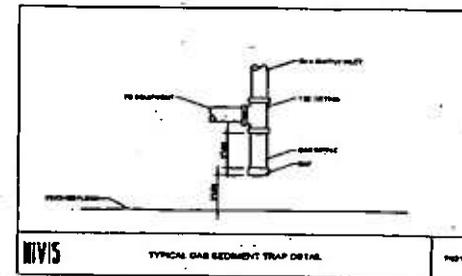
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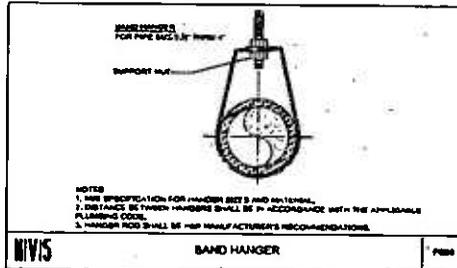
NIVIS BAND HANGER WITH INSULATED PIPE **FIG 1**



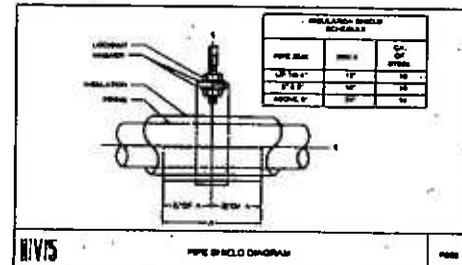
NIVIS REDUCED PRESSURE BACKFLOW PREVENTER **FIG 2**



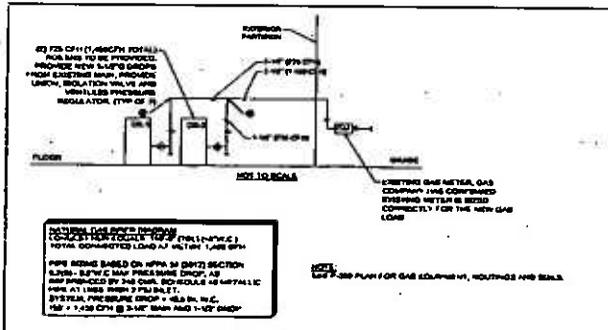
NIVIS TYPICAL GAS SEDIMENT TRAP DETAIL **FIG 3**



NIVIS BAND HANGER **FIG 4**



NIVIS PIPE SCHEDULE DIAGRAM **FIG 5**



NIVIS DOVER GAS PIPING ARRANGEMENT **FIG 6**

EXISTING AND PROPOSED GAS PIPING EQUIPMENT SCHEDULE (DOVER)

TAB NO. & EQUIPMENT	QTY.	PIPE SCHED. (IN)	TOTAL LENGTH (FT)	REQD. PRESS.	LOCATION	PROPOSED DROP FROM METER	REMARKS
EXISTING BOILERS	7	1/2"	1,300	0" W.C.	BOILER / MECHANICAL ROOM		NO EXISTING REGULATOR, CHECK FOR CORRECT DROP OF MAIN, COP AND BARGE WAPP.
NEW BOILERS	7	1/2"	1,300	0" W.C.	BOILER / MECHANICAL ROOM	48" W.C. SHALL APPLY TO TABLE 4.3.3.4	PROVIDE WITH 1/2" REG LOCKUP TYPE GAS PIPING & FOR TO BE RELEASE FROM REG. TO BE MAINT. LENGTH OF PIPING IS THAT INCLUDING VALVES, FITS AND BARGE.
		EXISTING TOTAL LOAD	1,300				
		PROPOSED TOTAL LOAD	1,300				

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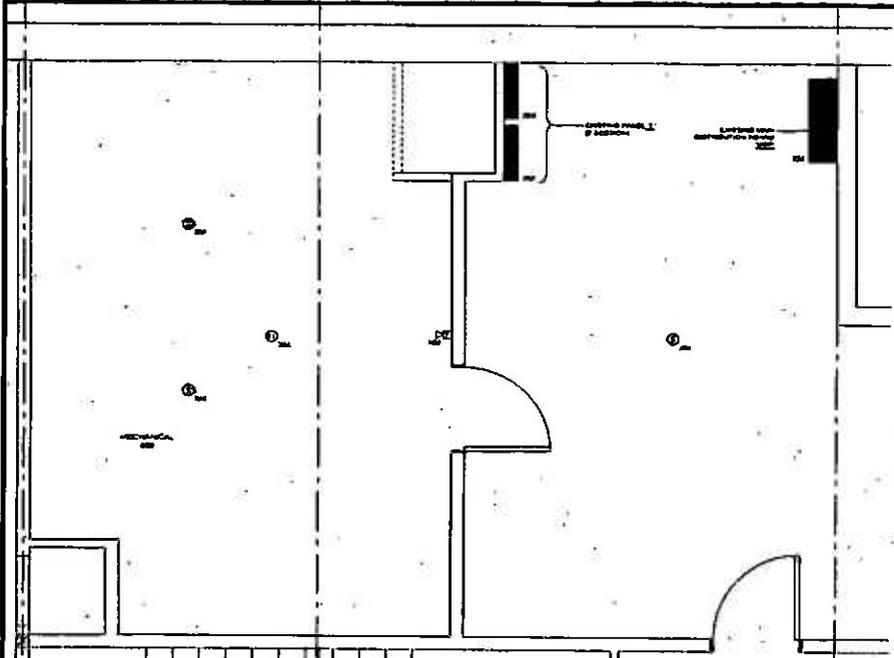


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 CIRCUIT COURT
 BOILER ROOM REPLACEMENT

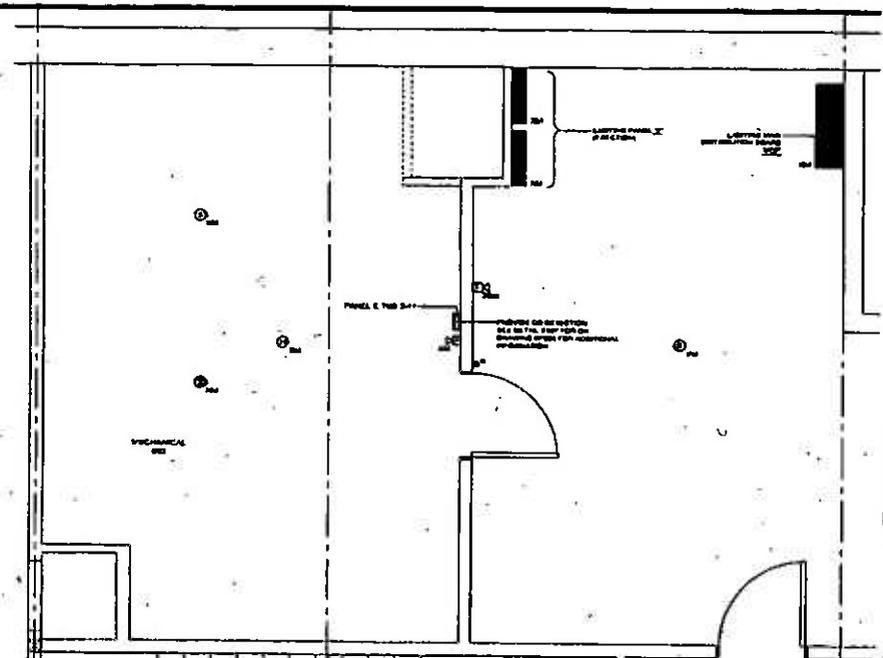
DRAWING

DATE: 10/1/2019
 DRAWN BY: [Signature]
 CHECKED BY: [Signature]
 10/1/2019
 DOVER CIRCUIT COURT
 FIRE ALARM BASEMENT
 DEMOLITION AND
 NEW WORK PART PLANS

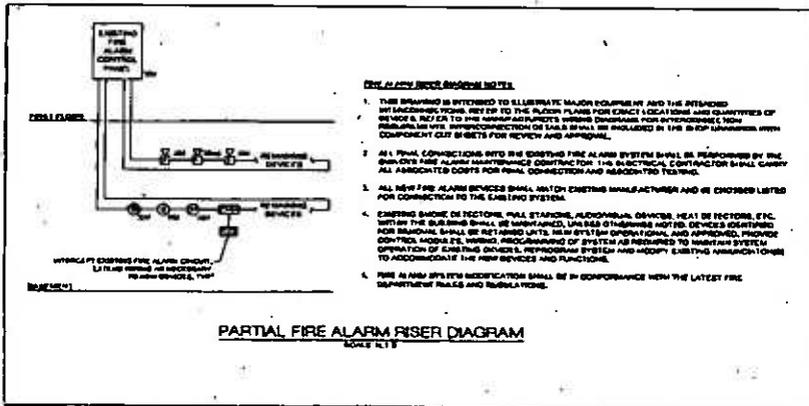
ED200
 SHEET 27 OF 29



1 FIRE ALARM - DEMOLITION
 BOILER ROOM - BASEMENT
 SCALE 1/8" = 1'-0"



2 FIRE ALARM - NEW WORK
 BOILER ROOM - BASEMENT
 SCALE 1/8" = 1'-0"



- FIRE ALARM PERMIT SUBMISSION NOTES**
- THIS DRAWING IS INTENDED TO ILLUSTRATE MAJOR COMPONENTS AND THE METHODS OF INSTALLATION. REFER TO THE FLOOR PLANS FOR EXACT LOCATIONS AND QUANTITIES OF DEVICES & RELAYS TO THE MANUFACTURER'S WIRING DIAGRAMS FOR ADDITIONAL NEW REQUIREMENTS. WIRE INTERCONNECTION OF TABS SHALL BE PROVIDED IN THE SHOP DRAWINGS WITH EQUIPMENT CUT SHEETS FOR REVIEW AND APPROVAL.
 - ALL FINAL CONNECTIONS INTO THE EXISTING FIRE ALARM SYSTEM SHALL BE PERFORMED BY THE QUALIFIED FIRE ALARM MAINTENANCE CONTRACTOR. THE ELECTRICAL CONTRACTOR SHALL VERIFY ALL ASSOCIATED CODES FOR FINAL CONNECTION AND MAINTENANCE TESTING.
 - ALL NEW FIRE ALARM DEVICES SHALL MEET THE EXISTING MANUFACTURER AND BE CHOSEN LISTED FOR CONNECTION TO THE EXISTING SYSTEM.
 - EXISTING BATTERIES OR BATTERIES, WALL STATIONS, ALARM BELL, BELL, HEAT BE DETECTORS, ETC. LEFT BY THE SUBMITTER SHALL BE MAINTAINED, UNLESS OTHERWISE NOTED. DEVICES IDENTIFIED ON THIS DRAWING SHALL BE REMOVED UNLESS OTHERWISE NOTED. PROVIDE PROPER LABELING FOR ALL DEVICES, WIRING, AND CONNECTIONS OF SYSTEM AS REQUIRED TO MAINTAIN SYSTEM OPERATION OF EXISTING OWNER, REPRESENTATIVE SYSTEM AND MODIFY EXISTING APPROPRIATION TO ACCOMMODATE THE NEW DEVICES AND FUNCTIONS.
 - FIRE ALARM SYSTEM MODIFICATION SHALL BE IN CONFORMANCE WITH THE LATEST FIRE DEPARTMENT RULES AND REGULATIONS.

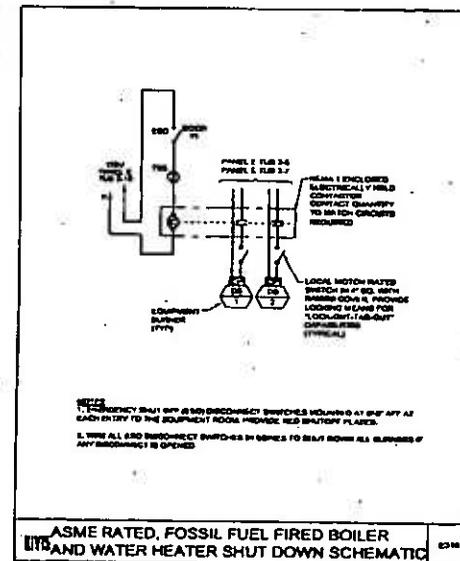
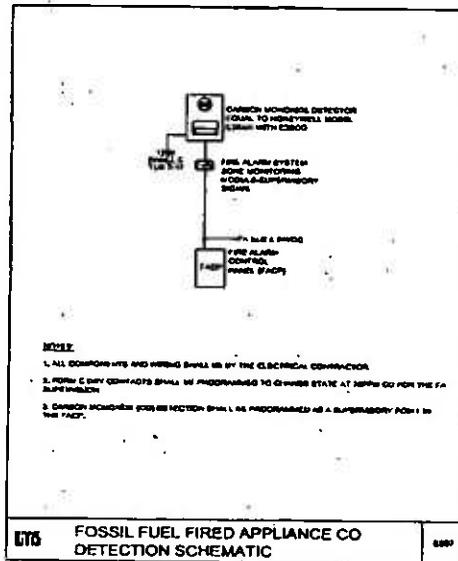
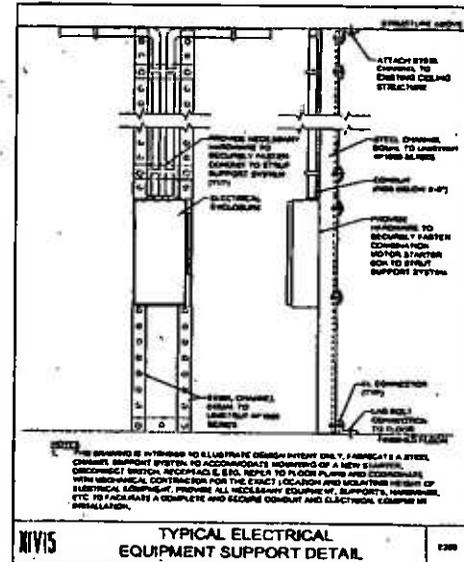
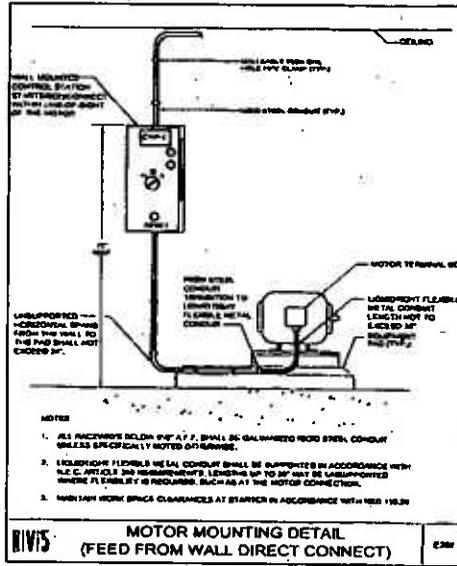
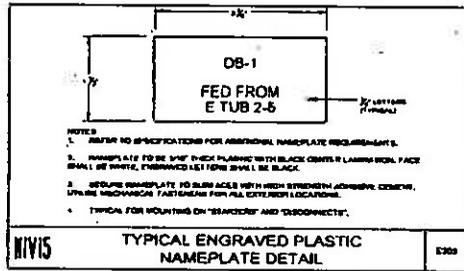
- FIRE ALARM PERMIT SUBMISSION NOTES**
- REFER TO NFPA 72 ARE TO THE NEW SYSTEM.
 - THIS DRAWING SUBMITTER'S THE TOP ONE FLOOR PLAN SUBMISSION IN ACCORDANCE WITH THE NEW SYSTEM OF FIRE SAFETY. THESE REQUIREMENTS INCLUDE, BUT ARE NOT LIMITED TO THE FOLLOWING:
 - FLOOR PLAN SHALL SHOW THE ALL ROOMS.
 - LOCATION OF ALL DEVICES, INCLUDING TYPES AND MODELS, ARE INDICATED BY THE ELECTRICAL CONTRACTOR AND MANUFACTURER. CONDUITS APPLY SUCH AS WITHIN OVER 10 FEET OR WHERE BEARS AND JOISTS ARE PRESENT.
 - CONDUITS OF 1/2" AND 3/4" SHALL BE USED AS SOON UNLESS OTHERWISE NOTED. SIGNAL SYSTEM WIRING AND ILLUMINATION TO NEW SYSTEMS REQUIRED.
 - LOCATION OF ALL NOTIFICATION APPLIANCES WITH EXISTING CANCELLED NUMBER.
 - LOCATION OF ALL FIRE ALARM CONTROL PANELS AND APPROPRIATIONS.
 - POWER SOURCES FOR ALL PANELS & NEW POWER SUPPLY.
 - THE INSTALLATION CONTRACTOR IS RESPONSIBLE FOR THE DEVELOPMENT AND SUBMISSION OF THE WIRING SHOP DRAWINGS. SHOP DRAWINGS SHALL BE SUBMITTED TO THE SUBMITTER FOR REVIEW AND BE OF QUALITY TO BE APPROVED PRIOR TO THE CONTRACTING SUBMISSION TO THE AIA FOR PERMIT.
 - IF THE 72 SHOP DRAWINGS REQUIREMENTS INCLUDE, BUT ARE NOT LIMITED TO THE FOLLOWING:
 - NAME, LICENSE NUMBER AND LICENSE EXPIRATION DATE OF THE INSTALLATION CONTRACTOR.
 - REBAR WIRING WITH ALL DEVICES, WIRE CONNECTIONS, WIRING AND CONNECTIONS IN THE FIELD.
 - SCALE DRAWINGS FOR POWER SUPPLY BOX AND APPLICABLE WIRING SCHEDULES FOR WIRING CAPACITY AND VOLTAGE DROP.
 - MANUFACTURER'S CUT SHEETS FOR ALL DEVICES AND BATTERIES.
 - THE ACTIVE SUBMITTER'S EVIDENCE OF OPERATIONS OBTAINED FROM THE OWNER'S MAINTENANCE CONTRACTOR.
 - FLOOR PLANS BEING FROM THE 1:00 ONE SUBMISSION PLANS WITH THE FLOOR PLAN INFORMATION MODIFICATIONS.
 - SHOP PLANS WILL BE MADE AVAILABLE FOR THE CONTRACTOR USE INCLUDING ALL FOR THE INFORMATION IN ACCORDANCE WITH THE CONTRACTUAL REQUIREMENTS. THE SUBMITTER SHALL CLEARLY PROVIDE ALL CONTRACTOR'S EVIDENCE OF ALL AVAILABLE INFORMATION.
 - CONDUCT ROUTING AND CONNECTION TYPE AND COUNT BETWEEN ALL DEVICES ILLUSTRATED WITH ALL INTENT, NUMBER REQUIRED BY THE REBAR AND/OR OTHERWISE CLEARLY ILLUSTRATE CLASS A BATTERY TYPE.
 - ALARM BELL SERVICE TAP IF IT IS WHERE ADJUSTABLE.
 - IF ANY SPACE REMAINS WHERE MANUFACTURER CAN APPLY THEM PRIOR TO INSTALLATION ON THE DAY.
 - IF THE 72 REQUIREMENTS INCLUDE, BUT ARE NOT LIMITED TO THE FOLLOWING:
 - AS-BUILT PLANS BEING FROM THE BEST TWO FLOOR PLANS ALTERNATING INSTALLED CONNECTION, SERVICE CONNECTION, FINAL TAP SETTINGS AND ALL OTHER WIRING AND TEST BE RELEASED THROUGHOUT THE SPACE.
 - WRITTEN EVIDENCE OF OPERATIONS SHALL BE PROVIDED.
 - ONE MANUAL PER NFPA 72 REQUIREMENTS.
 - SYSTEM RECORDS BY COMPLETION FORM PER NFPA 72 PERFORMS F.A.S.M. FORM (S) SECTION AS APPLICABLE TO THE PROJECT ROOM.
 - SYSTEM RECORDS BY INSPECTION AND RECORDS FORM PER NFPA 72 PERFORMS F.A.S.M. FORM (S) SECTION AS APPLICABLE TO THE PROJECT ROOM.
 - CONTRACTOR SHALL PROVIDE A RECORD COPY OF THE SITE SPECIFIC SHOP DRAWING TO BE DELIVERED TO THE SUBMITTER REPRESENTATIVE.

- NEW WORK NOTES**
- REFER TO DRAWING SHEET FOR LEGEND, SYMBOLS AND GENERAL NOTES.
 - FIRE ALARM BRANCH CIRCULARITY MAY BE 1/2" OR 3/4" CABLE WHERE CONDUIT TO WIRE SUPPLIES CONDUITS AND IN METAL BRID WALLS.
 - NO SIGNAL FOR FIRE ALARM DEVICES SHALL HAVE A RED DEN WIRE ALONG THE ENTIRE LENGTH. JUNCTION BOX COVER AND CONDUIT COULDER FOR ALL FIRE ALARM WIRING DEVICES SHALL BE PROVIDED PRIOR TO INSTALLATION.

A MAINTENANCE CONTRACTOR OF SERVICE CONTRACTOR ASSOCIATED WITH ALL EXISTING FIRE ALARM DEVICES TO REMAIN.



NIVIS



NIVIS

BY: [Signature]
DATE: 01/20/2024
1:28:46 AM
1/28/2024
PL: [Signature]

REVISIONS

NO.	DATE	DESCRIPTION

SCALE



PROJECT

STATE OF
NEW HAMPSHIRE
PORTSMOUTH, NH
DOVER, NH
CIRCUIT COURT
BOILERS REPLACEMENT

DRAWING

DATE: 01/20/2024
DRAWN BY: [Signature]
CHECKED BY: [Signature]
SCALE: AS SHOWN
DOVER
CIRCUIT COURT
ELECTRICAL DETAILS

ED300
SHEET 28 OF 29

NIVIS

PERFORMANCE BOND FORM

KNOW ALL MEN BY THESE PRESENTS that Merrimack Valley Corporation

15 Aegean Drive, Unit 3, Methuen, MA 01844

(Here insert the name and address or legal title of the Contractor)

as Principal, hereinafter called Contractor, and _____

Merchants Bonding Company (Mutual)

(Here insert the legal title of Surety)

P.O. Box 14498, Des Moines, IA 50306-3498

as Surety, hereinafter called Surety, are held and firmly bound unto

Department of Administrative Services

25 Capitol Street, Concord, NH 03301

(Here insert the name and address or legal title of the Owner)

as Oblgee, hereinafter called Owner, in the amount of one hundred fourteen thousand six hundred ninety-five

Dollars (\$114,695.00)

for the payment hereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement, dated March 18, 2025

entered into a Contract with Owner for Dover Circuit Courthouse - boiler removal and installation services

(Here insert full name and title)

which Contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

- a. The Surety hereby waives notice of any alteration or extension of time made by the Owner.
- b. Whenever Contractor shall be, and declared by Owner to be in default under the Contract, the Owner having performed Owner's obligations thereunder, the Surety may promptly remedy the default, or shall promptly:
 - 1. Complete the Contract in accordance with its terms and conditions, or
 - 2. Obtain a bid or bids for submission to Owner for completing the Contract in accordance with its terms and conditions, and upon determination by Owner and Surety of the lowest responsible bidder, arrange for a contract between such bidder and Owner, and make available as work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the Contract price; but

not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the Contract price" as used in this paragraph, shall mean the total amount payable by Owner to Contractor under the Contract and any amendments thereto, less the amount properly paid by Owner to Contractor.

- c. Any suit under this bond must be instituted before the expiration of two (2) years from the date on which final payment under the Contract falls due.
- d. No right of action shall accrue on this bond to or for the use of any person or corporation other than the Owner named herein or the heirs, executors, administrators, or successors of Owner.

SIGNED AND SEALED this 18th day of March A.D. 2025

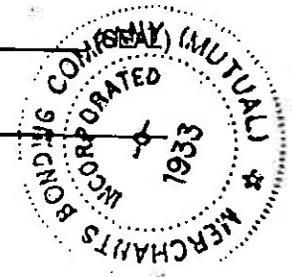
In the presence of:

Witness

Merrimack Valley Corporation
Keith M. Bentley (SEAL)
(Principal)
Keith M. Bentley
Chief Financial Officer
Title

[Signature]
Witness

(Merchants Bonding Company (Mutual)
Surety
Christopher M Hewey
(Attorney-in-Fact
Title



Countersigned
by [Signature]

MERCHANTS BONDING COMPANY, INC.

POWER OF ATTORNEY

Know All Persons By These Presents, that MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC., both being corporations of the State of Iowa, d/b/a Merchants National Indemnity Company (In California only) (herein collectively called the "Companies") do hereby make, constitute and appoint, individually,

Christopher M Hewey

their true and lawful Attorney(s)-in-Fact, to sign its name as surety(ies) and to execute, seal and acknowledge any and all bonds, undertakings, contracts and other written instruments in the nature thereof, on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

This Power-of-Attorney is granted and is signed and sealed by facsimile under and by authority of the following By-Laws adopted by the Board of Directors of Merchants Bonding Company (Mutual) on April 23, 2011 and amended August 14, 2015 and April 27, 2024 and adopted by the Board of Directors of Merchants National Bonding, Inc., on October 18, 2015 and amended on April 27, 2024.

"The President, Secretary, Treasurer, or any Assistant Treasurer or any Assistant Secretary or any Vice President shall have power and authority to appoint Attorneys-in-Fact, and to authorize them to execute on behalf of the Company, and attach the seal of the Company thereto, bonds and undertakings, recognizances, contracts of indemnity and other writings obligatory in the nature thereof."

"The signature of any authorized officer and the seal of the Company may be affixed by facsimile or electronic transmission to any Power of Attorney or Certification thereof authorizing the execution and delivery of any bond, undertaking, recognizance, or other suretyship obligations of the Company, and such signature and seal when so used shall have the same force and effect as though manually fixed."

In connection with obligations in favor of the Florida Department of Transportation only, it is agreed that the power and authority hereby given to the Attorney-in-Fact includes any and all consents for the release of retained percentages and/or final estimates on engineering and construction contracts required by the State of Florida Department of Transportation. It is fully understood that consenting to the State of Florida Department of Transportation making payment of the final estimate to the Contractor and/or its assignee, shall not relieve this surety company of any of its obligations under its bond.

In connection with obligations in favor of the Kentucky Department of Highways only, it is agreed that the power and authority hereby given to the Attorney-in-Fact cannot be modified or revoked unless prior written personal notice of such intent has been given to the Commissioner-Department of Highways of the Commonwealth of Kentucky at least thirty (30) days prior to the modification or revocation.

In Witness Whereof, the Companies have caused this instrument to be signed and sealed this 18th day of March, 2025.



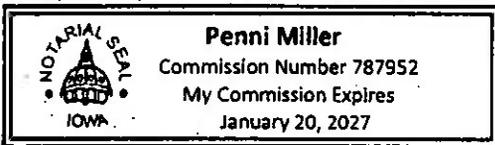
MERCHANTS BONDING COMPANY (MUTUAL)
MERCHANTS NATIONAL BONDING, INC.
d/b/a MERCHANTS NATIONAL INDEMNITY COMPANY

By

Larry Taylor
President

STATE OF IOWA
COUNTY OF DALLAS ss.

On this 18th day of March, 2025, before me appeared Larry Taylor, to me personally known, who being by me duly sworn did say that he is President of MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC.; and that the seals affixed to the foregoing instrument are the Corporate Seals of the Companies; and that the said instrument was signed and sealed in behalf of the Companies by authority of their respective Boards of Directors.



Penni Miller
Notary Public

(Expiration of notary's commission does not invalidate this instrument)

I, Elisabeth Sanderfeld, Secretary of MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC., do hereby certify that the above and foregoing is a true and correct copy of the POWER-OF-ATTORNEY executed by said Companies, which is still in full force and effect and has not been amended or revoked.

In Witness Whereof, I have hereunto set my hand and affixed the seal of the Companies on this 18th day of March, 2025.



Elisabeth Sanderfeld
Secretary

DOCUMENT 00620

PAYMENT BOND FORM

KNOW ALL MEN: That we Merrimack Valley Corporation

15 Aegean Drive, Unit 3, Methuen, MA 01844

hereinafter called the Principal, and Merchants Bonding Company (Mutual)

P.O. Box 14498, Des Moines, IA 50306-3498

and

hereinafter called the Surety, or Sureties, are held and firmly bound unto

Department of Administrative Services
25 Capitol Street, Concord, NH 03301

hereinafter called the Owners, and to such persons, firms and corporations who may furnish materials for, or perform labor on the work, building or improvements, contemplated in the contract hereinafter mentioned, in the

sum of one hundred fourteen thousand six hundred ninety-five

Dollars (\$114,695.00)

for the payment whereof the Principal and Surety, or Sureties, bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents:

WHEREAS, the Principal has by means of a written agreement dated March 18, 2025 entered into a contract with the Owner for Dover Circuit Courthouse - boiler removal and installation services

a copy of which Agreement is by reference made a part hereof.

NOW, THEREFORE, the conditions of this obligation are such that if the Principal shall faithfully perform the Contract on his part, and satisfy all claims and demands incurred for the same and shall fully indemnify and save harmless the Owner from all costs and damage which he may suffer by reason of failure so to do and shall fully reimburse and repay the Owner all outlay and expense which the Owner may incur in making good any such default and shall promptly make payment to all persons supplying labor or material for use in the prosecution of the work provided for in such contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

AND PROVIDED, that any alterations which may be made in the terms of the Contract, or in the work to be done under it, or the giving by the Owner of any extension of time for the performance of the Contract, or any other forbearance on the part of either the Owner or the Principal to the other shall not in any way release the Principal and the Surety, or Sureties, or either or any of them, their heirs, executors, administrators, successors or assigns from their liability hereunder, notice to Surety, or Sureties, of any such alteration, extension or forbearance being hereby waived.

This bond is made for the use and benefit of all persons, firms and corporations who may furnish any material or perform any labor for or on account of said work, building or improvements and they and each of them are hereby made Obligees hereunder the same as if their own proper names were written herein as such, and they and each of them may sue herein.

Signed and Sealed this 18th day of March, 2025

In the presence of:

Leonard Thomas III)
_____)
[Signature])
_____)
[Signature])
_____)
_____)
_____)

Merrimack Valley Corporation (SEAL)
as to Keith M. Bentley

Keith M. Bentley
Chief Financial Officer
Merchants Bonding Company (Mutual) (SEAL)
as to Christopher M Hewey

Christopher M Hewey Attorney-in-Fact

_____ (SEAL)
as to _____

Countersigned
by _____

MERCHANTS BONDING COMPANY

POWER OF ATTORNEY

Know All Persons By These Presents, that MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC., both being corporations of the State of Iowa, d/b/a Merchants National Indemnity Company (in California only) (herein collectively called the "Companies") do hereby make, constitute and appoint, individually,

Christopher M Hewey

their true and lawful Attorney(s)-in-Fact, to sign its name as surety(ies) and to execute, seal and acknowledge any and all bonds, undertakings, contracts and other written instruments in the nature thereof, on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

This Power-of-Attorney is granted and is signed and sealed by facsimile under and by authority of the following By-Laws adopted by the Board of Directors of Merchants Bonding Company (Mutual) on April 23, 2011 and amended August 14, 2015 and April 27, 2024 and adopted by the Board of Directors of Merchants National Bonding, Inc., on October 18, 2015 and amended on April 27, 2024.

"The President, Secretary, Treasurer, or any Assistant Treasurer or any Assistant Secretary or any Vice President shall have power and authority to appoint Attorneys-in-Fact, and to authorize them to execute on behalf of the Company, and attach the seal of the Company thereto, bonds and undertakings, recognizances, contracts of indemnity and other writings obligatory in the nature thereof."

"The signature of any authorized officer and the seal of the Company may be affixed by facsimile or electronic transmission to any Power of Attorney or Certification thereof authorizing the execution and delivery of any bond, undertaking, recognizance, or other suretyship obligations of the Company, and such signature and seal when so used shall have the same force and effect as though manually fixed."

In connection with obligations in favor of the Florida Department of Transportation only, it is agreed that the power and authority hereby given to the Attorney-in-Fact includes any and all consents for the release of retained percentages and/or final estimates on engineering and construction contracts required by the State of Florida Department of Transportation. It is fully understood that consenting to the State of Florida Department of Transportation making payment of the final estimate to the Contractor and/or its assignee, shall not relieve this surety company of any of its obligations under its bond.

In connection with obligations in favor of the Kentucky Department of Highways only, it is agreed that the power and authority hereby given to the Attorney-in-Fact cannot be modified or revoked unless prior written personal notice of such intent has been given to the Commissioner-Department of Highways of the Commonwealth of Kentucky at least thirty (30) days prior to the modification or revocation.

In Witness Whereof, the Companies have caused this instrument to be signed and sealed this 18th day of March, 2025



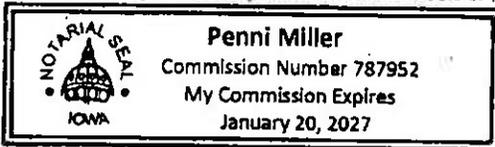
MERCHANTS BONDING COMPANY (MUTUAL)
MERCHANTS NATIONAL BONDING, INC.
d/b/a MERCHANTS NATIONAL INDEMNITY COMPANY

By

Larry Taylor
President

STATE OF IOWA
COUNTY OF DALLAS ss.

On this 18th day of March, 2025, before me appeared Larry Taylor, to me personally known, who being by me duly sworn did say that he is President of MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC.; and that the seals affixed to the foregoing instrument are the Corporate Seals of the Companies; and that the said instrument was signed and sealed in behalf of the Companies by authority of their respective Boards of Directors.



Penni Miller
Notary Public

(Expiration of notary's commission
does not invalidate this instrument)

I, Elisabeth Sandersfeld, Secretary of MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC., do hereby certify that the above and foregoing is a true and correct copy of the POWER-OF-ATTORNEY executed by said Companies, which is still in full force and effect and has not been amended or revoked.

In Witness Whereof, I have hereunto set my hand and affixed the seal of the Companies on this 18th day of March, 2025



Elisabeth Sandersfeld
Secretary

State of New Hampshire

Department of State

CERTIFICATE

I, David M. Scanlan, Secretary of State of the State of New Hampshire, do hereby certify that MERRIMACK VALLEY, CORP. is a Massachusetts Profit Corporation registered to transact business in New Hampshire on January 15, 2010. I further certify that all fees and documents required by the Secretary of State's office have been received and is in good standing as far as this office is concerned.

Business ID: 624740

Certificate Number: 0007158057



IN TESTIMONY WHEREOF,

I hereto set my hand and cause to be affixed
the Seal of the State of New Hampshire,
this 14th day of April A.D. 2025.

A handwritten signature in black ink, appearing to read "D. Scanlan", is written over a faint circular stamp.

David M. Scanlan
Secretary of State

ACTION BY WRITTEN CONSENT OF SOLE DIRECTOR

— OF —

BUSINESS NAME

I, Leonard J. Thomas, Jr., certify I am the sole director of Merrimack Valley Corporation, a New Hampshire corporation (the "Corporation"), and hereby consent to the adoption of the following resolutions:

RESOLVED, that it is in the best interests of the Corporation to enter into the transactions contemplated by that certain Agreement (the "Agreement") for HVAC contractor service to be provided to the State of New Hampshire upon the terms and conditions set forth therein, said Agreement being awarded to the Corporation as the result of State of New Hampshire Contract No. / Bid No. 72961698

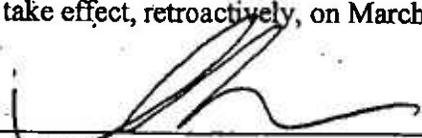
RESOLVED, that the terms and conditions of the Agreement are hereby authorized, accepted, and approved;

RESOLVED, that Leonard J. Thomas, Jr., is hereby authorized to execute and deliver the Agreement in the name of and on behalf of the Corporation together with any and all such other agreements, documents, or instruments and to take such other actions as may be necessary to consummate the transactions contemplated by the Agreement;

RESOLVED, that any other actions of Leonard J. Thomas, Jr. in furtherance of the foregoing resolutions, whether taken before or after the adoption or effectiveness of these resolutions, are hereby approved, confirmed, ratified, and adopted;

RESOLVED, that a facsimile or portable document format (PDF) signature on these resolutions shall be equivalent to, and have the same force and effect as, an original signature; and

RESOLVED, that the foregoing resolutions shall take effect, retroactively, on March 1st, 2025.



Leonard J. Thomas, Jr.
Merrimack Valley Corporation

