

PROJECT MANUAL

**Roof Repair Project
Salem Police Station
95 Margin Street
Salem, MA**

January 11, 2017

RBA Project No. 2016051

Prepared by:



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INVITATION TO BID

**CITY OF SALEM
INVITES PROPOSALS FOR
ROOF REPAIRS TO THE
SALEM POLICE STATION
95 MARGIN STREET
SALEM, MASSACHUSETTS**

The City of Salem (Awarding Authority) will receive bids for Roof Repairs to the Salem Police Station located at 95 Margin Street, Salem, MA at the Office of the Purchasing Agent located at Salem City Hall, 93 Washington Street, 2nd Floor, Salem, MA 01970. The estimated construction cost of this Project is \$550,000. Sealed Filed Sub-Bids for HVAC (Section 23 00 00 and Section 26 00 00) will be received until **2:00PM on January 26, 2017**, at which time they will be publicly opened and read. Sealed General Bids will be received until **2:00PM on February 2, 2017**, at which time they will be publicly opened and read.

All General Bids shall be accompanied by a bid deposit in the form of a certified, cashier's or treasurer's check issued by a responsible bank or trust company made payable to the City of Medford or a bid bond, in an amount not less than five percent (5%) of the value of the bid.

The successful bidder will be required to furnish a Performance Bond and a Labor and Material (Payment) Bond each in the amount of one hundred percent (100%) of the contract sum. Bonds shall be obtained from a surety licensed to do business in the Commonwealth of Massachusetts and the form shall be satisfactory to the City of Salem. The cost of such bonds shall be included in the bid price.

Hard copies of the Bidding Documents for the work will be available for pick-up at the Salem Purchasing Department located at Salem City Hall, 93 Washington Street, 2nd Floor, Salem, MA 01970. Hard copies will be available upon the non-refundable fee of \$150.00 payable to the City of Salem starting on **January 11, 2017 at 1:00pm**. A non-refundable fee of \$65.00 paid in advance will be charged per set of Contract Documents should such be mailed. Electronic copies of the Bidding Documents for the work will be available on the City of Salem's website at salem.com/purchasing under "Open Procurements".

Examination of the Bidding Documents may be done at the Salem Purchasing Department located at Salem City Hall, 93 Washington Street, 2nd Floor, Salem, MA 01970 between 9:00 AM and 4:00 PM Monday through Thursday, and between 9:00 AM and 12:00 PM on Friday.

The bids must be filled out and signed, sealed in an envelope addressed to, Salem Purchasing Department located at Salem City Hall, 93 Washington Street, 2nd Floor, Salem, MA 01970, endorsed with the name and address of the bidder, and clearly marked "Bid" as appropriate followed by "Roof Repairs Project to the Salem Police Station, Salem, MA" and left with either a bid bond in accordance with Chapter 30, Section 39M or Chapter 149, Section 44B or a certified treasurer's or cashier's check issued by a responsible bank, for 5 percent of the value of the proposed work payable to the City of Salem. This check to be the property of the City of Salem

if the Bidder fails to execute the contract and satisfactory bond within ten (10) days after the contract is presented to him.

Attention is directed to the Massachusetts Prevailing Wage Rates to be paid as determined by the Department of Labor Standards under the provisions of Massachusetts General Laws, Chapter 149, §§26 – 27, a copy of which is included in the Contract Documents, and will be made a part of the Contract.

Bids shall be received by the Awarding Authority at the address listed above, no later than the times and dates specified below, at which times and place, they will be publicly opened and forthwith read aloud. Any bid received after the time and date specified will not be considered. Bidding procedures and award of the Contract and Subcontracts shall be in accordance with the provisions of Chapter 30, Section 39M as amended and Chapter 149, Sections 44A through 44L inclusive, of the General Laws of the Commonwealth of Massachusetts, including all current amendments; and the guidelines established by the Deputy Commissioner of the Commonwealth of Massachusetts Division of Capital Assets Management (DCAMM), dated June 30, 1981.

Each General Bidder must be certified by DCAMM for Prime Roofing and Flashing for the dollar amount equal to or greater than their bid for this project. Each Filed Sub-Bidder must be certified by DCAMM for HVAC for the dollar amount equal to or greater than their bid for this project. Each General Bidder must submit all of the following documents and forms to be considered responsive to this Invitation to Bid. Failure to submit all required documents and forms may invalidate the Bid.

1. Form for General Bid (filled out and signed).
2. A copy of the Bidder's DCAMM Certificate of Eligibility.
3. A copy of the Bidder's DCAMM Update Statement.
4. City of Salem Tax Certification Form (filled out and signed).
5. City of Salem Certificate of Non-Collusion (filled out and signed).
6. Bid Bond or check (certified or bank) for 5% of bid amount.

Each Filed Sub-Bidder must submit all of the following documents and forms to be considered responsive to this Invitation to Bid. Failure to submit all required documents and forms may invalidate the Bid.

1. Form for Filed Sub-Bid (filled out and signed).
2. A copy of the Bidder's DCAMM Certificate of Eligibility.
3. A copy of the Bidder's DCAMM Update Statement.

A pre-bid conference will be held at **11:00 AM**, local legal time, on **January 19, 2017** at the Salem Police Station located at 95 Margin Street, Salem, MA. All bidders are invited to attend.

The Awarding Authority is exempt from sales and federal excise tax to the extent permitted under law. Bidders should not include such taxes in figuring or in references to any bid.

Commonwealth of Massachusetts General Laws Section 149, Sections 44A through 44L and Chapter 30, Sections 39F through 39P, are incorporated herein by reference. Any inconsistency between the Invitation to Bid, Instruction to Bidders, Bid Forms, Conditions of the Contract, and any other Contract Documents and these statutes, or any other applicable statutes, bylaws, or regulations existing on the date on which the bids are to be received, shall not be grounds for invalidating the bidding procedures, but, where required by law, such statute, bylaw, or regulation shall be deemed to govern.

The Awarding Authority reserves the right to waive any irregularities in or to reject any and all bids, if it be in the public interest to do so, and to act upon the bids and make its award in any lawful manner. A brief description of the Project Scope and Schedule is as follows:

PROJECT SCOPE

General Bidders are to be DCAMM certified in Roofing. Filed Sub-Bidders are to be DCAMM certified in HVAC. The Roofing Contractor shall be the General Contractor. The project scope consists of roof replacement and repairs to the Salem Police Station located at 95 Margin Street, Salem, MA. The general scope of the construction work is briefly described as follows:

1. **Base Bid Work** - Re-roofing of the existing low-sloped roofing systems utilizing a “tear-off” application. A new adhered PVC roof membrane system (60-mil minimum thickness) is specified and detailed complete with a manufacturer’s 20-year full system warranty. Removal of the existing EPDM roof membrane system and installation of an adhered PVC roof membrane system to include rigid board roof insulation (polyisocyanurate), flashings (membrane & sheetmetal), roof drainage replacement and repairs, sealant replacement at parapet stones and other select locations, and skylight replacement.
2. **Alternate No. 1 Bid Work (Filed Sub-bid Required)** - Removal and replacement of two (2) old (circa 1991) rooftop units seven (7) old (circa 1991) exhaust fans.

The Filed Sub-Bid work is being bid as Alternate No. 1 Bid; the work includes HVAC work as specified and detailed as follows:

- a. Specification Section 23 00 00 HVAC and Drawings H-1, H-2, H-3 & H-4.
- b. Specification Section 26 00 00 ELECTRICAL and Drawings E-1, E-2 & E-3.

ANTICIPATED PROJECT MILESTONE SCHEDULE

Project out to bid..... January 11, 2017
On-site Pre-Bid Meeting..... January 19, 2017 at 11:00 a.m.
Filed Sub-Bids Due January 26, 2017 at 2:00 p.m.
General Bids Due..... February 2, 2017 at 2:00 p.m.

A contract is expected to be promptly awarded to the lowest responsible and eligible bidder. The construction phase is expected to commence on or before April 3, 2017 and be completed by May 31, 2017. The work hours shall be as follows: Monday through Saturday 8:00 am to 5:00 pm.

All bids shall remain in effect for 30 days, Saturdays, Sundays, and legal holidays excluded after opening of General Bids. Successful bidders shall agree to commence work and complete the Work in accordance with the dates set forth in the Bidding Documents.

The City of Salem reserves the right to award or not award the project.

Ms. Whitney C. Haskell
Office of the Purchasing Agent
Salem City Hall
93 Washington Street, 2nd Floor
Salem, MA 01970

“An Equal Opportunity Employer”

INSTRUCTION TO BIDDERS

1.00 COMPLEMENTARY DOCUMENT

- A. INVITATION TO BID, included herewith, is complementary to this document and shall be carefully reviewed by bidders for specific instructions, which are not repeated herein.

2.00 STATUTES REGULATING COMPETITIVE BIDDING

- A. Bidding procedures and award of general contract and subcontracts shall be in accordance with the provisions of Chapter 149, Sections 44A through 44J inclusive, of the General Laws of the Commonwealth of Massachusetts, including all current amendments.
- B. In the event of any discrepancy or inconsistency between the provisions of these Instructions to Bidders and Contract Documents and the above-mentioned statutes, the provisions of the above-mentioned statutes shall govern. In such event, the application of all remaining provisions not in conflict to any circumstance other than that in which the conflict occurs shall not be affected thereby.

3.00 BIDDER'S QUALIFICATIONS

- A. No Contractor who is currently subject to debarment by the state or federal government shall be eligible to serve as General Contractor or as Subcontractor on the Project.
- B. No individual or firm may submit a General Bid or Sub Bid unless it is accompanied by a CERTIFICATE OF ELIGIBILITY issued by the Massachusetts Division of Capital Asset Management and Maintenance (DCAMM) including a current DCAMM UPDATE STATEMENT on or before the time and date stipulated in the Invitation to Bid in accordance with the above-referenced General Laws. The Update Statements are not public records and will not be open to public inspection.
- C. The Awarding Authority may at its discretion give the bidder notice of defects or omissions in the bidder's Update Statement and an opportunity to make revisions to that statement. A Contractor's bid will not be rejected if there are mistakes or omissions of form in its Update Statement, provided the contractor promptly corrects those mistakes or omissions upon request by the Awarding Authority.
- D. The Awarding Authority will consider the information contained in the Update Statement, which it may verify by its own investigation, and information that it may obtain from DCAMM, in determining whether the low bidder is eligible for contract award. The Awarding Authority's eligibility review of the low bidder will concentrate on the bidder's performance since its last certification by DCAMM, provided, however, that the Awarding Authority may bring information to DCAMM's attention concerning a contractor's qualifications, if DCAMM was not

aware of that information when it certified the contractor. In determining who is the lowest responsible and eligible bidder, the Awarding Authority may consider the bidder's past performance on projects undertaken or completed within the past five years.

- E. A bidder may not be awarded a contract which, when the annualized value thereof is added to the annualized cost to complete all other currently held contracts, would exceed the bidder's DCAMM aggregate rating limit. The Awarding Authority will use the information provided in the Update Statement to compute the amount of work the bidder has underway. If the bidder provides the Awarding Authority with evidence that its outstanding annualized balance of contracts (plus the annualized value of its bid for this project) will be within its aggregate rating limit by the start date of the project for which it is low bidder, the Awarding Authority may, at its discretion, make the contract award.
- F. Should the low bidder be determined not to be eligible, the Awarding Authority shall review the next low bidder's eligibility, in accordance with these Instructions and applicable law, until a bidder is determined to be eligible for contract award.
- G. The contract shall not be awarded to any bidder whose submitted background information, when investigated and verified by the Awarding Authority, raises significant question as to its ability to successfully complete the project due to problems with its competence and responsibility.

4.00 INTERPRETATION OF DOCUMENTS: NOTIFICATION OF ERRORS

- A. Interpretation of the provisions of the Contract Documents will be made by the Awarding Authority upon written request of any general bidder or sub-bidder, **provided that such request is received by the Architect at least seven (7) days prior to date of applicable bid opening**, and that the Architect considers such interpretation to be of sufficient importance. Oral or telephone interpretations will not generally be made, and if made, shall be strictly informal and not legally valid or binding.

AWARDING AUTHORITY: City of Salem
93 Washington Street, 2nd Floor
Salem, MA 01970
Tel: (978) 619-5695
Email: whaskell@Salem.com
Contact: Whitney C. Haskell
Purchasing Agent

- B. Architect's interpretations shall be in the form of Addenda to the Contract Documents.
- C. Bidders are urged to communicate all errors and discrepancies found in the Contract Documents to the Architect. Telephone calls pointing out any such errors or discrepancies will be taken by the Architect, but only for the purpose of receiving the information in order that it may be properly processed, and not for interpretation or clarification.

5.00 EXAMINATION OF BIDDING AND CONTRACT DOCUMENTS

- A. It is the responsibility of each Bidder, before submitting a Bid, to (a) examine all of the Bidding Documents thoroughly, (b) visit the site to become familiar with general, local and prevailing conditions, (c) familiarize him/herself with and consider Laws covering the Work, (d) study and carefully correlate the Bidder's observations with the Bidding Documents, and (e) request written interpretations or clarifications, promptly after discovering any conflicts, ambiguities, errors, or omissions in the Bidding Documents. Upon receipt of the plans and specifications the bidder shall immediately check that all documents listed have been received. The Bidder is solely responsible for errors and misinterpretations resulting from the use of incomplete Bidding Documents in preparing bids. Submission of a Bid constitutes a binding representation by the Bidder that they have examined the site, the existing building conditions, and the Contract Documents to the extent required herein and throughout the Contract Documents.
- B. Without limitation of the foregoing, before submitting a Bid, each Bidder shall examine the contents of the Bidding Documents, the site and the existing conditions to identify (a) the coordination and cooperation requirements between the Work and other work at or near the site, (b) any limitations in access to or release of portions of the site to accommodate other work at or near the site, (c) any Contract Time and work sequence conditions indicated in or required by the Bidding Documents to effect interfacing between the progress of the Work and the progress of the other work at or near the site, (d) conditions relating to the transportation, disposal, handling and storage of materials, (e) the availability and suitability of labor, materials, water, electric power, telephone, sanitary services and roads, (f) daily and monthly weather variations, including any related subsurface conditions, river stages, or similar conditions, (g) the character, quality and quantity of surface and subsurface conditions at the site, including but not limited to ground water table variations and the location, configuration and condition of existing structures and underground utilities, (h) the character of equipment and facilities needed preliminary to and during Work performance, (i) conditions related to the maintenance of the uninterrupted operation of existing services or facilities, and (j) the nature, characteristics and use of any adjacent or nearby property insofar as they may affect site operations. Bidders shall be held responsible for requirements affecting the work of their respective trade(s) required in any Section of the Specifications or on any Drawing, whether or not specifically mentioned in their Specification Section.
- C. Submission of a Bid constitutes a binding representation by the Bidder that all prices bid on the Bid Form reflect all conditions and consequences which may result from the performance of other work and which may in any manner affect cost, schedule, progress, performance, or furnishing of the Work.
- D. The submission of a Bid constitutes a binding representation by the Bidder that the Bidder has complied with every requirement of the Bid Documents, that without exception the Bid is premised upon performing and furnishing the Work required by or reasonably inferable from the Bidding Documents, and that the Bidder considers the Bidding Documents to be sufficient in scope and detail to

indicate and convey a clear understanding of all terms and reasonably foreseeable conditions applicable to the Work, and how such terms and conditions may affect the cost, schedule, progress, performance and furnishing of the work.

- E. Any failure of a Bidder to take the actions described and acknowledged in the Bidding Documents will not relieve the Bidder of responsibility for estimating properly the difficulty, cost of, and schedule for successfully performing and furnishing the Work, or for proceeding to successfully perform and furnish the Work without an increase in Contract Price or Contract Time.

6.00 PRE-BID CONFERENCE

- A. Pre-bid conference will be held at location and time stipulated in the INVITATION TO BID.

7.00 MODIFICATION AND WITHDRAWAL OF BIDS

- A. Modifications or withdrawals of General Bids and Sub-bids will be permitted after submission of such bids provided clearly written, readily understandable instructions for same are received by the Awarding Authority in writing prior to the time established for opening of such bids. No General Bid or Sub-bids may be withdrawn after that time, except as otherwise provided herein or by law.

8.00 ADDENDA

- A. Addenda may be required during the bidding period to modify, clarify, or interpret the Contract Documents. It is intended, but not guaranteed, that such Addenda shall be mailed or faxed by the Awarding Authority to all persons or parties to whom Contract Documents have been issued (Bidders of Record). Failure to receive such Addenda shall in no way relieve any bidder from the execution of its provisions. All bidders are cautioned to verify the number of Addenda that have been issued and to secure any needed copies from the Awarding Authority before submitting a bid.
- B. Bidders shall acknowledge each and every Addendum in the spaces provided on the Bid Form. Failure of a bidder to acknowledge each and every Addendum in the space provided on the Bid Form may cause rejection of the bid.

9.00 FORM FOR BIDS

- A. The Awarding Authority will make available to every person applying therefore, a Form for General Bid and a Form for Sub-bid. Each bona fide General Bidder and Sub-bidder will be furnished forms for his/her proposal upon request. Such forms will be made available at the Architect's office during the regular office hours throughout the bidding period. Bids must be submitted on the forms provided by Architect or on forms included in the bid documents of the Project Manual.
- B. All blank spaces provided on the bid forms shall be filled in with ink or typewritten. Where space is provided, sums shall be expressed in both words

and figures. In case of discrepancy between the two, the written words shall govern.

- C. No interlineations, additions, alterations, or erasures shall be made on the forms.
- D. The Awarding Authority is exempt from sales and federal excise tax to the extent permitted under law; bidders should not include such taxes in figuring or in references to any bid.
- E. All Bidders shall include with their bids updated certificates of eligibility as required by MGL Chapter 579.
- F. A completed and signed Prime/General Contractor Update Statement must be submitted with every Prime/General Bid for a contract pursuant to M.G.L. c.149, §44A, and a completed and signed Sub-Bidder Update Statement must be submitted with every filed Sub-Bid pursuant to M.G.L. c.149, §44F.

10.00 ALTERNATES

NOT APPLICABLE

11.00 SUBMISSION OF GENERAL BIDS

- A. The Form for General Bid shall be properly executed and enclosed with the required Bid Deposit, DCAMM Certificate of Eligibility and Update Statement in a sealed envelope plainly marked on the outside with the following information:

GENERAL BID FOR: **Salem Police Station Roof Repair Project**
Salem, Massachusetts

SUBMITTED BY: _____
(Name of General Bidder)

(Address of General Bidder)

- B. If General Bids are mailed, the above required envelope shall be enclosed in a second envelope identified with the above markings and mailed to the place of general bid opening, as described in the Invitation to Bid. Mailed General Bids must be received before time scheduled for opening of General Bids.

12.00 BID DEPOSIT

- A. Every General Bid and every Sub-Bid shall be accompanied by a bid deposit in the form of a bid bond, or cash, or a certified check on, or a treasurer's or cashier's check issued by, a responsible bank or trust company, payable to the Town of Natick. A bid bond shall be (a) in a form satisfactory to the awarding authority, (b) with a surety company qualified to do business in the commonwealth and satisfactory to the awarding authority and (c) conditioned upon the faithful performance by the principal of the agreements contained in the bid. The amount of such bid deposit shall be five percent of the value of the bid.

- B. All bid deposits of general bidders, except those of the three lowest responsible and eligible general bidders, shall be returned within five days, Saturdays, Sundays and legal holidays excluded, after the opening of the general bids. The bid deposits of the three lowest responsible and eligible general bidders shall be returned upon the execution and delivery of the general contract or, if no award is made, upon the expiration of the time prescribed in G.L. ch. 149, section forty-four A for making an award; except that, if any general bidder who fails to perform his agreement to execute a contract and furnish a performance bond and also a labor and materials or payment bond as stated in his bid, his bid deposit shall become and be the property of the Town of Natick as liquidated damages; provided that the amount of the bid deposit which becomes the property of the Town of Natick shall not, in any event, exceed the difference between his bid price and the bid price of the next lowest responsible and eligible bidder; and provided further that, in case of death, disability, bona fide clerical or mechanical error of a substantial nature, or other similar unforeseen circumstances affecting the general bidder, his bid deposit shall be returned to him.
- C. All bids deposits of sub-bidders, except (a) those of the sub-bidders named in the general bids of the three lowest responsible and eligible general bidders and (b) those of the three lowest responsible and eligible sub-bidders for each trade, shall be returned within five days, Saturdays, Sundays and legal holidays excluded, after opening of the general bids. The bid deposits of sub-bidders not returned pursuant to the preceding sentence shall be returned within 5 days, Saturdays, Sundays and legal holidays excluded, after the execution of the general contract; except that, if a selected sub-bidder fails to perform his agreement to execute a sub-contract with the general bidder selected as the general contractor, contingent upon the execution of the general contract, and furnish a performance and payment bond as stated in his sub-bid, the bid deposit of that sub-bidder shall become and be the property of the Town of Natick; provided that the amount of the bid deposit which becomes the property of the Town of Natick shall not, in any event, exceed the difference between his sub-bid price and the sub-bid price of the next lowest responsible and eligible sub-bidder; and provided further that, in case of death, disability, bona fide clerical or mechanical error of a substantial nature, or other unforeseen circumstances affecting any such sub-bidder, his bid deposit shall be returned to him.
- D. In addition to the provisions for the return of bid deposits above, upon receipt of a bid bond in an amount not less than the amount of the required bid deposit, the awarding authority shall return any bid deposit of a bidder forthwith after public opening of bids. The bid bond shall be in an amount and in the form provided above.

13.00 PERFORMANCE AND PAYMENT BONDS

- A. The Performance and Payment Bonds required of the General Contractor shall each be in the amount of 100% of the respective Contract Sum or subcontract price from a surety company qualified to do business under the laws of the Commonwealth of Massachusetts and approved by the Awarding Authority.

14.00 FOREIGN CORPORATIONS

- A. The attention of bidders is called to the General Laws, Chapter 30, Section 39L, as amended by The Acts of 1967, Chapter 3, under which the Awarding Authority may not enter into a contract with a foreign corporation (a corporation not organized under the Laws of Massachusetts), nor approve a foreign corporation as a subcontractor, unless the foreign corporation has filed with the Awarding Authority a certificate by the State Secretary stating that the foreign corporation has complied with the requirements of Section 15.03 of Subdivision A of Part 15 of General Laws, Chapter 156D, and the date of such compliance, and further has filed all annual reports required by Section 16.22 of Subdivision B of Part 16 of said Chapter 156D.

15.00 AWARD OF CONTRACT

- A. The Contract will be awarded to the lowest responsible, competent and eligible bidder in accordance with Chapter 149, Sections 44A through 44J of the Massachusetts General Laws.
- B. The Awarding Authority reserves the right to reject general bids and sub-bids in accordance with the provisions of Massachusetts General Laws, Chapter 149, §§44A-44J.

In addition, the Awarding Authority may consider informal and may reject any general bid or sub-bid which is not prepared and submitted in accordance with all requirements of the bid documents, or which contains erasures, alterations, additions, errors or irregularities of any kind, or which contains proposed prices for any class or item of work which are, in the judgment of the Awarding Authority, substantially less or more than the actual cost to complete the work; provided, however, that the Awarding Authority reserves the right to waive any and all informalities as to form. Matters as to substance shall not be waived. Subject to the provisions of applicable laws, if the bid forms, specifications, or any other bid documents require submission of special information or data to accompany general bids, or sub-bids for any trade, if applicable, and any bidder neglects to furnish such information or data with its bid, the Awarding Authority may reject the bid of such bidder as incomplete; provided, however, that the Awarding Authority reserves the right to deem any such omission as an informality for which such bid will not be rejected, and to subsequently receive such information or data prior to award of the contract. See Section 3.00 above as to the Awarding Authority's right to reject the bid of any bidder who is not qualified, competent and responsible.

- C. Prior to execution of the contract, the successful general contractor must file with the Awarding Authority and DCAMM certain financial statements and information as required by Massachusetts General Laws, Chapter 30, §39R. In addition, at or prior to the time of execution of the contract the successful general contractor must furnish to the Awarding Authority (i) evidence of compliance with all laws of the Commonwealth of Massachusetts relating to taxes, (ii) an affidavit of compliance with certain laws of the Commonwealth relating to corporations, and evidence of authority for execution of the contract, and (iii) performance and payment bonds as stated herein and in the bid form. In addition, prior to

commencement of work the selected contractor must furnish to the Awarding Authority certificates evidencing required insurance coverage in accordance with the Contract Documents.

16.00 COMMENCEMENT AND COMPLETION OF WORK

- A. The successful bidder, upon execution of the Contract, shall commence and complete the work in accordance with the requirements stipulated in the AGREEMENT BETWEEN OWNER AND CONTRACTOR.

17.00 LIQUIDATED DAMAGES

- A. Liquidated damages for failure to complete the Work within the time limit specified in the Contract will be assessed to the Contractor. Liquidated damages will be in the amount as specified in AGREEMENT BETWEEN OWNER AND CONTRACTOR.

18.00 UNIT PRICES

- A. Bidders' attention is directed to the fact that certain sections of the Specifications contain unit prices which will be applicable to the designated items of work.

19.00 BUILDING PERMITS

- A. The Application Fee for the Building Permit, as well as all other municipal permits, licenses and inspection fees, shall be waived by the City of Salem. Obtaining permits, licenses and inspections remains the responsibility of the General Contractor and various trades performing the work after the award of the Contract.

20.00. CORI-RELATED STANDARDS OF THE CITY OF SALEM

- A. The City of Salem employ CORI-related policies, practices and standards that are fair to all persons involved and seeks to do business with vendors that have substantially similar policies, practices and standards. The City of Salem will do business only with vendors who, when required by law to perform CORI checks, employ CORI-related policies, practices, and standards that are consistent with policies of the City of Salem.

END OF SECTION

APPENDIX TO BIDDING INSTRUCTIONS

1. Any prospective bidder requesting a **change** in, or interpretation of, existing specifications or terms and conditions must do so (7) seven days prior (Saturdays, Sundays, and Holidays excluded) to the scheduled bid opening date. All requests are to be in writing to the Purchasing Department. No changes will be considered or any interpretation issued unless the request is in our hands within (7) seven days (Saturdays, Sundays, and Holidays excluded) **BEFORE** scheduled bid opening date.
2. Bids which are incomplete, not properly endorsed, or signed, or otherwise contrary to these instructions will be rejected as informal by the Purchasing Agent. Conditional Bids Will Not Be Accepted.
3. By signing this Bid, the Bidder certifies that no official or employee of the City of Salem, Massachusetts, is pecuniarily interested in this proposal or in the contract which the bidder offers to execute or in expected profits to arise therefrom, unless there has been compliance with provisions of G.L.C. 43" section 27, and that this bid is made in good faith without fraud or collusion or connection with any other person submitting a proposal.
4. As the City of Salem is exempt from the payment of Federal Excise Taxes, prices quoted herein are not to include these taxes.
5. Before submitting a quotation, each bidder must make a careful study of these specifications and proposal, and fully assure himself as to the quality of the materials and character of the workmanship required.
6. The bidder must visit the place where the work is to be performed and materials delivered and take into consideration the existing conditions and should his quotation be accepted, he will be held responsible for any omissions, misunderstanding or error, whether it results from his failure to do so or not.
7. The right is reserved to make changes in the work without affecting validity of the contract, the value of such alteration to be added to or taken away from the contract prices as provided in the contract agreement. Any additional compensation will be allowed only after price agreement and authorization by the Purchasing Agent.
11. No alterations shall be made in the work described by the specifications except upon written order of the contracting officer and when so made the value of the work added or omitted shall be computed and the amount so ascertained shall be added to or deducted from the contract price.
12. Bidders are required to inform themselves fully relative to conditions under which the work is to be performed, and this contractor must employ as far as possible such methods and means in the carrying out of his work as will not cause any interruption or interference with the existing service and conditions.
13. All work and material must comply in every respect with the building Laws, City Regulations and Massachusetts State Department of Public Safety Regulations.

14. The Contractor is to give proper authorities notice relating to the work, obtain official permits when required and pay all proper fees for same.
15. All materials used shall be of the very best quality of their respective kinds and all of the work performed shall be executed in the most skillful and workman like manner and both materials used and work performed shall, in every respect meet the complete satisfaction of the Purchasing Agent or his authorized agent. The bidder to whom a contract is awarded guarantees to the City of Salem all equipment, materials and/or workmanship for a period of (1) one year after final inspection and acceptance and shall replace promptly any defective equipment, materials, and/or workmanship required without additional cost to the City.
16. The premises shall be kept clean and free from debris. Upon completion of the work, all rubbish and surplus materials then remaining in or about the building or grounds shall be removed promptly, leaving the premises in perfect and proper condition.
17. The Contractor shall be responsible for all materials delivered in connection with this work, and shall pay all charges for cartage, scaffolds, planking and erecting material, and replace all materials and apparatus which may become damaged or stolen before the final acceptance of the work.
18. The City of Salem reserves the right to reject any and all bids, wholly or in part.
19. If Bid is withdrawn after time and date specified, the bidder shall forfeit deposit on bid as liquidated damages.
20. The Contractor will not be permitted to either assign or underlet the contract, nor assign either legally or equitably any monies hereunder, or its claim thereto without the previous written consent of the City Treasurer and of the Purchasing Agent of the City.
21. If this bid shall be accepted by the City, and the bidder shall fail to contract as aforesaid and to give Bonds in the amount as specified in the section 3, within ten (10) days, (not including Saturday, Sunday or a Legal Holiday) from the date of the mailing of a Contract from the City to him according to the address given herewith, the City may by option determine that the bidder has abandoned the contract and thereupon the proposal and acceptance shall be null and void and the bid security accompanying this proposal shall become the property of the City as liquidated damages.
22. All bids are to be submitted on the Forms contained in the bid package provided by the City.
23. If in the judgment of the Purchasing Agent any property is needlessly damaged by an act or omission of the contractor or his employees, servants, or agents, the amount of such damages shall be determined by the Purchasing Agent of the City of Salem and such amount shall be deducted from any money due the contractor or may be recovered from said contractor in actions at law.
24. It is agreed that deliveries and/or completion are subject to strikes, lockouts, accidents and Acts of God.
25. The Contractor shall, before commencing the work, provide by insurance for the payment of compensation and the furnishing of other benefits under Chapter 152 of the General Laws

(Ten. Ed.) to all persons employed under the contract, and he shall continue such insurance in force and effect during the term thereof.

26. The Contractor shall carry public liability insurance with an Insurance Company satisfactory to the City so as to save the city harmless from any and all claims for damages arising out of bodily injury to or death of any person or persons, and for all claims for damages arising out of injury to or destruction of property caused by accident resulting from the use of implements, equipment or labor used in the performance of the contract or from the neglect, default or omission, or want of proper care, or misconduct on the part of the Contractor or any one in his employ during the execution of the work.. The insurance company should have an A.M. Best rating of A- (excellent) or better and a financial size category of IX or better.
27. Prior to starting work on this contract, the Contractor shall deposit with the City Purchasing Agent certificates from the insurers to the effect that the insurance policies required in the above paragraph have been issued to the Contractor. The certificate must be on a form satisfactory to the City Purchasing Agent.
28. No cancellation of any insurance whether by the insurer or by the insured shall be effective unless written notice thereof is given to the city at least thirty days prior to the intended effective date thereof, which date has been expressed in the notice. Prior to the effective date of any such cancellation the contractor shall take out new insurance to cover the policies so canceled. The insurance companies shall remain liable, however, until new and satisfactory insurance policies have been delivered to and accepted by the City.
29. The conditions of employment and minimum wage rates, as set forth by the Massachusetts Commissioners of Labor and Industries, shall prevail in the execution of the work under this contract. The Wage Rate Schedule is contained in the Specifications.
30. In the employment of mechanics and apprentices, teamsters, chauffeurs and laborers in the construction of public works by the Commonwealth, or by a Country, Town or District, or by persons contracting or subcontracting for such works, (preference shall first be given to citizens of the Commonwealth who have been residents of the Commonwealth for at least six months) at the commencement of their employment, who are male veterans as defined in clause Forty-Three of Section Seven of Chapter Four, and who are qualified to perform the work to which the employment relates; and secondly, to citizens of the Commonwealth generally who have been residents of the Commonwealth for at least six months at the commencement of their employment, and if they cannot be obtained in sufficient numbers, then to citizens of the United States, and every contract for such work shall contain a provision to this effect. Each County, Town or District in the construction of public works, or persons contracting or subcontracting for such works, shall give preference to veterans and citizens who are residents of such County, Town or District.
31. The Contractor certifies that he/she is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work site; that all employees to be employees at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is a least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first

payroll report for each employee; and that he/she will comply fully with all laws and regulations applicable to awards made subject to section 44A.

END OF SECTION

Name of Filed Sub-Bidder: _____

**ROOF REPAIRS TO THE
SALEM POLICE STATION
95 MARGIN STREET
SALEM, MASSACHUSETTS**

FORM FOR HVAC FILED SUB-BID

To all General Bidders except those excluded.

FILED SUB-BIDS DUE: January 26, 2017 @2:00 PM

- A. The undersigned proposes to furnish all labor and materials and equipment required for completing, in accordance with the hereinafter described plans, specifications and addenda, all the work specified in **Section 230000 – HVAC & Section 260000 – Electrical, and detailed on Drawings H1, H2, H3, H4, E1, E2 & E3.** of the Project Manual and Drawings, prepared by Russo Barr Associates, Inc. dated January 11, 2017 for Roof Repairs at the Salem Police Station, 95 Margin Street, Salem, Massachusetts and the following addenda, for the contract sum of:

Addendum No. _____ Dated _____

Having carefully examined the Plans and Specifications and Addenda; having carefully examined the existing conditions, building layout and surrounding conditions; having examined all other conditions that may affect the work, the undersigned proposes to provide all labor, materials and equipment to perform the work as specified for the stipulated lump sum dollar amount of:

- B. The proposed Contract Price (Alternate No. 1 Bid) is:

_____ Dollars
\$ _____

- C. This sub-bid

may be used by any General Bidder except:

may only be used by the following General Bidders:

(To exclude general bidders, insert "X" in one box only and fill in blank following that box. Do not answer C. if no general bidders are excluded)

D. The undersigned agrees that, if he is selected as a sub-bidder, he will, within five days, Saturdays, Sundays, and legal holidays excluded, after presentation of a subcontract by the general bidder selected as the general contractor, execute with such general bidder a subcontract in accordance with the terms of this sub-bid, and contingent upon the execution of the general contract, and, if requested so to do in the general bid by such general bidder, who shall pay the premiums therefore, furnish a performance and payment bond of a surety company qualified to do business under the laws of the Commonwealth and satisfactory to the awarding authority, in the full sum of the subcontract price.

E. The names of all persons, firms and corporations furnishing to the undersigned labor or labor and materials for the class or classes or part thereof of work for which the provisions of the section of the specifications for this sub-trade require a listing in this paragraph, including the undersigned if customarily furnished by persons on his own payroll and in the absence of a contrary provision in the specifications, the name of each such class of work or part thereto and the bid price for such class of work or part thereof are:

Name	Class of Work	Bid Price
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

[Do not give bid price for any class or part thereof furnished by undersigned.]

F. The undersigned agrees that the above list of bids to the undersigned represents bona fide bids based on the herein before described plans, specifications and addenda and that, if the undersigned is awarded the contract, they will be used for the work indicated at the amounts stated, if satisfactory to the awarding authority.

G. The undersigned further agrees to be bound to the general contractor by the terms of the hereinbefore described plans, specifications, including all general conditions stated therein, and addenda, and to assume toward him all the obligations and responsibilities that he, by those documents, assumes toward the owner.

H. The undersigned offers the following information as evidence of his qualifications to perform the work as bid upon according to all the requirements of the plans and specification:

1. Have been in business under present business name _____ years.
2. Ever failed to complete any work awarded? _____

3. List one or more recent buildings with names of the general contractor and architect on which you served as a subcontractor for work of similar character as required for the above named building.

	Building	Architect	General Contractor	Amount of Contract
(a)				
(b)				
(c)				

4. Bank Reference _____

- I. The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work; that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and that it will comply fully with all laws and regulations applicable to awards made subject to Section 44A of Chapter 149 of the Massachusetts General Laws.

The undersigned further certifies under penalties of perjury that this sub-bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this subsection the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity. The undersigned further certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the commonwealth under the provisions of section twenty-nine F of chapter twenty-nine, or any other applicable debarment provisions of any other chapter of the General Law or any rule or regulation promulgated thereunder.

J. CONSTRUCTION SCHEDULE:

A contract is expected to be promptly awarded to the lowest responsible and eligible bidder. The construction phase is expected to commence on or before April 3, 2017 and be completed by May 31, 2017. The work hours shall be as follows: Monday through Saturday 8:00 am to 5:00 pm.

The Contractor shall start the work under this Contract on written notice from and on the date set by the Awarding Authority and continue to completion with all practical dispatch and regularity so that the entire project shall be completed in a timely fashion.

Date: _____

(Name of Sub-Bidder)

Roof Repair Project
Salem Police Station
Salem, MA
RBA Project No. 2016051

Signed: _____

By: _____
(Name and Title of Person Signing Bid and Title)

(Business Address)

(City and State)

(If a Corporation, attach to each signed Bid a notarized copy of the Corporate Vote authorizing the signatory to sign this contract.)

Name of General Bidder: _____

**ROOF REPAIRS TO THE
SALEM POLICE STATION
95 MARGIN STREET
SALEM, MASSACHUSETTS**

FORM FOR GENERAL BID

GENERAL BIDS DUE: February 2, 2017, @ 2:00 PM

This bid must be accompanied by a bid deposit in the form of cash, or a bid bond, or a certified check, treasurer's check, or cashier's check, payable to the City of Salem (hereinafter referred to as the "Owner", or the "Awarding Authority") in the amount of five percent (5%) of the value of the bid. No other form of bid security will be accepted.

By submitting this bid the undersigned represents to the Owner that it has examined and understands the Advertisement for Bids, Instructions to Bidders, Contract Forms, Conditions of the Contract (General and Supplementary), Drawings, Specifications and all other Contract Documents and has examined the site, as defined therein, and that this bid is made with distinct reference and relation to all said Contract Documents; but the undersigned declares that in regard to the conditions affecting the work to be done and the labor and materials needed, this bid is based solely on its own investigation and research and not in reliance upon any drawings, surveys, measurements, dimensions, calculations, estimates, borings, pile tests or other tests or representations of any employee, officer, agent or consultant of the Owner. By submitting this bid, the undersigned agrees that it shall be subject to the jurisdiction of the courts of the Commonwealth of Massachusetts with respect to any actions arising out of or related to this bid or any contract that may be entered into based upon this bid, and that any such actions commenced by the undersigned shall be commenced in the courts of the Commonwealth of Massachusetts.

A bidder wishing to amend this bid after transmittal to the Owner may do so only by withdrawing this bid and resubmitting another bid prior to the time for opening bids.

TO: CITY OF SALEM:

- A. The Undersigned proposes to furnish all labor and materials and equipment required for Roof Repairs at the Salem Police Station, 95 Margin Street, Salem, MA, in accordance with the accompanying Project Manual and Drawings prepared by Russo Barr Associates, Inc., dated January 11, 2017 for the contract price specified below, subject to additions and deductions according to the terms of the Project Manual and Drawings.
- B. This Bid includes Addenda numbered _____
- C. The proposed Contract Price is:

Base Bid:

_____ dollars
 \$ _____

Alternate No. 1 Bid (Filed Sub-bid):

_____ dollars
 \$ _____

D. The subdivision of the proposed Contract Price (Alternate No. 1-Filed Sub-bid) is:

Item 1. The work of the General Contractor, being all work other than that covered by item 2.

\$ _____

Item 2. Sub-bids as follows:

Sub-Trade	Name of Sub-Bidder	Amount	Bonds required, indicated by "Yes" or "No"
Section 230000 HVAC	_____	\$ _____	_____
Total of Item 2		\$ _____	

The undersigned agrees that the above named sub-bidder will be used for the work indicated at the amount stated, unless a substitution is made. The undersigned further agrees to pay the premiums for the performance and payment bonds furnished by sub-bidder as requested herein and that all of the cost of all such premiums is included in the amount set forth in Item 1. of this bid.

The undersigned agrees that if he is selected as General Contractor, he will promptly confer with the Awarding Authority on the question of sub-bidders; and that the Awarding Authority may substitute for any sub-bid listed above a sub-bid filed with the Awarding Authority by another sub-bidder for the sub-trade against whose standing and ability the undersigned makes no objection; and that the undersigned will use all such finally selected sub-bidders at the amounts named in their respective sub-bids and be in every way as responsible for them and their work as if they had been originally named in this General Bid, the total contract price being adjusted to conform thereto.

E. UNIT PRICES

1. Should unit price work be required or should the quantities of certain classes be increased or decreased from those on which the Contract Price is based, not by the undersigned's request but by the order of approval of the Owner or Owner's representative, the undersigned agrees the following unit prices will be the basis of payment or credit for such addition, increase or decrease in the work. Unit Prices given shall represent the exact net amount per unit to be added to the Price inclusive of General Conditions (in the case of additions or increases) or to be refunded to the Owner (in the case of decreases). The Owner shall have the right to reject any or all proposed Unit Prices at any time prior to signing the Agreement for performance of the work. **The maximum difference between add and deduct unit prices shall be twenty percent (20%).**

a. Random removal and replacement of deteriorated steel roof decking. Quantities shall be determined by calculation of actual square footage installed with no allowance for waste. The Contractor shall include 600 square feet as the Base Bid quantity. Reference Section 05 31 00.

ADD: \$_____/SF DEDUCT: \$_____/SF

b. Random wire brushing and painting of existing rusted steel roof decking. Quantities shall be determined by calculation of actual square footage installed with no allowance for waste. The Contractor shall include 600 square feet (SF) as the Base Bid quantity. Reference Section 05 31 00.

ADD: \$_____/SF DEDUCT: \$_____/SF

c. Random installation of galvanized steel sheet over existing steel roof decking. Quantities shall be determined by calculation of actual square footage installed with no allowance for waste. The Contractor shall include 600 square feet (SF) as the Base Bid quantity. Reference Section 05 31 00.

ADD: \$_____/SF DEDUCT: \$_____/SF

d. Random installation of necessary fasteners for proper steel roof deck securement. Reference Section 05 31 00.

ADD: \$_____/100 fasteners

e. Random removal and replacement of existing deteriorated wood blocking. Quantities shall be determined by calculation of actual board footage installed with no allowance for waste. The Contractor shall include 50 board feet as the Bid quantity. Reference Section 06 10 63.

ADD: \$_____/BF DEDUCT: \$_____/BF

F. Bidders are advised to examine the work area before submitting a bid. By submitting a bid, the Bidder covenants and agrees that he has carefully examined the drawings, specifications, associated bid documents, and addenda and/or bulletins, if any, and visited the site, that he relies on no hearsay, and that from his own investigation he has satisfied himself as to the nature and location of the work, the general and local conditions, and all matters which may in any way affect the work or its performance, and that as a result of such examination and investigation, he fully understands the intent and purpose of the documents and conditions of bidding and that he will not make any claim for, and waives any right to, damages because of any misinterpretations or misunderstanding of the bid documents and the conditions of bidding.

G. MANUFACTURERS:

If awarded the Contract for this work, we shall use the following PVC Roofing Membrane System Manufacturer.

H. CONSTRUCTION SCHEDULE:

A contract is expected to be promptly awarded to the lowest responsible and eligible bidder. The construction phase is expected to commence on or before April 3, 2017 and be completed by May 31, 2017. The work hours shall be as follows: Monday through Saturday 8:00 am to 5:00 pm.

The Contractor shall start the work under this Contract on written notice from and on the date set by the Awarding Authority and continue to completion with all practical dispatch and regularity so that the entire project shall be completed in a timely fashion.

I. The undersigned agrees that, if he is selected as General Contractor, he will within five days, Saturdays, Sundays and legal holidays excluded, after presentation thereof by the awarding authority, execute a contract in accordance with the terms of this bid and furnish a performance bond and also a labor and materials or Payment bond, each of a surety company qualified to do business under the laws of the Commonwealth of Massachusetts and satisfactory to the awarding authority and each in the sum of the contract price, the premiums for which are to be paid by the General Contractor and are included in the Contract price.

The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work; that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and that it will comply fully with all laws and regulations applicable to awards made subject to Section 44A of Chapter 149 of the Massachusetts General Laws.

The undersigned further certifies under penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this subsection the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity. The undersigned further certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the Commonwealth under the provisions of section twenty-nine F of chapter twenty-nine or any other applicable document provisions of any other Chapters of the General Laws or any other rule or regulation promulgated thereunder.

Date _____
_____ (Print Name of General Bidder)

By: _____
_____ (Name of Person Signing Bid and Title)

_____ (Business Address)

City: _____ State: _____ Zip: _____

Telephone (____) _____ - _____

Social Security Number
or Federal Identification Number: _____

NOTE: If the bidder is a corporation, indicate state of incorporation; if a Partnership, give full names and addresses of all partners; and if an individual, give residential address if different from business address.

1. If a Corporation:
Incorporated in what state: _____
President: _____
Treasurer: _____
Secretary: _____
2. If a Partnership:
Name of Partner: _____
Residence: _____
Name of Partner: _____
Residence: _____

Name of Partner: _____

Residence: _____

3. If an Individual:

Name of Partner: _____

Residence: _____

4. If an Individual doing business under a firm name:

Name of Firm: _____

Name of Individual: _____

Business Address: _____

Residence: _____

5. Other form of business organization:

The bidder will give below the name and address of the surety company who will sign the bonds.

**CITY OF SALEM – OFFICE OF THE PURCHASING AGENT
SALEM CITY HALL, 93 WASHINGTON STREET, 2ND FLOOR
SALEM, MASSACHUSETTS 01970**

TAX CERTIFICATION

CHAPTER 233 (SECTIONS 35 and 36) of the ACTS AND RESOLVES OF 1983, enacted the Revenue Enforcement and Protection Program effective July 1, 1983. One aspect of the law requires providers of goods and/or services to attest under the penalty of perjury, that he/she is in compliance with the laws of The Commonwealth of Massachusetts relating to taxes.

To comply with this requirement. YOU MUST SIGN THE FORM BELOW AND RETURN IT WITH YOUR BID OFFER. ANY PERSON FAILING TO SIGN THE ATTESTATION CLAUSE SHALL NOT BE ALLOWED TO OBTAIN, RENEW OR EXTEND A LICENSE, PERMIT OR CONTRACT.

PURSUANT TO MASSACHUSETTS GENERAL LAWS, CHAPTER 62C, SECTION 49A, I CERTIFY UNDER THE PENALTIES OF PERJURY THAT I, TO THE BEST OF MY KNOWLEDGE AND BELIEF, HAVE FILED ALL STATE TAX RETURNS AND PAID ALL STATE TAXES REQUIRED UNDER THE LAW.

(COMPANY NAME)

(FEDERAL IDENTIFICATION/SOCIAL SECURITY #)

(ADDRESS)

(CITY)

(STATE)

(ZIP)

(AUTHORIZED SIGNATURE)

(TITLE)

(PRINT NAME-AUTHORIZED SIGNER)

(DATE SIGNED)

CERTIFICATE OF NON-COLLUSION

The undersigned certifies under penalties of perjury that this bid or proposal has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word "person" shall mean any natural person, business, partnership, corporation, union, committee, club, or other organization, entity, or group of individuals.

(Signature of Individual submitting bid or proposal)

(Name of Business)

FORM TO BE INCLUDED WITH BID

AFFIDAVIT OF COMPLIANCE AND VOTE OF CORPORATION

_____ Massachusetts Business Corporation
_____ Foreign (non-Mass) Corp.
_____ Non-Profit Corporation

I, _____, President/Clerk of _____
(Name of Corporation)

whose principal office is located at _____

do hereby certify that the above named corporation has filed with the Massachusetts Secretary of State all certificates and annual reports required by Chapter 156B, Section 109 (business corporation), by Chapter 181, Section 4 (foreign corporation) or by Chapter 180, Section 26A (non-profit corporation) of the Massachusetts General Laws.

SIGNED UNDER THE PENALTIES OF PERJURY this _____ day of _____,
20____.

Signature of Responsible Corporate Officer _____

Title _____

If a corporation, complete below or attach to each signed copy of the Contract a notarized copy of vote of corporation authorizing the signatory to sign this Contract.

At a duly authorized meeting of the Board of Directors of the

_____ held on _____
(Name of Corporation) (Date)

at which all the Directors were present or waived notice, it was VOTED, that,

(Name) (Office)
of this corporation be and hereby is authorized to execute contracts, bonds and other instruments in the name and behalf of said corporation and affix its corporate seal thereto, and such execution of any contract or other instrument or obligation in this corporation's name on its behalf by

such _____ of the corporation, shall be valid and binding upon this corporation.
(Officer)

I hereby certify that I am the Clerk of

that _____ is the duly elected

(Name)

(Office)

of said corporation, and that the above vote has not been amended or rescinded and remains in full force and affect as of the date of this Contract.

A true copy,

ATTEST _____
(Clerk)

Place of Business _____

_____ Corporate Seal

FORM TO BE INCLUDED WITH BID
STATEMENT OF STATE TAX COMPLIANCE

Pursuant to Chapter 62C of the Massachusetts General Laws, Section 49A (b),

I, _____, authorized signatory for
Name and Title

_____, whose principal place of business is
Contracting Party

at _____, do hereby certify under
Address

the pains and penalties of perjury that _____ has
Contracting Party

compiled with all laws of the Commonwealth relating to taxes.

Authorized Signature

Date

FORM TO BE INCLUDED WITH BID
CONTRACTOR'S CERTIFICATION

certifies that: _____

CONTRACTOR

1. intends to use the following listed construction trades in the work under the contract
_____, and
2. will comply with the minority manpower ratio and specific affirmative action steps contained herein; and
3. will obtain from each of its subcontractors and submit to the contracting or administering agency prior to the award of any subcontract under this contract the subcontractor certification required by these bid conditions.

(Signature of Authorized Representative of Contractor)

FORM TO BE INCLUDED WITH BID
AFFIDAVIT OF OSHA COMPLIANCE

The undersigned agrees that if he is selected as the contractor, he will comply with the provisions of M.G.L. Chapter 149, Section 44A.

The undersigned certifies, under penalties of perjury, that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work; that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and that all employees to be employed in the work subject to this bid have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration.

Date _____

(Name of Bidder)

By _____
(Name of person Signing Bid and Title)
Signature is required

(Business Address)

(City and State)

(Telephone Number)

CONTRACT & ASSOCIATED DOCUMENTS

1. **OWNER CONTRACTOR AGREEMENT (A101 - 1997)**
2. **GENERAL CONDITIONS FOR THE CONTRACT FOR CONSTRUCTION (AIA 201-1997)**
3. **SUPPLEMENTARY GENERAL CONDITIONS**
4. **SUPPLEMENTS TO CONTRACT FORMS**
5. **MASSACHUSETTS PREVAILING WAGE RATES**

AIA DOCUMENT A101-1997

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a STIPULATED SUM

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

Text

day of

Text

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

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

Text

AIA Document A201-1997, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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

Text

This document has been approved and endorsed by The Associated General Contractors of America.

The Project is:
(Name and location)

Text

The Architect is:
(Name, address and other information)

Text

The Owner and Contractor agree as follows.



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ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement; these form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents, other than Modifications, appears in Article 8.

ARTICLE 2 THE WORK OF THIS CONTRACT

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

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

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

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

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

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

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

(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. Unless stated elsewhere in the Contract Documents, insert any requirements for earlier Substantial Completion of certain portions of the Work.)

, subject to adjustments of this Contract Time as provided in the Contract Documents.

(Insert provisions, if any, for liquidated damages relating to failure to complete on time or for bonus payments for early completion of the Work.)



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ARTICLE 4 CONTRACT SUM

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

4.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:
(State the numbers or other identification of accepted alternates. If decisions on other alternates are to be made by the Owner subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

4.3 Unit prices, if any, are as follows:

ARTICLE 5 PAYMENTS

5.1 PROGRESS PAYMENTS

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

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

5.1.3 Provided that an Application for Payment is received by the Architect not later than the _____ day of a month, the Owner shall make payment to the Contractor not later than the _____ day of the _____ month. If an Application for Payment is received by the Architect after the application date fixed above, payment shall be made by the Owner not later than _____ days after the Architect receives the Application for Payment.

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



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

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

- 1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of _____ percent (____ %). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Subparagraph 7.3.8 of AIA Document A201-1997;
- 2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of _____ percent (____ %);
- 3 Subtract the aggregate of previous payments made by the Owner; and
- 4 Subtract amounts, if any, for which the Architect has withheld or nullified a Certificate for Payment as provided in Paragraph 9.5 of AIA Document A201-1997.

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

- 1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Architect shall determine for incomplete Work, retainage applicable to such work and unsettled claims; and (*Subparagraph 9.8.5 of AIA Document A201-1997 requires release of applicable retainage upon Substantial Completion of Work with consent of surety, if any.*)
- 2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Subparagraph 9.10.3 of AIA Document A201-1997.

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

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

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

5.2 FINAL PAYMENT

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

- 1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Subparagraph 12.2.2 of AIA Document A201-1997, and to satisfy other requirements, if any, which extend beyond final payment; and
- 2 a final Certificate for Payment has been issued by the Architect.



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

ARTICLE 6 TERMINATION OR SUSPENSION

6.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201-1997.

6.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201-1997.

ARTICLE 7 MISCELLANEOUS PROVISIONS

7.1 Where reference is made in this Agreement to a provision of AIA Document A201-1997 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

7.2 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

(Insert rate of interest agreed upon, if any.)

(Usury laws and requirements under the Federal Truth in Lending Act, similar state and local consumer credit laws and other regulations at the Owner's and Contractor's principal places of business, the location of the Project and elsewhere may affect the validity of this provision. Legal advice should be obtained with respect to deletions or modifications, and also regarding requirements such as written disclosures or waivers.)

7.3 The Owner's representative is:
(Name, address and other information)

7.4 The Contractor's representative is:
(Name, address and other information)

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

7.6 Other provisions:



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ARTICLE 8 ENUMERATION OF CONTRACT DOCUMENTS

8.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated as follows:

8.1.1 The Agreement is this executed 1997 edition of the Standard Form of Agreement Between Owner and Contractor, AIA Document A101-1997.

8.1.2 The General Conditions are the 1997 edition of the General Conditions of the Contract for Construction, AIA Document A201-1997.

8.1.3 The Supplementary and other Conditions of the Contract are those contained in the Project Manual dated _____, and are as follows:

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

8.1.4 The Specifications are those contained in the Project Manual dated as in Subparagraph 8.1.3, and are as follows:

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

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

8.1.5 The Drawings are as follows, and are dated _____ unless a different date is shown below:

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

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



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8.1.6 The Addenda, if any, are as follows:

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

Portions of Addenda relating to bidding requirements are not part of the Contract Documents unless the bidding requirements are also enumerated in this Article 8.

8.1.7 Other documents, if any, forming part of the Contract Documents are as follows:

(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201-1997 provides that bidding requirements such as advertisement or invitation to bid, Instructions to Bidders, sample forms and the Contractor's bid are not part of the Contract Documents unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)

This Agreement is entered into as of the day and year first written above and is executed in at least three original copies, of which one is to be delivered to the Contractor, one to the Architect for use in the administration of the Contract, and the remainder to the Owner.

OWNER *(Signature)*

CONTRACTOR *(Signature)*

(Printed name and title)

(Printed name and title)

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

This document has been approved and endorsed by The Associated General Contractors of America.



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ARTICLE 1 GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

1.1.1 THE CONTRACT DOCUMENTS

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

1.1.2 THE CONTRACT

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

1.1.3 THE WORK

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

1.1.4 THE PROJECT

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

1.1.5 THE DRAWINGS

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

1.1.6 THE SPECIFICATIONS

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

1.1.7 THE PROJECT MANUAL

The Project Manual is a volume assembled for the Work which may include the bidding requirements, sample forms, Conditions of the Contract and Specifications.

1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are



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complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

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

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

1.3 CAPITALIZATION

1.3.1 Terms capitalized in these General Conditions include those which are (1) specifically defined, (2) the titles of numbered articles and identified references to Paragraphs, Subparagraphs and Clauses in the document or (3) the titles of other documents published by the American Institute of Architects.

1.4 INTERPRETATION

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

1.5 EXECUTION OF CONTRACT DOCUMENTS

1.5.1 The Contract Documents shall be signed by the Owner and Contractor. If either the Owner or Contractor or both do not sign all the Contract Documents, the Architect shall identify such unsigned Documents upon request.

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

1.6 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

1.6.1 The Drawings, Specifications and other documents, including those in electronic form, prepared by the Architect and the Architect's consultants are Instruments of Service through which the Work to be executed by the Contractor is described. The Contractor may retain one record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications and other documents prepared by the Architect or the Architect's consultants, and unless otherwise indicated the Architect and the Architect's consultants shall be deemed the authors of them and will retain all common law, statutory and other reserved rights, in addition to the copyrights. All copies of Instruments of Service, except the Contractor's record set, shall be returned or suitably accounted for to the Architect, on request, upon completion of the Work. The Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants. The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants appropriate to and for use in



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the execution of their Work under the Contract Documents. All copies made under this authorization shall bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' copyrights or other reserved rights.

ARTICLE 2 OWNER

2.1 GENERAL

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

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

2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

2.2.1 The Owner shall, at the written request of the Contractor, prior to commencement of the Work and thereafter, furnish to the Contractor reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. Furnishing of such evidence shall be a condition precedent to commencement or continuation of the Work. After such evidence has been furnished, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

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

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

2.2.4 Information or services required of the Owner by the Contract Documents shall be furnished by the Owner with reasonable promptness. Any other information or services relevant to the Contractor's performance of the Work under the Owner's control shall be furnished by the Owner after receipt from the Contractor of a written request for such information or services.

2.2.5 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, such copies of Drawings and Project Manuals as are reasonably necessary for execution of the Work.

2.3 OWNER'S RIGHT TO STOP THE WORK

2.3.1 If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents as required by Paragraph 12.2 or persistently fails to carry out Work in



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accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Subparagraph 6.1.3.

2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

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

ARTICLE 3 CONTRACTOR

3.1 GENERAL

3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Contractor" means the Contractor or the Contractor's authorized representative.

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

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

3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

3.2.1 Since the Contract Documents are complementary, before starting each portion of the Work, the Contractor shall carefully study and compare the various Drawings and other Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Subparagraph 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, any errors, inconsistencies or omissions discovered by the Contractor shall be reported promptly to the Architect as a request for information in such form as the Architect may require.

3.2.2 Any design errors or omissions noted by the Contractor during this review shall be reported promptly to the Architect, but it is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional unless otherwise specifically provided in the Contract Documents. The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations, but any nonconformity discovered by or made known to the Contractor shall be reported promptly to the Architect.



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3.2.3 If the Contractor believes that additional cost or time is involved because of clarifications or instructions issued by the Architect in response to the Contractor's notices or requests for information pursuant to Subparagraphs 3.2.1 and 3.2.2, the Contractor shall make Claims as provided in Subparagraphs 4.3.6 and 4.3.7. If the Contractor fails to perform the obligations of Subparagraphs 3.2.1 and 3.2.2, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. The Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents or for differences between field measurements or conditions and the Contract Documents unless the Contractor recognized such error, inconsistency, omission or difference and knowingly failed to report it to the Architect.

3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

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

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

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

3.4 LABOR AND MATERIALS

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

3.4.2 The Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order.

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

3.5 WARRANTY

3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Contract



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Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

3.6 TAXES

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

3.7 PERMITS, FEES AND NOTICES

3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and other permits and governmental fees, licenses and inspections necessary for proper execution and completion of the Work which are customarily secured after execution of the Contract and which are legally required when bids are received or negotiations concluded.

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

3.7.3 It is not the Contractor's responsibility to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations. However, if the Contractor observes that portions of the Contract Documents are at variance therewith, the Contractor shall promptly notify the Architect and Owner in writing, and necessary changes shall be accomplished by appropriate Modification.

3.7.4 If the Contractor performs Work knowing it to be contrary to laws, statutes, ordinances, building codes, and rules and regulations without such notice to the Architect and Owner, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

3.8 ALLOWANCES

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

3.8.2 Unless otherwise provided in the Contract Documents:

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

3.8.3 Materials and equipment under an allowance shall be selected by the Owner in sufficient time to avoid delay in the Work.



3.9 SUPERINTENDENT

3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case.

3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

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

3.10.2 The Contractor shall prepare and keep current, for the Architect's approval, a schedule of submittals which is coordinated with the Contractor's construction schedule and allows the Architect reasonable time to review submittals.

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

3.11 DOCUMENTS AND SAMPLES AT THE SITE

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

3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

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

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

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

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

3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by



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the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. Submittals which are not marked as reviewed for compliance with the Contract Documents and approved by the Contractor may be returned by the Architect without action.

3.12.6 By approving and submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

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

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

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

3.12.10 The Contractor shall not be required to provide professional services which constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Subparagraph 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.



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3.13 USE OF SITE

3.13.1 The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

3.14 CUTTING AND PATCHING

3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly.

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

3.15 CLEANING UP

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

3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the cost thereof shall be charged to the Contractor.

3.16 ACCESS TO WORK

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

3.17 ROYALTIES, PATENTS AND COPYRIGHTS

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

3.18 INDEMNIFICATION

3.18.1 To the fullest extent permitted by law and to the extent claims, damages, losses or expenses are not covered by Project Management Protective Liability insurance purchased by the Contractor in accordance with Paragraph 11.3, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be



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construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Paragraph 3.18.

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

ARTICLE 4 ADMINISTRATION OF THE CONTRACT

4.1 ARCHITECT

4.1.1 The Architect is the person lawfully licensed to practice architecture or an entity lawfully practicing architecture identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Architect" means the Architect or the Architect's authorized representative.

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

4.1.3 If the employment of the Architect is terminated, the Owner shall employ a new Architect against whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the former Architect.

4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT

4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents, and will be an Owner's representative (1) during construction, (2) until final payment is due and (3) with the Owner's concurrence, from time to time during the one-year period for correction of Work described in Paragraph 12.2. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified in writing in accordance with other provisions of the Contract.

4.2.2 The Architect, as a representative of the Owner, will visit the site at intervals appropriate to the stage of the Contractor's operations (1) to become generally familiar with and to keep the Owner informed about the progress and quality of the portion of the Work completed, (2) to endeavor to guard the Owner against defects and deficiencies in the Work, and (3) to determine in general if the Work is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will neither have control over or charge of, nor be responsible for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Subparagraph 3.3.1.

4.2.3 The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.



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

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

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

4.2.7 The Architect will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken with such reasonable promptness as to cause no delay in the Work or in the activities of the Owner, Contractor or separate contractors, while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Paragraphs 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Paragraph 7.4.

4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion, will receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor, and will issue a final Certificate for Payment upon compliance with the requirements of the Contract Documents.

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

4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor.



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The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If no agreement is made concerning the time within which interpretations required of the Architect shall be furnished in compliance with this Paragraph 4.2, then delay shall not be recognized on account of failure by the Architect to furnish such interpretations until 15 days after written request is made for them.

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

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

4.3 CLAIMS AND DISPUTES

4.3.1 Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. Claims must be initiated by written notice. The responsibility to substantiate Claims shall rest with the party making the Claim.

4.3.2 Time Limits on Claims. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims must be initiated by written notice to the Architect and the other party.

4.3.3 Continuing Contract Performance. Pending final resolution of a Claim except as otherwise agreed in writing or as provided in Subparagraph 9.7.1 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

4.3.4 Claims for Concealed or Unknown Conditions. If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall so notify the Owner and Contractor in writing, stating the reasons. Claims by either party in opposition to such determination must be made within 21 days after the Architect has given notice of the decision. If the conditions encountered are materially different, the Contract Sum and Contract Time shall be equitably adjusted, but if the Owner and Contractor cannot agree on an adjustment in the Contract Sum or Contract Time, the adjustment shall be referred to the Architect for initial determination, subject to further proceedings pursuant to Paragraph 4.4.



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4.3.5 Claims for Additional Cost. If the Contractor wishes to make Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Paragraph 10.6.

4.3.6 If the Contractor believes additional cost is involved for reasons including but not limited to (1) a written interpretation from the Architect, (2) an order by the Owner to stop the Work where the Contractor was not at fault, (3) a written order for a minor change in the Work issued by the Architect, (4) failure of payment by the Owner, (5) termination of the Contract by the Owner, (6) Owner's suspension or (7) other reasonable grounds, Claim shall be filed in accordance with this Paragraph 4.3.

4.3.7 CLAIMS FOR ADDITIONAL TIME

4.3.7.1 If the Contractor wishes to make Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

4.3.7.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

4.3.8 Injury or Damage to Person or Property. If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

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

4.3.10 Claims for Consequential Damages. The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes:

1. damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
2. damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Subparagraph 4.3.10 shall be deemed to preclude an award of liquidated direct damages, when applicable, in accordance with the requirements of the Contract Documents.

4.4 RESOLUTION OF CLAIMS AND DISPUTES

4.4.1 Decision of Architect. Claims, including those alleging an error or omission by the Architect but excluding those arising under Paragraphs 10.3 through 10.5, shall be referred initially to the Architect for decision. An initial decision by the Architect shall be required as a



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condition precedent to mediation, arbitration or litigation of all Claims between the Contractor and Owner arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Architect with no decision having been rendered by the Architect. The Architect will not decide disputes between the Contractor and persons or entities other than the Owner.

4.4.2 The Architect will review Claims and within ten days of the receipt of the Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Architect is unable to resolve the Claim if the Architect lacks sufficient information to evaluate the merits of the Claim or if the Architect concludes that, in the Architect's sole discretion, it would be inappropriate for the Architect to resolve the Claim.

4.4.3 In evaluating Claims, the Architect may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Architect in rendering a decision. The Architect may request the Owner to authorize retention of such persons at the Owner's expense.

4.4.4 If the Architect requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either provide a response on the requested supporting data, advise the Architect when the response or supporting data will be furnished or advise the Architect that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Architect will either reject or approve the Claim in whole or in part.

4.4.5 The Architect will approve or reject Claims by written decision, which shall state the reasons therefor and which shall notify the parties of any change in the Contract Sum or Contract Time or both. The approval or rejection of a Claim by the Architect shall be final and binding on the parties but subject to mediation and arbitration.

4.4.6 When a written decision of the Architect states that (1) the decision is final but subject to mediation and arbitration and (2) a demand for arbitration of a Claim covered by such decision must be made within 30 days after the date on which the party making the demand receives the final written decision, then failure to demand arbitration within said 30 days' period shall result in the Architect's decision becoming final and binding upon the Owner and Contractor. If the Architect renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence, but shall not supersede arbitration proceedings unless the decision is acceptable to all parties concerned.

4.4.7 Upon receipt of a Claim against the Contractor or at any time thereafter, the Architect or the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Architect or the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

4.4.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines prior to resolution of the Claim by the Architect, by mediation or by arbitration.

4.5 MEDIATION

4.5.1 Any Claim arising out of or related to the Contract, except Claims relating to aesthetic effect and except those waived as provided for in Subparagraphs 4.3.10, 9.10.4 and 9.10.5 shall, after initial decision by the Architect or 30 days after submission of the Claim to the Architect, be



subject to mediation as a condition precedent to arbitration or the institution of legal or equitable proceedings by either party.

4.5.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Mediation Rules of the American Arbitration Association currently in effect. Request for mediation shall be filed in writing with the other party to the Contract and with the American Arbitration Association. The request may be made concurrently with the filing of a demand for arbitration but, in such event, mediation shall proceed in advance of arbitration or legal or equitable proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order.

4.5.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

4.6 ARBITRATION

4.6.1 Any Claim arising out of or related to the Contract, except Claims relating to aesthetic effect and except those waived as provided for in Subparagraphs 4.3.10, 9.10.4 and 9.10.5, shall, after decision by the Architect or 30 days after submission of the Claim to the Architect, be subject to arbitration. Prior to arbitration, the parties shall endeavor to resolve disputes by mediation in accordance with the provisions of Paragraph 4.5.

4.6.2 Claims not resolved by mediation shall be decided by arbitration which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association currently in effect. The demand for arbitration shall be filed in writing with the other party to the Contract and with the American Arbitration Association, and a copy shall be filed with the Architect.

4.6.3 A demand for arbitration shall be made within the time limits specified in Subparagraphs 4.4.6 and 4.6.1 as applicable, and in other cases within a reasonable time after the Claim has arisen, and in no event shall it be made after the date when institution of legal or equitable proceedings based on such Claim would be barred by the applicable statute of limitations as determined pursuant to Paragraph 13.7.

4.6.4 Limitation on Consolidation or Joinder. No arbitration arising out of or relating to the Contract shall include, by consolidation or joinder or in any other manner, the Architect, the Architect's employees or consultants, except by written consent containing specific reference to the Agreement and signed by the Architect, Owner, Contractor and any other person or entity sought to be joined. No arbitration shall include, by consolidation or joinder or in any other manner, parties other than the Owner, Contractor, a separate contractor as described in Article 6 and other persons substantially involved in a common question of fact or law whose presence is required if complete relief is to be accorded in arbitration. No person or entity other than the Owner, Contractor or a separate contractor as described in Article 6 shall be included as an original third party or additional third party to an arbitration whose interest or responsibility is insubstantial. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of a Claim not described therein or with a person or entity not named or described therein. The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.



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4.6.5 Claims and Timely Assertion of Claims. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

4.6.6 Judgment on Final Award. The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

ARTICLE 5 SUBCONTRACTORS

5.1 DEFINITIONS

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

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

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

5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect will promptly reply to the Contractor in writing stating whether or not the Owner or the Architect, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Owner or Architect to reply promptly shall constitute notice of no reasonable objection.

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

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

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

5.3 SUBCONTRACTUAL RELATIONS

5.3.1 By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the



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

5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

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

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

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

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Paragraph 4.3.

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

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

6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights which apply to the



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Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

6.2 MUTUAL RESPONSIBILITY

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

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

6.2.3 The Owner shall be reimbursed by the Contractor for costs incurred by the Owner which are payable to a separate contractor because of delays, improperly timed activities or defective construction of the Contractor. The Owner shall be responsible to the Contractor for costs incurred by the Contractor because of delays, improperly timed activities, damage to the Work or defective construction of a separate contractor.

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

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

6.3 OWNER'S RIGHT TO CLEAN UP

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

ARTICLE 7 CHANGES IN THE WORK

7.1 GENERAL

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

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

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



7.2 CHANGE ORDERS

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

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

7.2.2 Methods used in determining adjustments to the Contract Sum may include those listed in Subparagraph 7.3.3.

7.3 CONSTRUCTION CHANGE DIRECTIVES

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

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

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

- 1 mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- 2 unit prices stated in the Contract Documents or subsequently agreed upon;
- 3 cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- 4 as provided in Subparagraph 7.3.6.

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

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

7.3.6 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the method and the adjustment shall be determined by the Architect on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, a reasonable allowance for overhead and profit. In such case, and also under Clause 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Subparagraph 7.3.6 shall be limited to the following:

- 1 costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
- 2 costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- 3 rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;



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- 4 costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
- 5 additional costs of supervision and field office personnel directly attributable to the change.

7.3.7. The amount of credit to be allowed by the Contractor to the Owner for a deletion or change which results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

7.3.8 Pending final determination of the total cost of a Construction Change Directive to the Owner, amounts not in dispute for such changes in the Work shall be included in Applications for Payment accompanied by a Change Order indicating the parties' agreement with part or all of such costs. For any portion of such cost that remains in dispute, the Architect will make an interim determination for purposes of monthly certification for payment for those costs. That determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a claim in accordance with Article 4.

7.3.9 When the Owner and Contractor agree with the determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and shall be recorded by preparation and execution of an appropriate Change Order.

7.4 MINOR CHANGES IN THE WORK

7.4.1 The Architect will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly.

ARTICLE 8 TIME

8.1 DEFINITIONS

8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

8.1.2 The date of commencement of the Work is the date established in the Agreement.

8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Paragraph 9.8.

8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

8.2 PROGRESS AND COMPLETION

8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance. Unless the date of commencement is established by the Contract Documents or a notice to proceed given



by the Owner, the Contractor shall notify the Owner in writing not less than five days or other agreed period before commencing the Work to permit the timely filing of mortgages, mechanic's liens and other security interests.

8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

8.3 DELAYS AND EXTENSIONS OF TIME

8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control, or by delay authorized by the Owner pending mediation and arbitration, or by other causes which the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Paragraph 4.3.

8.3.3 This Paragraph 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

9.1 CONTRACT SUM

9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

9.2 SCHEDULE OF VALUES

9.2.1 Before the first Application for Payment, the Contractor shall submit to the Architect a schedule of values allocated to various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

9.3 APPLICATIONS FOR PAYMENT

9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment for operations completed in accordance with the schedule of values. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and reflecting retainage if provided for in the Contract Documents.

9.3.1.1 As provided in Subparagraph 7.3.8, such applications may include requests for payment on account of changes in the Work which have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

9.3.1.2 Such applications may not include requests for payment for portions of the Work for which the Contractor does not intend to pay to a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.



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9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

9.4 CERTIFICATES FOR PAYMENT

9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Subparagraph 9.5.1.

9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that the Work has progressed to the point indicated and that, to the best of the Architect's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

9.5 DECISIONS TO WITHHOLD CERTIFICATION

9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Subparagraph 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Subparagraph 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's



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opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Subparagraph 3.3.2, because of:

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or another contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 persistent failure to carry out the Work in accordance with the Contract Documents.

9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

9.6 PROGRESS PAYMENTS

9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

9.6.2 The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of such Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

9.6.4 Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may otherwise be required by law.

9.6.5 Payment to material suppliers shall be treated in a manner similar to that provided in Subparagraphs 9.6.2, 9.6.3 and 9.6.4.

9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.



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9.7 FAILURE OF PAYMENT

9.7.1 If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by arbitration, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

9.8 SUBSTANTIAL COMPLETION

9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion which shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

9.9 PARTIAL OCCUPANCY OR USE

9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Clause 11.4.1.5 and authorized by public authorities having jurisdiction over the Work. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and



have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Subparagraph 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

9.10 FINAL COMPLETION AND FINAL PAYMENT

9.10.1 Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Subparagraph 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that



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portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from:

- .1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents; or
- .3 terms of special warranties required by the Contract Documents.

9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

10.1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

10.2 SAFETY OF PERSONS AND PROPERTY

10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to:

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

10.2.2 The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Clauses 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Clauses 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Paragraph 3.18.



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10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

10.2.7 The Contractor shall not load or permit any part of the construction or site to be loaded so as to endanger its safety.

10.3 HAZARDOUS MATERIALS

10.3.1 If reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

10.3.2 The Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to verify that it has been rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. The Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up, which adjustments shall be accomplished as provided in Article 7.

10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Subparagraph 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) and provided that such damage, loss or expense is not due to the sole negligence of a party seeking indemnity.

10.4 The Owner shall not be responsible under Paragraph 10.3 for materials and substances brought to the site by the Contractor unless such materials or substances were required by the Contract Documents.

10.5 If, without negligence on the part of the Contractor, the Contractor is held liable for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

10.6 EMERGENCIES

10.6.1 In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or



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extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Paragraph 4.3 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 claims under workers' compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;
- .2 claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 claims for damages insured by usual personal injury liability coverage;
- .5 claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 claims for bodily injury or property damage arising out of completed operations; and
- .8 claims involving contractual liability insurance applicable to the Contractor's obligations under Paragraph 3.18.

11.1.2 The insurance required by Subparagraph 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment.

11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. These certificates and the insurance policies required by this Paragraph 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment as required by Subparagraph 9.10.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness in accordance with the Contractor's information and belief.

11.2 OWNER'S LIABILITY INSURANCE

11.2.1 The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

11.3 PROJECT MANAGEMENT PROTECTIVE LIABILITY INSURANCE

11.3.1 Optionally, the Owner may require the Contractor to purchase and maintain Project Management Protective Liability insurance from the Contractor's usual sources as primary coverage for the Owner's, Contractor's and Architect's vicarious liability for construction operations under the Contract. Unless otherwise required by the Contract Documents, the Owner



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shall reimburse the Contractor by increasing the Contract Sum to pay the cost of purchasing and maintaining such optional insurance coverage, and the Contractor shall not be responsible for purchasing any other liability insurance on behalf of the Owner. The minimum limits of liability purchased with such coverage shall be equal to the aggregate of the limits required for Contractor's Liability Insurance under Clauses 11.1.1.2 through 11.1.1.5.

11.3.2 To the extent damages are covered by Project Management Protective Liability insurance, the Owner, Contractor and Architect waive all rights against each other for damages, except such rights as they may have to the proceeds of such insurance. The policy shall provide for such waivers of subrogation by endorsement or otherwise.

11.3.3 The Owner shall not require the Contractor to include the Owner, Architect or other persons or entities as additional insureds on the Contractor's Liability Insurance coverage under Paragraph 11.1.

11.4 PROPERTY INSURANCE

11.4.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Paragraph 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Paragraph 11.4 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

11.4.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

11.4.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance which will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

11.4.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

11.4.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

11.4.1.5 Partial occupancy or use in accordance with Paragraph 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial



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occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

11.4.2 Boiler and Machinery Insurance. The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

11.4.3 Loss of Use Insurance. The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

11.4.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

11.4.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Subparagraph 11.4.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

11.4.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Paragraph 11.4. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

11.4.7 Waivers of Subrogation. The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Paragraph 11.4 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.



11.4.8 A loss insured under Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Subparagraph 11.4.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

11.4.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or in accordance with an arbitration award in which case the procedure shall be as provided in Paragraph 4.6. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

11.4.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved as provided in Paragraphs 4.5 and 4.6. The Owner as fiduciary shall, in the case of arbitration, make settlement with insurers in accordance with directions of the arbitrators. If distribution of insurance proceeds by arbitration is required, the arbitrators will direct such distribution.

11.5 PERFORMANCE BOND AND PAYMENT BOND

11.5.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

11.5.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall permit a copy to be made.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

12.1 UNCOVERING OF WORK

12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

12.1.2 If a portion of the Work has been covered which the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.



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12.2 CORRECTION OF WORK

12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

12.2.1.1 The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

12.2.2 AFTER SUBSTANTIAL COMPLETION

12.2.2.1 In addition to the Contractor's obligations under Paragraph 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Subparagraph 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Paragraph 2.4.

12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work.

12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Paragraph 12.2.

12.2.3 The Contractor shall remove from the site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

12.2.5 Nothing contained in this Paragraph 12.2 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the one-year period for correction of Work as described in Subparagraph 12.2.2 relates only to the specific obligation of the Contractor to correct the Work and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

12.3 ACCEPTANCE OF NONCONFORMING WORK

12.3.1 If the Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.



ARTICLE 13 MISCELLANEOUS PROVISIONS

13.1 GOVERNING LAW

13.1.1 The Contract shall be governed by the law of the place where the Project is located.

13.2 SUCCESSORS AND ASSIGNS

13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to the other party hereto and to partners, successors, assigns and legal representatives of such other party in respect to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Subparagraph 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

13.2.2 The Owner may, without consent of the Contractor, assign the Contract to an institutional lender providing construction financing for the Project. In such event, the lender shall assume the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

13.3 WRITTEN NOTICE

13.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified mail to the last business address known to the party giving notice.

13.4 RIGHTS AND REMEDIES

13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

13.5 TESTS AND INSPECTIONS

13.5.1 Tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections or approvals which do not become requirements until after bids are received or negotiations concluded.

13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Subparagraph 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Subparagraph 13.5.3, shall be at the Owner's expense.



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13.5.3 If such procedures for testing, inspection or approval under Subparagraphs 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

13.6 INTEREST

13.6.1 Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

13.7 COMMENCEMENT OF STATUTORY LIMITATION PERIOD

13.7.1 As between the Owner and Contractor:

- 1** Before Substantial Completion. As to acts or failures to act occurring prior to the relevant date of Substantial Completion, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than such date of Substantial Completion;
- 2** Between Substantial Completion and Final Certificate for Payment. As to acts or failures to act occurring subsequent to the relevant date of Substantial Completion and prior to issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of issuance of the final Certificate for Payment; and
- 3** After Final Certificate for Payment. As to acts or failures to act occurring after the relevant date of issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of any act or failure to act by the Contractor pursuant to any Warranty provided under Paragraph 3.5, the date of any correction of the Work or failure to correct the Work by the Contractor under Paragraph 12.2, or the date of actual commission of any other act or failure to perform any duty or obligation by the Contractor or Owner, whichever occurs last.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR

14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

- 1** issuance of an order of a court or other public authority having jurisdiction which requires all Work to be stopped;
- 2** an act of government, such as a declaration of national emergency which requires all Work to be stopped;



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- 3 because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Subparagraph 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- 4 the Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Subparagraph 2.2.1.

14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Paragraph 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

14.1.3 If one of the reasons described in Subparagraph 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery, including reasonable overhead, profit and damages.

14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has persistently failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Subparagraph 14.1.3.

14.2 TERMINATION BY THE OWNER FOR CAUSE

14.2.1 The Owner may terminate the Contract if the Contractor:

- 1 persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- 2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- 3 persistently disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction; or
- 4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

14.2.2 When any of the above reasons exist, the Owner, upon certification by the Architect that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- 1 take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- 2 accept assignment of subcontracts pursuant to Paragraph 5.4; and
- 3 finish the Work by whatever reasonable method the Owner may deem expedient. Upon request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

14.2.3 When the Owner terminates the Contract for one of the reasons stated in Subparagraph 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.



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14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Architect, upon application, and this obligation for payment shall survive termination of the Contract.

14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Subparagraph 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent:

- .1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall:

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.



SUPPLEMENTARY GENERAL CONDITIONS

The following supplements modify the General Conditions of the Contract for Construction (AIA Document A201, 1997 Edition). Where a portion of the General Conditions is modified or deleted by these Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect. In addition, copies of the statutory provisions (Massachusetts General Laws, Chapter 30, 39F, 39k, 39M, 39N, 39O, 39P) do modify the General Conditions of the Contract for Construction (AIA Document A201, 1997 Edition) and the Supplementary General Conditions (Section 00800), as stipulated.

ARTICLE 1 - GENERAL PROVISIONS

1.1.1 through 1.1.4 - No modifications.

1.1.5 - Amend as an addition to the existing with the following:

The Owner will not furnish to the Contractor any copy of drawings and specifications necessary for the execution of this work. All hard copies shall be printed by the contractor from electronic files provided.

1.1.6 - Amend as an addition to the existing with the following:

- A. Titles to Divisions and paragraphs in these specifications are introduced for convenience and shall not be taken as an exact, correct or complete segregation of materials and labor.
- B. No responsibility is assumed by the Engineer or the Owner for omissions or duplications by the Contractor or his Subcontractors due to real or alleged error in arrangement of matter in this specification.
- C. Latest revisions of Federal, State and ASTM Specifications shall be used where only the specification number without date or revision number is given these specifications.
- D. Attention is directed to the fact that typographical errors may appear in the text of the Specifications. Should any such errors be found, they shall not serve to alter the sense of the passage concerned, nor shall they be permitted to provide a basis for any extra claim by the Contractor by reason thereof.
- E. Any such errors found which lead to ambiguity of intent shall be referred to the Engineer for clarification in writing prior to submitting any Proposal for work. The submitting of a proposal shall be construed as indicating that no such ambiguities exist.
- F. The specifications and drawings are intended mutually to explain each other and anything which is shown on the drawings and not mentioned or referred to in the specifications or which is referred to in the specifications and not shown on the

drawings shall be considered as being shown and mentioned or referred to in both of these documents. Such work shall be done and performed accordingly at no additional cost to the Owner.

- G. If any errors or contradictions between the drawings and the specifications are found to exist in the appearance or in fact, the more stringent, in the sole judgment of the Engineer, shall apply. Such work shall be done and performed accordingly at no additional cost to the Owner.

1.1.7 through 1.6.1 - No modifications.

ARTICLE 2 - OWNER

2.1.1 - Delete the last sentence and replace with the following:

The word "Owner" as used herein these specifications or on the drawings refers to City of Salem, MA.

2.1.2 through 2.2.1 - Delete completely.

2.2.2 through 2.4.1 - No modifications.

ARTICLE 3 - CONTRACTOR

3.1.1 - Amend as an addition to the existing with the following:

The word "Contractor" as used herein refers to the individual, partnership, firm or corporation whose proposal for the work contemplated in the accompanying plans and specifications is accepted. The Contractor shall finance his own operations, shall operate at all times as an independent Contractor and never as an agent of the Owner.

3.1.2 through 3.3.3 - No modifications.

3.4.1 - Amend as an addition to the existing with the following:

- A. All labor in connection with this work, including trucking, handling, installation, etc., shall be done by skilled craftsmen, normally employed by the various construction trades.
- B. The Contractor shall provide, at his sole cost, all labor, transportation, materials, apparatus, utilities scaffolding, and utensils necessarily and reasonably implied on the drawings and/or in this specification as belonging to the work.
- C. All materials and workmanship shall be of the best of their several kinds. Unless otherwise specified, all materials shall be new and the Contractor, if required, shall furnish satisfactory evidence of their quality.

3.4.2 through 3.4.3 - No modifications.

3.5.1 - Amend as an addition to the existing with the following:

- A. Submit to the Engineer all guarantees and warranties that have been specified in various, individual sections of the specifications as follows:
 - 1. The Contractor shall furnish to the Owner a written a guarantee covering all defects of materials and workmanship and that the work will be watertight for a period of two years from the date of final completion of the project. Should any defects in materials or workmanship develop within this time, all repairs and replacements shall be made at no additional cost to the Owner.
 - 2. The roofing system manufacturer shall provide a warranty that guarantees the complete roofing system for a period as stipulated in the applicable roofing technical specification. During these periods, manufacturer shall make good at his own expense any faults or imperfections that may arise due to defects in all components of the systems supplied by the roofing manufacturer to include all related accessories involved in their installation. Such repairs shall be made as promptly after observation as weather and site conditions permit.
- B. The Engineer must be present during the final inspection by the manufacturer of the roofing system. Inspection shall not be made unless a minimum of 48 hours advance notice is given to the office of the Engineer. Inspections made without the presence of the Engineer will not be valid and reinspection by the manufacturer shall be required.
- C. The Contractor shall include all guarantee and warranty costs including inspection and reinspection fees, if required, in his base bid.

3.6.1 through 3.7.4 - No modifications.

3.8.1 through 3.8.3 - Delete completely.

3.9.1 through 3.18.2 - No modifications.

ARTICLE 4 - ADMINISTRATION OF CONTRACT

4.1.1 - *Delete and replace with the following:*

The word "Architect" or "Engineer" or "Designer" as used herein refers to Russo Barr Associates, Inc., 55 Sixth Road, Suite 200, Woburn, Massachusetts 01801 (telephone 781-273-1537).

4.1.2 - Delete completely.

4.1.3 - No modifications.

4.2.1 through 4.3.7.2 - Delete completely.

4.3.8 through 4.6.6 - No modifications.

ARTICLE 5 - SUBCONTRACTORS

5.1.1 - Amend as an addition to the existing with the following:

The word "Subcontractor" as used herein refers to the individual, partnership, firm or corporation to whom portions of the work and/or materials included in this Contract are awarded by the General Contractor with the approval of the Engineer. The Engineer retains the right to disapprove the use of any subcontractor whom he considers to be unqualified to perform the specified work in a timely and professional manner in accordance with all drawings and specifications.

5.1.2 through 5.4.1 - No modifications.

5.4.2 - Delete completely.

ARTICLE 6 - CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

6.1.1 through 6.1.3 - No modifications.

6.1.4 - Delete completely.

6.2.1 through 6.3.1 - No modifications.

ARTICLE 7 - CHANGES IN WORK

7.1.1 through 7.1.3 - No modifications.

7.2.1 Amend as an addition to the existing with the following:

- A. A change order is a written order to the Contractor, signed by the Owner, authorizing a change in the Work, the Contract Price or the final completion date.
- B. The Engineer, without invalidating the Contract Documents, may issue orders making changes by altering, adding to, or deducting from the Work. A change in the Work may also necessitate an adjustment in the Contract Price.

No change in the Work shall proceed and no claim for additional moneys for such change or for any extra work, so-called, will be valid unless such work is done pursuant to a written order from the Engineer to the Contractor signed by an Owner's Representative. Advance approval is not necessary for extra work required to protect life or property under emergency conditions. The Engineer shall determine in each case whether the Work done without written approval

was of an emergency nature and whether it is to be reimbursed and a Change Order issued.

- C. No extra work shall be undertaken or subcontracted for or materials ordered unless first approved in writing by the Owner and Engineer. By submitting a bid, the bidder agrees that he has examined the site, and the specifications and the drawings are adequate, and the required results can be produced under the drawings and specifications. No claim for extra work will be allowed because of alleged impossibilities in the production of the results specified or because of inadequate or improper plans and specifications, and wherever a result is required, the successful bidder shall furnish any and all labor and material and make any changes needed to produce, to the satisfaction of the Engineer, the required results.
- D. Where additional work is required by the Owner, and this work does not alter in the opinion of the Engineer, the scope of the contract work, the Owner may elect to pay for all this work in the following manner:
- 1) The cost of Work for any change order may be by one of the following agreed upon means: a lump sum agreed to by the Owner, a unit quantity and unit price adjustment or actual costs and a percentage fee for overhead and profit. Such percentage fee shall not exceed ten percent (10%) of the direct costs of labor and material for work performed by the Contractor. The direct cost of labor is the actual cost of labor excluding fringe benefits, payroll taxes, and insurance.

For work performed by a Subcontractor, the cost to the Owner shall be determined by a lump sum agreed to by all parties or the direct costs of the Subcontractor, plus a percentage fee not to exceed ten percent (10%) for the Subcontractor's overhead and profit, plus a fee not to exceed ten percent (10%) for the Contractor's overhead and profit.
 - 2) If deductions are ordered, a credit shall be computed on the same basis as increases for extra work.

7.2.2 through 7.4.1 - No modifications.

ARTICLE 8 - TIME

8.1.1 through 8.2.1 - No modifications.

8.2.2 - Delete completely.

8.2.3 through 8.3.3 - No modifications.

ARTICLE 9 - PAYMENTS AND COMPLETION

9.1.1 through 9.2.1 - No modifications.

9.3.1 - Delete and replace with the following:

A. On or before the last day of each calendar month, the Contractor shall submit to the Engineer an itemized Application for Payment showing value of all work completed and material or equipment for inclusion in the work delivered to the site during the previous month.

- 1) Application for Payment: Contractor shall submit to the Engineer the Contractor's Application for Payment which shall state the amount to which each subcontractor, supplier of materials and workman is then entitled and which shall incorporate the following documents:
 - a) An Affidavit in the form of Exhibit "A" (Application for Payment).
 - b) Waivers of Lien in the form of Exhibit "B" (Discharge of Lien by Subcontractor) from each material supplier and subcontractor to whom payment has been made, according to the affidavit.
 - c) Waiver of Lien by the Contractor in the form of Exhibit "C" (Discharge of Lien by Contractor).
 - d) Satisfactory bills of sale for all materials and equipment, etc. for which payment is requested and which have not yet been incorporated in the work; said bills of sale to evidence ownership of such material to the Owner.

Application for payment shall not be accepted unless all information requested by the Engineer is provided. Contractor shall use only forms provided by the Engineer. Others forms, invoices, waivers, etc. shall not be acceptable (see Supplements to Contract Forms).

- 2) Any amount paid to the Contractor by the Owner pursuant to such Application for Payment shall be made to the Contractor for each purpose, in the first instance, and before any other use of such amount by the Contractor, of enabling the Contractor to pay any subcontractor, supplier of materials or workman who has not there-to-fore been paid the amount to which he is entitled to as shown in said application, and the Contractor shall forthwith upon receipt of such amount from the Owner shall make all such payments. The Contractor agrees that he shall, with respect to the entire amount so paid to him, be a Trustee, for the benefit of the Owner, each unpaid subcontractor, supplier of materials and/or workman, subject to all the obligations customarily imposed upon Trustees by the Law of that State in which the work is to be performed and in addition to such obligations, the Contractor, as Trustee, shall make such payment to such subcontractors, supplier of materials and workmen, shall furnish to the Owner such releases or waivers of lien and such indication of title as the Owner may reasonably require.

- 3) Failure of the Engineer in any particular instance to require full compliance with the provisions of the first paragraph of this Article shall not constitute a waiver of Contractor's obligations to comply in full in any other instance, and Contractor's acceptance of any payment for which application has not been made in the manner described above shall constitute (i) a warranty and representation by Contractor that all workmen have been paid for the work so done by them which is covered by such payments and that all subcontractors and suppliers of materials have been paid, or shall forthwith be paid, out of the proceeds of such payment to the Contractor, and (ii) a binding agreement by the Contractor to hold and apply such payment subject to and upon all of the terms and conditions set forth in the next preceding paragraph of this Article.
 - 4) Owner reserves the right, to be exercised in Owner's sole and absolute discretion, to make the whole or any part of any payment required hereunder directly to any subcontractor or material man entitled to payment for any work done or materials or equipment supplied for the completion of the contract or to make payments jointly to Contractor and any subcontractor or material man, and any payment so made by Owner shall be credited toward any amount payable by Owner to Contractor.
 - 5) Contractor shall have one separate item for the group of general conditions, overhead and profit and shall prorate this on monthly and final requisitions in an equitable fashion. He shall show only true subcontracted costs, and in the event of dispute shall show signed subcontracts and invoices to Engineer.
- B. Upon receipt of each complete and properly filled out Application for Payment, the Engineer will verify quantities of labor, material and equipment and the amount therefore and shall certify for payment that portion of total amount of application that he finds to be due.
- 1) The properly filled in certificate for payments will be approved and submitted to the Owner by the Engineer within seven days of receipt by him of same.
 - 2) Contractor shall be responsible for the submission of complete information, including waivers of lien, on the forms provided by the Engineer. Neither Engineer nor Owner shall be responsible for delay in payments due to the Contractor's failure to comply with the Contract Documents.
- C. Within thirty days after the approval by the Engineer of the Contractor's Application for Payment, the Owner shall make payment to the Contractor of such sum as together with previous amount paid to him shall equal 95% of the amount of said applications approved for payments. The monies retained by the

Owner hereunder shall not be due the Contractor until final until six months after final completion.

- 1) Payments by the Owner shall not constitute acceptance of the work nor waivers or rights or redress against the Contractors for any failure to comply with contract documents.
- 2) Payments may be withheld by the Owner on account of a) defective work not remedied; b) claims or liens filed; or c) unsatisfactory prosecution of the Work by the Contractor.

9.3.1.1 through 9.6.4 - No modifications.

9.6.5 - Delete completely.

9.6.6 through 9.6.7 - No modifications.

9.7.1 - Delete the words "or awarded by arbitration,"

9.8.1 through 9.8.5 - No modifications.

9.9.1 - Delete completely.

9.9.2 through 9.10.3 - No modifications.

9.10.4 Amend as an addition to the existing with the following:

Final payment shall be made to the Contractor only after occurrence of the events described below:

- A. Acceptance of the Work by the Engineer and the Owner as fully performed under the Contract Documents.
- B. Submission by the Contractor to the Owner or the Engineer of:
 - 1) The consent of surety, if any; and
 - 2) Written assignment to the Owner by all Subcontractors and suppliers of material and equipment of all warranties and guarantees including manufacturers in the form approved by the Owner; and
 - 3) Three copies of any Maintenance Manuals issued by any Manufacturer and/or Supplier, if any; and
 - 4) The Project Record reproducible drawings if required by the Contract Documents; and
 - 5) Written Full and Final Discharge of all liens and/or requests to file mechanics, materials, suppliers, and like liens against the Project, signed

by each subcontractor and material man who performed labor or furnished materials in connection with the Work. If any subcontractor or material or equipment supplier refuses to furnish a release or waiver, the Contractor shall furnish a bond satisfactory to the Owner to indemnify him against any such possible lien; and

- 6) If required by the Owner, other data establishing payment or satisfaction of such obligations.
- C. Final payment date, under terms of the contract, will be 45 days after completion of all punch list items and shall apply to subcontractors as well as the General Contractor. The General Contractor and all subcontractors must furnish the Owner with a Full and Final Discharge of Lien prior to release of final payment. See Exhibits "D" and "E" attached hereto.
- D. All Contractor's bills for additional work and any adjustments in contract price must be submitted for approval of the Engineer before the above-mentioned 45 day period begins.
- E. Final payment shall not be processed until all required guarantee forms, in the form approved by the Owner, are fully executed by the Contractor and supplied to the Owner.
- F. No payment hereunder, nor occupancy of the facility or any part thereof shall be construed as an acceptance of any Work or a waiver of any rights of the Owner in the Contract Documents or at law.

9.10.5 – Delete completely

ARTICLE 10 - PROTECTION OF PERSONS AND PROPERTY

10.1.1 through 10.6.1 - No modifications.

ARTICLE 11 - INSURANCE BONDS

11.1.1 - Amend as an addition to the existing with the following:

The word "Owner" as used herein these specifications or on the drawings refers to City of Salem, MA.

- A. The Contractor shall indemnify and hold harmless the Owner and the Engineer and their Agents and employees from and against all claims, damages, losses and expenses including attorneys' fees arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss or expense (1) is attributable to personal injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of the use resulting therefrom, and (2) is caused in whole or in part by any negligent

act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder. In any and all claims against the Owner or the Engineer or any of their Agents or employees by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, in the indemnification obligation under this Paragraph shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under worker's compensation acts, disability benefits acts or other employee benefit acts.

The obligation of the Contractor under this Paragraph shall not extend to the liability of the Engineer, his Agents or employees arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications, or (2) the giving or the failure to give directions or instructions by the Engineer, his Agents or employees, provided such giving or failure to give is the primary cause of the injury or damage.

Any insurance that insures to the benefit of the Owner must also insure to the benefit and protection of any other party that Owner must protect in accordance with its lease agreements at this location, and if any certificates are to be issued to the Owner, these parties are to be protected as their interests appear. These parties are: the Owners of Record and any tenants, which may be affected by the work. **Owner and Engineer shall be named as additional insureds.**

The insurance shall be written for not less than the following:

- | | | |
|----|--|-------------|
| A. | Workers' Compensation | |
| | 1) State | Statutory |
| | 2) Applicable Federal (e.g., Longshoremen's) | Statutory |
| | 3) Employer's Liability | |
| | Each accident | \$1,000,000 |
| | Disease policy limit | \$ 500,000 |
| | Disease per employee | \$ 100,000 |
| B. | Comprehensive General Liability (including Premises-Operations; Independent Contractor' Protective; Products and Completed Operation Broad Form Property Damage) | |
| | 1) Bodily Injury | |
| | a) Each Person | \$1,000,000 |
| | b) Annual Aggregate | \$1,000,000 |
| | 2) Property Damage | |
| | a) Each Occurrence | \$1,000,000 |
| | b) Annual Aggregate | \$1,000,000 |
| C. | Contractual Liability | |
| | 1) Bodily Injury | |

a) Each Occurrence	\$1,000,000
2) Property Damage	
a) Each Occurrence	\$1,000,000
b) Annual Aggregate	\$1,000,000
D. Personal Injury with Employment Exclusion deleted	
1) Annual Aggregate	\$1,000,000
E. Completed Operations and Products Liability shall be maintained for one year after final payment	
F. Property Damage Liability Insurance shall include coverage for the following hazards:	
Explosion	\$1,000,000
Collapse	\$1,000,000
Underground	\$1,000,000
G. Comprehensive Automobile Liability	
1) Bodily Injury	
a) Each Person	\$1,000,000
b) Each Occurrence	\$1,000,000
2) Property Damage	
a) Each Occurrence	\$1,000,000
H. If an exposure exists, Aircraft Liability (owned and non-owned) and Watercraft Liability (owned and non-owned) with limited approved by the Owner shall be provided.	
I. The Contractor shall carry insurance in addition to that specifically named above as follows:	
1) Coverage on all building materials on equipment at the job site	\$1,000,000
J. Umbrella Liability, BI + PD combined	\$5,000,000

11.1.2 through 11.5.1 - No modifications.

11.5.2 Amend as an addition to the existing the following:

- A. The Contractor shall furnish prior to the signing of the Contract, Bonds covering the faithful performance of the Contract and the Payment of all obligations arising thereunder and also a lien bond.
- B. The Bonds shall be in such form as the Owner may prescribe and with such sureties as he may approve.
- C. The cost of the Bonds shall be included in the base and alternate bids.

ARTICLE 12 - UNCOVERING AND CORRECTION OF WORK

12.1.1 through 12.3.1 - No modifications.

ARTICLE 13 - MISCELLANEOUS PROVISIONS

13.1.1 through 13.7.1 - No modifications.

13.8.1 Amend as an addition to the existing with the following:

- A. The Contractor shall be responsible for the proper care and protection of all portions of the construction and all materials delivered and work performed by the Contractor until the completion and acceptance of the construction as a whole, and the construction shall be delivered at completion in an uninjured condition.
- B. The Contractor hereby agrees, for the consideration herein provided, not to record in any Registry of Deeds or City or Town Hall, this agreement or any notice of the existence of this agreement, or its intention to claim a lien upon said premises. If the said Contractor shall violate the terms of this paragraph, said breach shall entitle the said Owner to cancel this agreement, and all monies which may be due to or owing to the said Contractor may be retained by said Owner as liquidated damages for said breach, or at their election the Owner may terminate the employment of the Contractor and proceed with the completion of the work as provided for in Article 14 in the AIA General Conditions. If this paragraph shall be declared void or unlawful by a proper tribunal, then it is expressly agreed that no other part of this contract shall in anyway be waived or affected thereby and Owner shall have the right to make further payments.
- C. The Contractor agrees that he is as fully responsible to the Owner for the acts and omissions of his subcontractors and of persons directly or indirectly employed by them as he is for the acts and omissions of persons directly employed by him.
- D. Neither the Contractor nor any subcontractor shall supply, sell or permit the use of intoxicating liquors or illegal drugs upon or about the Work or the site.
- E. Manufacturer's Directions: All manufactured articles, material, and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer unless specified to the contrary.
- F. Occupational Safety and Health Act: The Contractor agrees to defend, indemnify and hold the Owner harmless for all loss, claims, fines, demands, costs, injuries, penalties or damages resulting from failure to comply by the Contractor or Subcontractors with standards as set out in the Williams-Steiger Occupational Safety and Health Act of 1970 which are within his control or that of his subcontractors.

- G. Contractor shall take all necessary precautions for the safety of, and shall provide and continuously maintain the necessary protection to prevent damage, injury or loss to:
- 1) All workmen, Owner's employees, the public and all other persons who may be affected thereby, and
 - 2) All the Work, all materials or equipment to be incorporated therein, whether in storage on or off the site, and
 - 3) Any other property at the site or adjacent thereto including but not limited to, trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.
- H. The Contractor shall notify Owners of adjacent property and utilities when prosecution of the Work may affect them.
- I. All damage, injury or loss to any property referred to in this paragraph, caused whether through omission or commission, directly or indirectly, in whole or in part, by the Contractor, any Subcontractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, shall be remedied by Contractor and Contractor shall bear the entire responsibility for same, except damage or loss attributable to the fault of Drawings or Specifications or to the sole negligence of the Owner or the Engineer or anyone employed by either of them or anyone for whose acts either of them may be liable.
- J. Work must be totally completed before Contractor leaves project.
- K. The Contractor agrees not to disclose to others any confidential information or to make use of it, except on the Owner's behalf, either during or after performance of the Work whether or not such information is produced by the Contractor's own efforts.

The Contractor also agrees not to disclose to other any information with respect to development, ways of doing business, etc. which in themselves are generally known but whose use by the Owner is not generally known. The term confidential information, as used herein, includes confidential information of the Owner or confidential information entrusted to the Owner by others and includes matters not generally known outside the Owner's organization such as manufacturing procedures, expansion plans, development relating to existing and future products, services marketed or used by the Owner and data relating to the general business operations of the Owner concerning sales, costs, profits, organization, customer lists, pricing methods, etc. The Contractor shall impose the same obligations of Non-Disclosure on all other employed, or retained, to

perform any work for the Contractor in connection with the Work contemplated under the Contract.

ARTICLE 14 - TERMINATION OR SUSPENSION OF THE CONTRACT

14.1.1 - Delete completely.

14.1.2 through 14.4.3 - No modifications.

END OF SECTION

SECTION 00900

SUPPLEMENTS TO CONTRACT FORMS

	<u>Page</u>
1. Application for Payment (AIA G702 & G703)	1-2
2. Waivers of Lien (Exhibits "B" - "E")	3-6

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APPLICATION AND CERTIFICATE FOR PAYMENT

AIA DOCUMENT G702

(Instructions on reverse side)

PAGE ONE OF PAGES

TO (OWNER):

PROJECT:

APPLICATION NO:

Distribution to:
 OWNER
 ARCHITECT
 CONTRACTOR

FROM (CONTRACTOR):

VIA (ARCHITECT):

PERIOD TO:

ARCHITECT'S

PROJECT NO:

CONTRACT FOR:

CONTRACT DATE:

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for Payment, as shown below, in connection with the Contract. Continuation Sheet, AIA Document G703, is attached.

CHANGE ORDER SUMMARY		ADDITIONS	DEDUCTIONS
Change Orders approved in previous months by Owner			
TOTAL			
Approved this Month			
Number	Date	Approved	
TOTALS			
Net change by Change Orders			

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

State of: _____ County of: _____

Subscribed and sworn to before me this _____ day of _____, 19____

Notary Public:

My Commission expires:

By: _____ Date: _____

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising the above application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED \$ _____

(Attach explanation if amount certified differs from the amount applied for.)

ARCHITECT:

By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

CONTINUATION SHEET

AIA DOCUMENT G703 (Instructions on reverse side) PAGE OF PAGES

AIA Document G702, APPLICATION AND CERTIFICATE FOR PAYMENT, containing Contractor's signed Certification is attached.

In tabulations below, amounts are stated to the nearest dollar.

Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NUMBER:

APPLICATION DATE:

PERIOD TO:

ARCHITECT'S PROJECT NO:

A ITEM NO.	B DESCRIPTION OF WORK	C SCHEDULED VALUE	E WORK COMPLETED		F MATERIALS PRESENTLY STORED (NOT IN D OR E)	G TOTAL COMPLETED AND STORED TO DATE (D + E + F)	H BALANCE TO FINISH (C - G)	I RETAINAGE
			D FROM PREVIOUS APPLICATION (D + E)	THIS PERIOD				

EXHIBIT "B"

DISCHARGE OF LIEN BY SUBCONTRACTOR

KNOW ALL MEN BY THESE PRESENTS that _____
Subcontractor for _____ work in connection with the
construction, alteration or repair of the building(s) on the land hereinafter
described, acknowledges receipt of the sum of \$ _____ paid by
_____, Owner of said land (or by
General Contractor for said work of construction, hereby waive, relinquish,
release, and discharge all liens and claims of liens which said Subcontractor
may now have and (to the extent permitted by law) which it may hereafter acquire
for such work, including the portion thereof not yet completed or paid for.
The Subcontractor's work is being/has been performed on the premises
described below:

IN WITNESS WHEREOF said Subcontractor has executed/has caused to be
executed this instrument under seal on the _____ day of _____ 20 .

Signed, Sealed and Delivered in the
Presence of

(Signature of duly authorized repre-
sentative of Subcontractor)

STATE OF _____)
COUNTY OF _____) ss

20

Then personally appeared before me _____,
(Name of Person Acknowledging Release)

_____ of _____
(Office or Position) (Name of Subcontractor)

signer and sealer of the foregoing instrument, and acknowledged the same to be
his free act and deed and the free act and deed of

(Name of Subcontractor)

(Notary Public)

(Seal)

My commission expires _____

EXHIBIT "C"

DISCHARGE OF LIEN BY CONTRACTOR

KNOW ALL MEN BY THESE PRESENTS THAT _____ Contractor for general construction work in connection with the construction, alteration or repair of the building(s) on the land hereinafter described, acknowledges receipt of the sum of \$ _____ paid by _____, Owner of said land for said work of construction, alteration or repair, and said Contractor, in consideration of said payment does hereby waive, relinquish, release and discharge all liens and claims of liens which said Contractor may now have and (to the extent permitted by law) which it may hereafter acquire for such work, including the portion not yet completed or paid for.

The Contractor's work is being/has been performed on the premises described below:

IN WITNESS WHEREOF said Contractor has executed/has caused to be executed this instrument under seal on the _____ day of _____ 20 .

Signed, Sealed and Delivered in the Presence of

(Signature of duly authorized representative of General Contractor)

STATE OF _____)
COUNTY OF _____) ss

20

Then personally appeared before me _____

(Name of Person Acknowledging Release)

_____ of _____,
(Office or Position) (Name of Contractor)

signer and sealer of the foregoing instrument, and acknowledged the same to be his free act and deed and the free act and deed of

(Name of Contractor)

(Notary Public)

(Seal)

My commission expires _____

EXHIBIT "D"
FULL AND FINAL DISCHARGE OF LIEN BY CONTRACTOR

KNOW ALL MEN BY THESE PRESENTS THAT _____ Contractor for general construction work in connection with the construction, alteration or repair of the building(s) on the land herein described, acknowledges receipt of the sum of \$ _____ paid by _____, Owner of said land for said work of construction, alteration or repair, and said Contractor, in consideration of said payment does hereby waive, relinquish, release and discharge all liens and claims of liens which said Contractor may now have and (to the extent permitted by law) which it may hereafter acquire for such work, including the portion thereof not yet completed or paid for.

The Contractor also agrees that the sum stated above represents full and final payment including the base contract, all change orders and claims.

The Contractor also agrees to relinquish his final rights, titles and interests in this project for the amount stated above, and agrees not to make any future claim to the Owner, in the net total amount of \$ _____ which represents the final contract sum.

The Contractor's work is being/has been performed on the premises described below:

IN WITNESS WHEREOF said Contractor has executed/has caused to be executed this instrument under seal on the _____ day of _____ 20 .

Signed, Sealed and Delivered in the Presence of

(Name) (Title) (Corporate seal)

STATE OF _____)
COUNTY OF _____) ss

20

Then personally appeared before me _____

(Name of Person Acknowledging Release)

of _____

(Name of Contractor)

signer and sealer of the foregoing instrument, and acknowledged the same to be his free act and deed and the free act and deed of

(Name of Contractor)

(Notary Public)

(Seal)

My commission expires _____

EXHIBIT "E"
FULL AND FINAL DISCHARGE OF LIEN BY SUBCONTRACTOR

KNOW ALL MEN BY THESE PRESENTS THAT _____ Subcontractor for _____ work in connection with the construction, alteration or repair of the building(s) on the land hereinafter described acknowledges receipt of the sum of \$ _____ paid by _____, general contractor for said work of construction, alteration or repair, and said Subcontractor, in consideration of said payment does hereby waive, relinquish, release and discharge all liens and claims of liens which said Subcontractor may now have and (to the extent permitted by law) which it may hereafter acquire for such work, including the portion thereof not yet completed or paid for.

The Subcontractor also agrees that the sum stated above represents full and final payment including the base contract, all change orders and claims.

The Subcontractor also agrees to relinquish his final rights, titles and interests in this project for the amount stated above, and agrees not to make any future claim to the Owner, over and above the sum stated in his final requisition dated _____ in the total amount of \$ _____ which represents the final contract sum.

The Subcontractor's work is being/has been performed on the premises described below:

IN WITNESS WHEREOF said Contractor has executed/has caused to be executed this instrument under seal on the _____ day of _____

Signed, Sealed and Delivered in the Presence of

(Name) (Title) (Corporate seal)

STATE OF _____)
COUNTY OF _____) ss

20

Then personally appeared before me _____

(Name of Person Acknowledging Release)

of _____

(Name of Contractor)

signer and sealer of the foregoing instrument, and acknowledged the same to be his free act and deed and the free act and deed of

(Name of Contractor)

(Notary Public)

(Seal)

My commission expires _____

**The Massachusetts Prevailing Wage Law
M.G.L. c. 149, §§26-27**

NOTICE TO AWARDING AUTHORITIES

- The enclosed wage schedule applies only to the specific project listed at the top of the schedule, and these rates will remain in effect for the duration of the project, except in the case of multi-year projects. For projects lasting longer than one year, awarding authorities must request updated rates.
- You should request an updated wage schedule from the Department of Labor Standards if you have not opened bids or selected a contractor within 90 days of the date of issuance of the enclosed wage schedule.
- The wage schedule shall be incorporated in any advertisement or call for bids for the project for which it has been issued.
- Once a contractor has been selected by the awarding authority, the wage schedule shall be made a part of the contract for that project.

NOTICE TO CONTRACTORS

- The enclosed wage schedule must be posted in a conspicuous place at the work site during the life of the project.
- The wages listed on the enclosed wage schedule must be paid to employees on public works projects regardless of whether they are employed by the prime contractor, a filed sub-bidder, or any sub-contractor.
- The enclosed wage schedule applies to all phases of the project, including the final clean-up. Contractors whose only role is to perform final clean-up must pay their employees according to this wage schedule.
- All apprentices must be registered with the Massachusetts Division of Apprenticeship Standards (DAS) in order to be paid at the lower apprentice rates. All apprentices must keep his/her apprentice identification card on his/her person during all work hours. If a worker is not registered with DAS, they must be paid the "total rate" listed on the wage schedule regardless of experience or skill level. For further information, please call 617-626-5409, or write to:

DAS
19 Staniford Street, 1st Floor
P.O. Box 146759,
Boston, MA 02114.



CHARLES D. BAKER
Governor

KARYN E. POLITO
Lt. Governor

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DEPARTMENT OF LABOR STANDARDS

Prevailing Wage Rates

As determined by the Director under the provisions of the
Massachusetts General Laws, Chapter 149, Sections 26 to 27H

RONALD L. WALKER, II
Secretary

WILLIAM D MCKINNEY
Director

Awarding Authority: City of Salem
Contract Number: **City/Town:** SALEM
Description of Work: Scope of work includes removal of the existing roof and replacement with an adhere PVC roof system complete with flashings. Scope of work includes replacement of certain HVAC and exhaust fans.
Job Location: 95 Margin Street

Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

- This wage schedule applies only to the specific project referenced at the top of this page and uniquely identified by the “Wage Request Number” on all pages of this schedule.
- An Awarding Authority must request an updated wage schedule from the Department of Labor Standards (“DLS”) if it has not opened bids or selected a contractor within 90 days of the date of issuance of the wage schedule. For CM AT RISK projects (bid pursuant to G.L. c.149A), the earlier of: (a) the execution date of the GMP Amendment, or (b) the bid for the first construction scope of work must be within 90-days of the wage schedule issuance date.
- The wage schedule shall be incorporated in any advertisement or call for bids for the project as required by M.G.L. c. 149, § 27. The wage schedule shall be made a part of the contract awarded for the project. The wage schedule must be posted in a conspicuous place at the work site for the life of the project in accordance with M.G.L. c. 149 § 27. The wages listed on the wage schedule must be paid to employees performing construction work on the project whether they are employed by the prime contractor, a filed sub-bidder, or any sub-contractor.
- All apprentices working on the project are required to be registered with the Massachusetts Department of Labor Standards, Division of Apprentice Standards (DLS/DAS). Apprentice must keep his/her apprentice identification card on his/her person during all work hours on the project. An apprentice registered with DAS may be paid the lower apprentice wage rate at the applicable step as provided on the prevailing wage schedule. **Any apprentice not registered with DLS/DAS regardless of whether or not they are registered with any other federal, state, local, or private agency must be paid the journeyworker's rate for the trade.**
- The wage rates will remain in effect for the duration of the project, except in the case of multi-year public construction projects. For construction projects lasting longer than one year, awarding authorities must request an updated wage schedule. Awarding authorities are required to request these updates no later than two weeks before the anniversary of the date the contract was executed by the awarding authority and the general contractor. For multi-year CM AT RISK projects, awarding authority must request an annual update no later than two weeks before the anniversary date, determined as the earlier of: (a) the execution date of the GMP Amendment, or (b) the execution date of the first amendment to permit procurement of construction services. Contractors are required to obtain the wage schedules from awarding authorities, and to pay no less than these rates to covered workers. The annual update requirement is not applicable to 27F “rental of equipment” contracts.
- Every contractor or subcontractor which performs construction work on the project is required to submit weekly payroll reports and a Statement of Compliance directly to the awarding authority by mail or email and keep them on file for three years. Each weekly payroll report must contain: the employee’s name, address, occupational classification, hours worked, and wages paid. Do not submit weekly payroll reports to DLS. A sample of a payroll reporting form may be obtained at <http://www.mass.gov/dols/pw>.
- Contractors with questions about the wage rates or classifications included on the wage schedule have an affirmative obligation to inquire with DLS at (617) 626-6953.
- Employees not receiving the prevailing wage rate set forth on the wage schedule may report the violation to the Fair Labor Division of the office of the Attorney General at (617) 727-3465.
- Failure of a contractor or subcontractor to pay the prevailing wage rates listed on the wage schedule to all employees who perform construction work on the project is a violation of the law and subjects the contractor or subcontractor to civil and

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Construction						
(2 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	12/01/2016	\$32.15	\$10.91	\$10.89	\$0.00	\$53.95
(3 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	12/01/2016	\$32.22	\$10.91	\$10.89	\$0.00	\$54.02
(4 & 5 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	12/01/2016	\$32.34	\$10.91	\$10.89	\$0.00	\$54.14
ADS/SUBMERSIBLE PILOT <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2015	\$88.29	\$9.80	\$19.23	\$0.00	\$117.32
For apprentice rates see "Apprentice- PILE DRIVER"						
AIR TRACK OPERATOR <i>LABORERS - ZONE 2</i>	12/01/2016	\$33.15	\$7.45	\$12.65	\$0.00	\$53.25
For apprentice rates see "Apprentice- LABORER"						
ASBESTOS REMOVER - PIPE / MECH. EQUIPT. <i>HEAT & FROST INSULATORS LOCAL 6 (BOSTON)</i>	12/01/2016	\$33.90	\$11.50	\$7.10	\$0.00	\$52.50
	06/01/2017	\$34.90	\$11.50	\$7.10	\$0.00	\$53.50
	12/01/2017	\$35.90	\$11.50	\$7.10	\$0.00	\$54.50
	06/01/2018	\$36.90	\$11.50	\$7.10	\$0.00	\$55.50
	12/01/2018	\$37.90	\$11.50	\$7.10	\$0.00	\$56.50
	06/01/2019	\$38.90	\$11.50	\$7.10	\$0.00	\$57.50
	12/01/2019	\$39.90	\$11.50	\$7.10	\$0.00	\$58.50
	06/01/2020	\$40.90	\$11.50	\$7.10	\$0.00	\$59.50
	12/01/2020	\$41.90	\$11.50	\$7.10	\$0.00	\$60.50
ASPHALT RAKER <i>LABORERS - ZONE 2</i>	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75
For apprentice rates see "Apprentice- LABORER"						
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2016	\$45.38	\$10.00	\$15.25	\$0.00	\$70.63
	06/01/2017	\$46.38	\$10.00	\$15.25	\$0.00	\$71.63
	12/01/2017	\$47.38	\$10.00	\$15.25	\$0.00	\$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BACKHOE/FRONT-END LOADER <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2016	\$45.38	\$10.00	\$15.25	\$0.00	\$70.63
	06/01/2017	\$46.38	\$10.00	\$15.25	\$0.00	\$71.63
	12/01/2017	\$47.38	\$10.00	\$15.25	\$0.00	\$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BARCO-TYPE JUMPING TAMPER <i>LABORERS - ZONE 2</i>	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER <i>LABORERS - ZONE 2</i>	12/01/2016	\$33.15	\$7.45	\$12.65	\$0.00	\$53.25
For apprentice rates see "Apprentice- LABORER"						
BOILER MAKER <i>BOILERMAKERS LOCAL 29</i>	01/01/2016	\$41.62	\$6.97	\$16.21	\$0.00	\$64.80
	01/01/2017	\$42.92	\$6.97	\$16.21	\$0.00	\$66.10

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - BOILERMAKER - Local 29

Effective Date - 01/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	\$27.05	\$6.97	\$10.54	\$0.00	\$44.56
2	65	\$27.05	\$6.97	\$10.54	\$0.00	\$44.56
3	70	\$29.13	\$6.97	\$11.35	\$0.00	\$47.45
4	75	\$31.22	\$6.97	\$12.16	\$0.00	\$50.35
5	80	\$33.30	\$6.97	\$12.97	\$0.00	\$53.24
6	85	\$35.38	\$6.97	\$13.78	\$0.00	\$56.13
7	90	\$37.46	\$6.97	\$14.59	\$0.00	\$59.02
8	95	\$39.54	\$6.97	\$15.40	\$0.00	\$61.91

Effective Date - 01/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	\$27.90	\$6.97	\$10.54	\$0.00	\$45.41
2	65	\$27.90	\$6.97	\$10.54	\$0.00	\$45.41
3	70	\$30.04	\$6.97	\$11.35	\$0.00	\$48.36
4	75	\$32.19	\$6.97	\$12.16	\$0.00	\$51.32
5	80	\$34.34	\$6.97	\$12.97	\$0.00	\$54.28
6	85	\$36.48	\$6.97	\$13.78	\$0.00	\$57.23
7	90	\$38.63	\$6.97	\$14.59	\$0.00	\$60.19
8	95	\$40.77	\$6.97	\$15.40	\$0.00	\$63.14

Notes:

Apprentice to Journeyworker Ratio:1:5

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING)	08/01/2016	\$50.76	\$10.18	\$19.22	\$0.00	\$80.16
BRICKLAYERS LOCAL 3 (LYNN)	02/01/2017	\$51.33	\$10.18	\$19.22	\$0.00	\$80.73

Apprentice - BRICK/PLASTER/CEMENT MASON - Local 3 Lynn

Effective Date - 08/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.38	\$10.18	\$19.22	\$0.00	\$54.78
2	60	\$30.46	\$10.18	\$19.22	\$0.00	\$59.86
3	70	\$35.53	\$10.18	\$19.22	\$0.00	\$64.93
4	80	\$40.61	\$10.18	\$19.22	\$0.00	\$70.01
5	90	\$45.68	\$10.18	\$19.22	\$0.00	\$75.08

Effective Date - 02/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.67	\$10.18	\$19.22	\$0.00	\$55.07
2	60	\$30.80	\$10.18	\$19.22	\$0.00	\$60.20
3	70	\$35.93	\$10.18	\$19.22	\$0.00	\$65.33
4	80	\$41.06	\$10.18	\$19.22	\$0.00	\$70.46
5	90	\$46.20	\$10.18	\$19.22	\$0.00	\$75.60

Notes:

Apprentice to Journeyworker Ratio:1:5

BULLDOZER/GRADER/SCRAPER <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2016	\$44.94	\$10.00	\$15.25	\$0.00	\$70.19
	06/01/2017	\$45.93	\$10.00	\$15.25	\$0.00	\$71.18
	12/01/2017	\$46.92	\$10.00	\$15.25	\$0.00	\$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
CAISSON & UNDERPINNING BOTTOM MAN <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2016	\$37.95	\$7.45	\$14.00	\$0.00	\$59.40
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING LABORER <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2016	\$36.80	\$7.45	\$14.00	\$0.00	\$58.25
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING TOP MAN <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2016	\$36.80	\$7.45	\$14.00	\$0.00	\$58.25
For apprentice rates see "Apprentice- LABORER"						
CARBIDE CORE DRILL OPERATOR <i>LABORERS - ZONE 2</i>	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75
For apprentice rates see "Apprentice- LABORER"						
CARPENTER <i>CARPENTERS -ZONE 2 (Eastern Massachusetts)</i>	09/01/2016	\$37.80	\$9.90	\$17.00	\$0.00	\$64.70
	03/01/2017	\$38.77	\$9.90	\$17.00	\$0.00	\$65.67
	09/01/2017	\$39.78	\$9.90	\$17.00	\$0.00	\$66.68
	03/01/2018	\$40.78	\$9.90	\$17.00	\$0.00	\$67.68
	09/01/2018	\$41.82	\$9.90	\$17.00	\$0.00	\$68.72
	03/01/2019	\$42.85	\$9.90	\$17.00	\$0.00	\$69.75

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - CARPENTER - Zone 2 Eastern MA

Effective Date - 09/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$18.90	\$9.90	\$1.63	\$0.00	\$30.43
2	60	\$22.68	\$9.90	\$1.63	\$0.00	\$34.21
3	70	\$26.46	\$9.90	\$12.11	\$0.00	\$48.47
4	75	\$28.35	\$9.90	\$12.11	\$0.00	\$50.36
5	80	\$30.24	\$9.90	\$13.74	\$0.00	\$53.88
6	80	\$30.24	\$9.90	\$13.74	\$0.00	\$53.88
7	90	\$34.02	\$9.90	\$15.37	\$0.00	\$59.29
8	90	\$34.02	\$9.90	\$15.37	\$0.00	\$59.29

Effective Date - 03/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.39	\$9.90	\$1.63	\$0.00	\$30.92
2	60	\$23.26	\$9.90	\$1.63	\$0.00	\$34.79
3	70	\$27.14	\$9.90	\$12.11	\$0.00	\$49.15
4	75	\$29.08	\$9.90	\$12.11	\$0.00	\$51.09
5	80	\$31.02	\$9.90	\$13.74	\$0.00	\$54.66
6	80	\$31.02	\$9.90	\$13.74	\$0.00	\$54.66
7	90	\$34.89	\$9.90	\$15.37	\$0.00	\$60.16
8	90	\$34.89	\$9.90	\$15.37	\$0.00	\$60.16

Notes:

Apprentice to Journeyworker Ratio:1:5

CEMENT MASONRY/PLASTERING	07/01/2016	\$44.69	\$12.20	\$19.33	\$1.30	\$77.52
BRICKLAYERS LOCAL 3 (LYNN)	01/01/2017	\$45.67	\$12.20	\$19.41	\$1.30	\$78.58
	07/01/2017	\$46.30	\$12.20	\$19.41	\$1.30	\$79.21
	01/01/2018	\$46.54	\$12.20	\$19.41	\$1.30	\$79.45
	07/01/2018	\$46.79	\$12.20	\$19.41	\$1.30	\$79.70
	01/01/2019	\$47.03	\$12.20	\$19.41	\$1.30	\$79.94
	07/01/2019	\$47.27	\$12.20	\$19.41	\$1.30	\$80.18
	01/01/2020	\$47.52	\$12.20	\$19.41	\$1.30	\$80.43

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - CEMENT MASONRY/PLASTERING - Eastern Mass (Lynn)

Effective Date - 07/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$22.35	\$12.20	\$12.33	\$0.00	\$46.88
2	60	\$26.81	\$12.20	\$14.33	\$1.30	\$54.64
3	65	\$29.05	\$12.20	\$15.33	\$1.30	\$57.88
4	70	\$31.28	\$12.20	\$16.33	\$1.30	\$61.11
5	75	\$33.52	\$12.20	\$17.33	\$1.30	\$64.35
6	80	\$35.75	\$12.20	\$18.33	\$1.30	\$67.58
7	90	\$40.22	\$12.20	\$19.33	\$1.30	\$73.05

Effective Date - 01/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$22.84	\$12.20	\$12.41	\$0.00	\$47.45
2	60	\$27.40	\$12.20	\$14.41	\$1.30	\$55.31
3	65	\$29.69	\$12.20	\$15.41	\$1.30	\$58.60
4	70	\$31.97	\$12.20	\$16.41	\$1.30	\$61.88
5	75	\$34.25	\$12.20	\$17.41	\$1.30	\$65.16
6	80	\$36.54	\$12.20	\$18.41	\$1.30	\$68.45
7	90	\$41.10	\$12.20	\$19.41	\$1.30	\$74.01

Notes:

Steps 3,4 are 500 hrs. All other steps are 1,000 hrs.

Apprentice to Journeyworker Ratio:1:3

CHAIN SAW OPERATOR LABORERS - ZONE 2	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75
For apprentice rates see "Apprentice- LABORER"						
CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES OPERATING ENGINEERS LOCAL 4	12/01/2016	\$46.38	\$10.00	\$15.25	\$0.00	\$71.63
	06/01/2017	\$47.38	\$10.00	\$15.25	\$0.00	\$72.63
	12/01/2017	\$48.38	\$10.00	\$15.25	\$0.00	\$73.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
COMPRESSOR OPERATOR OPERATING ENGINEERS LOCAL 4	12/01/2016	\$31.17	\$10.00	\$15.25	\$0.00	\$56.42
	06/01/2017	\$31.86	\$10.00	\$15.25	\$0.00	\$57.11
	12/01/2017	\$32.55	\$10.00	\$15.25	\$0.00	\$57.80
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DELEADER (BRIDGE) PAINTERS LOCAL 35 - ZONE 2	07/01/2016	\$50.46	\$7.85	\$16.10	\$0.00	\$74.41
	01/01/2017	\$51.41	\$7.85	\$16.10	\$0.00	\$75.36

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - PAINTER Local 35 - BRIDGES/TANKS

Effective Date - 07/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.23	\$7.85	\$0.00	\$0.00	\$33.08
2	55	\$27.75	\$7.85	\$3.66	\$0.00	\$39.26
3	60	\$30.28	\$7.85	\$3.99	\$0.00	\$42.12
4	65	\$32.80	\$7.85	\$4.32	\$0.00	\$44.97
5	70	\$35.32	\$7.85	\$14.11	\$0.00	\$57.28
6	75	\$37.85	\$7.85	\$14.44	\$0.00	\$60.14
7	80	\$40.37	\$7.85	\$14.77	\$0.00	\$62.99
8	90	\$45.41	\$7.85	\$15.44	\$0.00	\$68.70

Effective Date - 01/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.71	\$7.85	\$0.00	\$0.00	\$33.56
2	55	\$28.28	\$7.85	\$3.66	\$0.00	\$39.79
3	60	\$30.85	\$7.85	\$3.99	\$0.00	\$42.69
4	65	\$33.42	\$7.85	\$4.32	\$0.00	\$45.59
5	70	\$35.99	\$7.85	\$14.11	\$0.00	\$57.95
6	75	\$38.56	\$7.85	\$14.44	\$0.00	\$60.85
7	80	\$41.13	\$7.85	\$14.77	\$0.00	\$63.75
8	90	\$46.27	\$7.85	\$15.44	\$0.00	\$69.56

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

DEMO: ADZEMAN LABORERS - ZONE 2	12/01/2015	\$35.50	\$7.45	\$13.55	\$0.00	\$56.50
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For apprentice rates see "Apprentice- LABORER"

DEMO: BACKHOE/LOADER/HAMMER OPERATOR LABORERS - ZONE 2	12/01/2015	\$36.50	\$7.45	\$13.55	\$0.00	\$57.50
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For apprentice rates see "Apprentice- LABORER"

DEMO: BURNERS LABORERS - ZONE 2	12/01/2015	\$36.25	\$7.45	\$13.55	\$0.00	\$57.25
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For apprentice rates see "Apprentice- LABORER"

DEMO: CONCRETE CUTTER/SAWYER LABORERS - ZONE 2	12/01/2015	\$36.50	\$7.45	\$13.55	\$0.00	\$57.50
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For apprentice rates see "Apprentice- LABORER"

DEMO: JACKHAMMER OPERATOR LABORERS - ZONE 2	12/01/2015	\$36.25	\$7.45	\$13.55	\$0.00	\$57.25
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For apprentice rates see "Apprentice- LABORER"

DEMO: WRECKING LABORER LABORERS - ZONE 2	12/01/2015	\$35.50	\$7.45	\$13.55	\$0.00	\$56.50
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For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DIRECTIONAL DRILL MACHINE OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2016	\$44.94	\$10.00	\$15.25	\$0.00	\$70.19
	06/01/2017	\$45.93	\$10.00	\$15.25	\$0.00	\$71.18
	12/01/2017	\$46.92	\$10.00	\$15.25	\$0.00	\$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DIVER <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2015	\$58.86	\$9.80	\$19.23	\$0.00	\$87.89
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2015	\$42.04	\$9.80	\$19.23	\$0.00	\$71.07
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2015	\$63.06	\$9.80	\$19.23	\$0.00	\$92.09
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER/SLURRY (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2015	\$88.23	\$9.80	\$19.23	\$0.00	\$117.26
For apprentice rates see "Apprentice- PILE DRIVER"						
DRAWBRIDGE OPERATOR (Construction) <i>ELECTRICIANS LOCAL 103</i>	09/01/2016	\$47.13	\$13.00	\$17.41	\$0.00	\$77.54
	03/01/2017	\$48.33	\$13.00	\$17.45	\$0.00	\$78.78
	09/01/2017	\$49.28	\$13.00	\$17.48	\$0.00	\$79.76
	03/01/2018	\$50.48	\$13.00	\$17.51	\$0.00	\$80.99
	09/01/2018	\$51.67	\$13.00	\$17.55	\$0.00	\$82.22
	03/01/2019	\$52.87	\$13.00	\$17.59	\$0.00	\$83.46
For apprentice rates see "Apprentice- ELECTRICIAN"						
ELECTRICIAN <i>ELECTRICIANS LOCAL 103</i>	09/01/2016	\$47.13	\$13.00	\$17.41	\$0.00	\$77.54
	03/01/2017	\$48.33	\$13.00	\$17.45	\$0.00	\$78.78
	09/01/2017	\$49.28	\$13.00	\$17.48	\$0.00	\$79.76
	03/01/2018	\$50.48	\$13.00	\$17.51	\$0.00	\$80.99
	09/01/2018	\$51.67	\$13.00	\$17.55	\$0.00	\$82.22
	03/01/2019	\$52.87	\$13.00	\$17.59	\$0.00	\$83.46

Apprentice - ELECTRICIAN - Local 103

Effective Date - 09/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$18.85	\$13.00	\$0.57	\$0.00	\$32.42
2	40	\$18.85	\$13.00	\$0.57	\$0.00	\$32.42
3	45	\$21.21	\$13.00	\$13.36	\$0.00	\$47.57
4	45	\$21.21	\$13.00	\$13.36	\$0.00	\$47.57
5	50	\$23.57	\$13.00	\$13.73	\$0.00	\$50.30
6	55	\$25.92	\$13.00	\$14.09	\$0.00	\$53.01
7	60	\$28.28	\$13.00	\$14.46	\$0.00	\$55.74
8	65	\$30.63	\$13.00	\$14.83	\$0.00	\$58.46
9	70	\$32.99	\$13.00	\$15.20	\$0.00	\$61.19
10	75	\$35.35	\$13.00	\$15.57	\$0.00	\$63.92

Effective Date - 03/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$19.33	\$13.00	\$0.58	\$0.00	\$32.91
2	40	\$19.33	\$13.00	\$0.58	\$0.00	\$32.91
3	45	\$21.75	\$13.00	\$13.37	\$0.00	\$48.12
4	45	\$21.75	\$13.00	\$13.37	\$0.00	\$48.12
5	50	\$24.17	\$13.00	\$13.75	\$0.00	\$50.92
6	55	\$26.58	\$13.00	\$14.11	\$0.00	\$53.69
7	60	\$29.00	\$13.00	\$14.48	\$0.00	\$56.48
8	65	\$31.41	\$13.00	\$14.85	\$0.00	\$59.26
9	70	\$33.83	\$13.00	\$15.22	\$0.00	\$62.05
10	75	\$36.25	\$13.00	\$15.60	\$0.00	\$64.85

Notes: :
App Prior 1/1/03; 30/35/40/45/50/55/65/70/75/80

Apprentice to Journeyworker Ratio:2:3***

ELEVATOR CONSTRUCTOR	01/01/2016	\$54.53	\$14.43	\$14.96	\$0.00	\$83.92
ELEVATOR CONSTRUCTORS LOCAL 4	01/01/2017	\$55.86	\$15.28	\$15.71	\$0.00	\$86.85

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - ELEVATOR CONSTRUCTOR - Local 4

Effective Date - 01/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$27.27	\$14.43	\$0.00	\$0.00	\$41.70
2	55	\$29.99	\$14.43	\$14.96	\$0.00	\$59.38
3	65	\$35.44	\$14.43	\$14.96	\$0.00	\$64.83
4	70	\$38.17	\$14.43	\$14.96	\$0.00	\$67.56
5	80	\$43.62	\$14.43	\$14.96	\$0.00	\$73.01

Effective Date - 01/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$27.93	\$15.28	\$0.00	\$0.00	\$43.21
2	55	\$30.72	\$15.28	\$15.71	\$0.00	\$61.71
3	65	\$36.31	\$15.28	\$15.71	\$0.00	\$67.30
4	70	\$39.10	\$15.28	\$15.71	\$0.00	\$70.09
5	80	\$44.69	\$15.28	\$15.71	\$0.00	\$75.68

Notes:

Steps 1-2 are 6 mos.; Steps 3-5 are 1 year

Apprentice to Journeyworker Ratio:1:1

ELEVATOR CONSTRUCTOR HELPER <i>ELEVATOR CONSTRUCTORS LOCAL 4</i>	01/01/2016	\$38.17	\$14.43	\$14.96	\$0.00	\$67.56
	01/01/2017	\$39.10	\$15.28	\$15.71	\$0.00	\$70.09
For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"						
FENCE & GUARD RAIL ERECTOR <i>LABORERS - ZONE 2</i>	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75
For apprentice rates see "Apprentice- LABORER"						
FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i>	11/01/2016	\$41.37	\$10.00	\$15.15	\$0.00	\$66.52
	05/01/2017	\$42.25	\$10.00	\$15.15	\$0.00	\$67.40
	11/01/2017	\$42.98	\$10.00	\$15.15	\$0.00	\$68.13
	05/01/2018	\$43.69	\$10.00	\$15.15	\$0.00	\$68.84
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i>	11/01/2016	\$42.82	\$10.00	\$15.15	\$0.00	\$67.97
	05/01/2017	\$43.71	\$10.00	\$15.15	\$0.00	\$68.86
	11/01/2017	\$44.44	\$10.00	\$15.15	\$0.00	\$69.59
	05/01/2018	\$45.16	\$10.00	\$15.15	\$0.00	\$70.31
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIELD ENG.ROD PERSON-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i>	11/01/2016	\$21.98	\$10.00	\$15.15	\$0.00	\$47.13
	05/01/2017	\$22.51	\$10.00	\$15.15	\$0.00	\$47.66
	11/01/2017	\$22.93	\$10.00	\$15.15	\$0.00	\$48.08
	05/01/2018	\$23.36	\$10.00	\$15.15	\$0.00	\$48.51
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIRE ALARM INSTALLER <i>ELECTRICIANS LOCAL 103</i>	09/01/2016	\$47.13	\$13.00	\$17.41	\$0.00	\$77.54
	03/01/2017	\$48.33	\$13.00	\$17.45	\$0.00	\$78.78
	09/01/2017	\$49.28	\$13.00	\$17.48	\$0.00	\$79.76
	03/01/2018	\$50.48	\$13.00	\$17.51	\$0.00	\$80.99
	09/01/2018	\$51.67	\$13.00	\$17.55	\$0.00	\$82.22
	03/01/2019	\$52.87	\$13.00	\$17.59	\$0.00	\$83.46
For apprentice rates see "Apprentice- ELECTRICIAN"						
FIRE ALARM REPAIR / MAINTENANCE <i>LOCAL 103</i> / COMMISSIONING <i>ELECTRICIANS</i>	09/01/2016	\$35.35	\$13.00	\$15.57	\$0.00	\$63.92
	03/01/2017	\$36.25	\$13.00	\$15.60	\$0.00	\$64.85
	09/01/2017	\$36.96	\$13.00	\$15.62	\$0.00	\$65.58
	03/01/2018	\$37.86	\$13.00	\$15.65	\$0.00	\$66.51
	09/01/2018	\$38.75	\$13.00	\$15.67	\$0.00	\$67.42
	03/01/2019	\$39.65	\$13.00	\$15.70	\$0.00	\$68.35
For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"						
FIREMAN (ASST. ENGINEER) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2016	\$37.65	\$10.00	\$15.25	\$0.00	\$62.90
	06/01/2017	\$38.49	\$10.00	\$15.25	\$0.00	\$63.74
	12/01/2017	\$39.32	\$10.00	\$15.25	\$0.00	\$64.57
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FLAGGER & SIGNALER <i>LABORERS - ZONE 2</i>	12/01/2016	\$20.50	\$7.45	\$12.65	\$0.00	\$40.60
For apprentice rates see "Apprentice- LABORER"						
FLOORCOVERER <i>FLOORCOVERERS LOCAL 2168 ZONE 1</i>	03/01/2016	\$42.13	\$9.80	\$17.62	\$0.00	\$69.55

Apprentice - FLOORCOVERER - Local 2168 Zone 1

Effective Date - 03/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.07	\$9.80	\$1.79	\$0.00	\$32.66
2	55	\$23.17	\$9.80	\$1.79	\$0.00	\$34.76
3	60	\$25.28	\$9.80	\$12.25	\$0.00	\$47.33
4	65	\$27.38	\$9.80	\$12.25	\$0.00	\$49.43
5	70	\$29.49	\$9.80	\$14.04	\$0.00	\$53.33
6	75	\$31.60	\$9.80	\$14.04	\$0.00	\$55.44
7	80	\$33.70	\$9.80	\$15.83	\$0.00	\$59.33
8	85	\$35.81	\$9.80	\$15.83	\$0.00	\$61.44

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

FORK LIFT/CHERRY PICKER <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2016	\$45.38	\$10.00	\$15.25	\$0.00	\$70.63
	06/01/2017	\$46.38	\$10.00	\$15.25	\$0.00	\$71.63
	12/01/2017	\$47.38	\$10.00	\$15.25	\$0.00	\$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GENERATOR/LIGHTING PLANT/HEATERS <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2016	\$31.17	\$10.00	\$15.25	\$0.00	\$56.42
	06/01/2017	\$31.86	\$10.00	\$15.25	\$0.00	\$57.11
	12/01/2017	\$32.55	\$10.00	\$15.25	\$0.00	\$57.80

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS)	07/01/2016	\$39.96	\$7.85	\$16.10	\$0.00	\$63.91
GLAZIERS LOCAL 35 (ZONE 2)	01/01/2017	\$40.91	\$7.85	\$16.10	\$0.00	\$64.86

Apprentice - GLAZIER - Local 35 Zone 2

Effective Date - 07/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.98	\$7.85	\$0.00	\$0.00	\$27.83
2	55	\$21.98	\$7.85	\$3.66	\$0.00	\$33.49
3	60	\$23.98	\$7.85	\$3.99	\$0.00	\$35.82
4	65	\$25.97	\$7.85	\$4.32	\$0.00	\$38.14
5	70	\$27.97	\$7.85	\$14.11	\$0.00	\$49.93
6	75	\$29.97	\$7.85	\$14.44	\$0.00	\$52.26
7	80	\$31.97	\$7.85	\$14.77	\$0.00	\$54.59
8	90	\$35.96	\$7.85	\$15.44	\$0.00	\$59.25

Effective Date - 01/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.46	\$7.85	\$0.00	\$0.00	\$28.31
2	55	\$22.50	\$7.85	\$3.66	\$0.00	\$34.01
3	60	\$24.55	\$7.85	\$3.99	\$0.00	\$36.39
4	65	\$26.59	\$7.85	\$4.32	\$0.00	\$38.76
5	70	\$28.64	\$7.85	\$14.11	\$0.00	\$50.60
6	75	\$30.68	\$7.85	\$14.44	\$0.00	\$52.97
7	80	\$32.73	\$7.85	\$14.77	\$0.00	\$55.35
8	90	\$36.82	\$7.85	\$15.44	\$0.00	\$60.11

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

HOISTING ENGINEER/CRANES/GRADALLS	12/01/2016	\$45.38	\$10.00	\$15.25	\$0.00	\$70.63
OPERATING ENGINEERS LOCAL 4	06/01/2017	\$46.38	\$10.00	\$15.25	\$0.00	\$71.63
	12/01/2017	\$47.38	\$10.00	\$15.25	\$0.00	\$72.63

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - OPERATING ENGINEERS - Local 4

Effective Date - 12/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$24.96	\$10.00	\$0.00	\$0.00	\$34.96
2	60	\$27.23	\$10.00	\$15.25	\$0.00	\$52.48
3	65	\$29.50	\$10.00	\$15.25	\$0.00	\$54.75
4	70	\$31.77	\$10.00	\$15.25	\$0.00	\$57.02
5	75	\$34.04	\$10.00	\$15.25	\$0.00	\$59.29
6	80	\$36.30	\$10.00	\$15.25	\$0.00	\$61.55
7	85	\$38.57	\$10.00	\$15.25	\$0.00	\$63.82
8	90	\$40.84	\$10.00	\$15.25	\$0.00	\$66.09

Effective Date - 06/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$25.51	\$10.00	\$0.00	\$0.00	\$35.51
2	60	\$27.83	\$10.00	\$15.25	\$0.00	\$53.08
3	65	\$30.15	\$10.00	\$15.25	\$0.00	\$55.40
4	70	\$32.47	\$10.00	\$15.25	\$0.00	\$57.72
5	75	\$34.79	\$10.00	\$15.25	\$0.00	\$60.04
6	80	\$37.10	\$10.00	\$15.25	\$0.00	\$62.35
7	85	\$39.42	\$10.00	\$15.25	\$0.00	\$64.67
8	90	\$41.74	\$10.00	\$15.25	\$0.00	\$66.99

Notes:

Apprentice to Journeyworker Ratio:1:6

HVAC (DUCTWORK) SHEETMETAL WORKERS LOCAL 17 - A	11/01/2016	\$43.40	\$10.70	\$23.07	\$2.32	\$79.49
	02/01/2017	\$44.50	\$10.70	\$23.07	\$2.32	\$80.59
	08/01/2017	\$45.60	\$10.70	\$23.07	\$2.32	\$81.69
	02/01/2018	\$46.75	\$10.70	\$23.07	\$2.32	\$82.84

For apprentice rates see "Apprentice- SHEET METAL WORKER"

HVAC (ELECTRICAL CONTROLS) ELECTRICIANS LOCAL 103	09/01/2016	\$47.13	\$13.00	\$17.41	\$0.00	\$77.54
	03/01/2017	\$48.33	\$13.00	\$17.45	\$0.00	\$78.78
	09/01/2017	\$49.28	\$13.00	\$17.48	\$0.00	\$79.76
	03/01/2018	\$50.48	\$13.00	\$17.51	\$0.00	\$80.99
	09/01/2018	\$51.67	\$13.00	\$17.55	\$0.00	\$82.22
	03/01/2019	\$52.87	\$13.00	\$17.59	\$0.00	\$83.46

For apprentice rates see "Apprentice- ELECTRICIAN"

HVAC (TESTING AND BALANCING - AIR) SHEETMETAL WORKERS LOCAL 17 - A	11/01/2016	\$43.40	\$10.70	\$23.07	\$2.32	\$79.49
	02/01/2017	\$44.50	\$10.70	\$23.07	\$2.32	\$80.59
	08/01/2017	\$45.60	\$10.70	\$23.07	\$2.32	\$81.69
	02/01/2018	\$46.75	\$10.70	\$23.07	\$2.32	\$82.84

For apprentice rates see "Apprentice- SHEET METAL WORKER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
HVAC (TESTING AND BALANCING -WATER) <i>PIPEFITTERS LOCAL 537 (Local 138)</i>	09/01/2016	\$47.86	\$9.70	\$16.14	\$0.00	\$73.70
	03/01/2017	\$48.86	\$9.70	\$16.14	\$0.00	\$74.70
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HVAC MECHANIC <i>PIPEFITTERS LOCAL 537 (Local 138)</i>	09/01/2016	\$47.86	\$9.70	\$16.14	\$0.00	\$73.70
	03/01/2017	\$48.86	\$9.70	\$16.14	\$0.00	\$74.70
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HYDRAULIC DRILLS <i>LABORERS - ZONE 2</i>	12/01/2016	\$33.15	\$7.45	\$12.65	\$0.00	\$53.25
For apprentice rates see "Apprentice- LABORER"						
INSULATOR (PIPES & TANKS) <i>HEAT & FROST INSULATORS LOCAL 6 (BOSTON)</i>	09/01/2016	\$45.09	\$11.75	\$14.20	\$0.00	\$71.04
	09/01/2017	\$47.09	\$11.75	\$14.20	\$0.00	\$73.04
	09/01/2018	\$49.34	\$11.75	\$14.20	\$0.00	\$75.29
	09/01/2019	\$51.84	\$11.75	\$14.20	\$0.00	\$77.79

Apprentice - ASBESTOS INSULATOR (Pipes & Tanks) - Local 6 Boston

Effective Date - 09/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$22.55	\$11.75	\$10.45	\$0.00	\$44.75
2	60	\$27.05	\$11.75	\$11.20	\$0.00	\$50.00
3	70	\$31.56	\$11.75	\$11.95	\$0.00	\$55.26
4	80	\$36.07	\$11.75	\$12.70	\$0.00	\$60.52

Effective Date - 09/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.55	\$11.75	\$10.45	\$0.00	\$45.75
2	60	\$28.25	\$11.75	\$11.20	\$0.00	\$51.20
3	70	\$32.96	\$11.75	\$11.95	\$0.00	\$56.66
4	80	\$37.67	\$11.75	\$12.70	\$0.00	\$62.12

Notes:

Steps are 1 year

Apprentice to Journeyworker Ratio:1:4

IRONWORKER/WELDER <i>IRONWORKERS LOCAL 7 (BOSTON AREA)</i>	09/16/2016	\$44.05	\$7.80	\$20.85	\$0.00	\$72.70
	03/16/2017	\$44.65	\$7.80	\$20.85	\$0.00	\$73.30

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - IRONWORKER - Local 7 Boston

Effective Date - 09/16/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$26.43	\$7.80	\$20.85	\$0.00	\$55.08
2	70	\$30.84	\$7.80	\$20.85	\$0.00	\$59.49
3	75	\$33.04	\$7.80	\$20.85	\$0.00	\$61.69
4	80	\$35.24	\$7.80	\$20.85	\$0.00	\$63.89
5	85	\$37.44	\$7.80	\$20.85	\$0.00	\$66.09
6	90	\$39.65	\$7.80	\$20.85	\$0.00	\$68.30

Effective Date - 03/16/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$26.79	\$7.80	\$20.85	\$0.00	\$55.44
2	70	\$31.26	\$7.80	\$20.85	\$0.00	\$59.91
3	75	\$33.49	\$7.80	\$20.85	\$0.00	\$62.14
4	80	\$35.72	\$7.80	\$20.85	\$0.00	\$64.37
5	85	\$37.95	\$7.80	\$20.85	\$0.00	\$66.60
6	90	\$40.19	\$7.80	\$20.85	\$0.00	\$68.84

Notes:

** Structural 1:6; Ornamental 1:4

Apprentice to Journeyworker Ratio:**

JACKHAMMER & PAVING BREAKER OPERATOR LABORERS - ZONE 2	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75
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For apprentice rates see "Apprentice- LABORER"

LABORER LABORERS - ZONE 2	12/01/2016	\$32.40	\$7.45	\$12.65	\$0.00	\$52.50
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Apprentice - LABORER - Zone 2

Effective Date - 12/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$19.44	\$7.45	\$12.65	\$0.00	\$39.54
2	70	\$22.68	\$7.45	\$12.65	\$0.00	\$42.78
3	80	\$25.92	\$7.45	\$12.65	\$0.00	\$46.02
4	90	\$29.16	\$7.45	\$12.65	\$0.00	\$49.26

Notes:

Apprentice to Journeyworker Ratio:1:5

LABORER: CARPENTER TENDER LABORERS - ZONE 2	12/01/2016	\$32.40	\$7.45	\$12.65	\$0.00	\$52.50
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For apprentice rates see "Apprentice- LABORER"

LABORER: CEMENT FINISHER TENDER LABORERS - ZONE 2	12/01/2016	\$32.40	\$7.45	\$12.65	\$0.00	\$52.50
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Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- LABORER"						
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER <i>LABORERS - ZONE 2</i>	12/01/2015	\$31.35	\$7.45	\$12.60	\$0.00	\$51.40
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER <i>LABORERS - ZONE 2</i>	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75
For apprentice rates see "Apprentice- LABORER"						
LABORER: MULTI-TRADE TENDER <i>LABORERS - ZONE 2</i>	12/01/2016	\$32.40	\$7.45	\$12.65	\$0.00	\$52.50
For apprentice rates see "Apprentice- LABORER"						
LABORER: TREE REMOVER <i>LABORERS - ZONE 2</i>	12/01/2016	\$32.40	\$7.45	\$12.65	\$0.00	\$52.50
This classification applies to all tree work associated with the removal of standing trees, and trimming and removal of branches and limbs when the work is not done for a utility company for the purpose of operation, maintenance or repair of utility company equipment. For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR <i>LABORERS - ZONE 2</i>	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75
For apprentice rates see "Apprentice- LABORER"						
MARBLE & TILE FINISHERS <i>BRICKLAYERS LOCAL 3 - MARBLE & TILE</i>	08/01/2016	\$38.78	\$10.18	\$17.78	\$0.00	\$66.74
	02/01/2017	\$39.24	\$10.18	\$17.78	\$0.00	\$67.20

Apprentice - MARBLE & TILE FINISHER - Local 3 Marble & Tile

Effective Date - 08/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.39	\$10.18	\$17.78	\$0.00	\$47.35
2	60	\$23.27	\$10.18	\$17.78	\$0.00	\$51.23
3	70	\$27.15	\$10.18	\$17.78	\$0.00	\$55.11
4	80	\$31.02	\$10.18	\$17.78	\$0.00	\$58.98
5	90	\$34.90	\$10.18	\$17.78	\$0.00	\$62.86

Effective Date - 02/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.62	\$10.18	\$17.78	\$0.00	\$47.58
2	60	\$23.54	\$10.18	\$17.78	\$0.00	\$51.50
3	70	\$27.47	\$10.18	\$17.78	\$0.00	\$55.43
4	80	\$31.39	\$10.18	\$17.78	\$0.00	\$59.35
5	90	\$35.32	\$10.18	\$17.78	\$0.00	\$63.28

Notes:

Apprentice to Journeyworker Ratio:1:3

MARBLE MASONS, TILELAYERS & TERRAZZO MECH <i>BRICKLAYERS LOCAL 3 - MARBLE & TILE</i>	08/01/2016	\$50.80	\$10.18	\$19.22	\$0.00	\$80.20
	02/01/2017	\$51.37	\$10.18	\$19.22	\$0.00	\$80.77

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - MARBLE-TILE-TERRAZZO MECHANIC - Local 3 Marble & Tile

Effective Date - 08/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.40	\$10.18	\$19.22	\$0.00	\$54.80
2	60	\$30.48	\$10.18	\$19.22	\$0.00	\$59.88
3	70	\$35.56	\$10.18	\$19.22	\$0.00	\$64.96
4	80	\$40.64	\$10.18	\$19.22	\$0.00	\$70.04
5	90	\$45.72	\$10.18	\$19.22	\$0.00	\$75.12

Effective Date - 02/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.69	\$10.18	\$19.22	\$0.00	\$55.09
2	60	\$30.82	\$10.18	\$19.22	\$0.00	\$60.22
3	70	\$35.96	\$10.18	\$19.22	\$0.00	\$65.36
4	80	\$41.10	\$10.18	\$19.22	\$0.00	\$70.50
5	90	\$46.23	\$10.18	\$19.22	\$0.00	\$75.63

Notes:

Apprentice to Journeyworker Ratio:1:5

MECH. SWEEPER OPERATOR (ON CONST. SITES) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2016	\$44.94	\$10.00	\$15.25	\$0.00	\$70.19
	06/01/2017	\$45.93	\$10.00	\$15.25	\$0.00	\$71.18
	12/01/2017	\$46.92	\$10.00	\$15.25	\$0.00	\$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MECHANICS MAINTENANCE <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2016	\$44.94	\$10.00	\$15.25	\$0.00	\$70.19
	06/01/2017	\$45.93	\$10.00	\$15.25	\$0.00	\$71.18
	12/01/2017	\$46.92	\$10.00	\$15.25	\$0.00	\$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MILLWRIGHT (Zone 1) <i>MILLWRIGHTS LOCAL 1121 - Zone 1</i>	04/01/2015	\$37.64	\$9.80	\$16.21	\$0.00	\$63.65
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Apprentice - MILLWRIGHT - Local 1121 Zone 1

Effective Date - 04/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$20.70	\$9.80	\$4.48	\$0.00	\$34.98
2	65	\$24.47	\$9.80	\$13.36	\$0.00	\$47.63
3	75	\$28.23	\$9.80	\$14.18	\$0.00	\$52.21
4	85	\$31.99	\$9.80	\$14.99	\$0.00	\$56.78

Notes:

Steps are 2,000 hours

Apprentice to Journeyworker Ratio:1:5

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
MORTAR MIXER <i>LABORERS - ZONE 2</i>	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75
For apprentice rates see "Apprentice- LABORER"						
OILER (OTHER THAN TRUCK CRANES,GRADALLS) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2016	\$22.96	\$10.00	\$15.25	\$0.00	\$48.21
	06/01/2017	\$23.47	\$10.00	\$15.25	\$0.00	\$48.72
	12/01/2017	\$23.99	\$10.00	\$15.25	\$0.00	\$49.24
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OILER (TRUCK CRANES, GRADALLS) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2016	\$26.94	\$10.00	\$15.25	\$0.00	\$52.19
	06/01/2017	\$27.54	\$10.00	\$15.25	\$0.00	\$52.79
	12/01/2017	\$28.15	\$10.00	\$15.25	\$0.00	\$53.40
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OTHER POWER DRIVEN EQUIPMENT - CLASS II <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2016	\$44.94	\$10.00	\$15.25	\$0.00	\$70.19
	06/01/2017	\$45.93	\$10.00	\$15.25	\$0.00	\$71.18
	12/01/2017	\$46.92	\$10.00	\$15.25	\$0.00	\$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PAINTER (BRIDGES/TANKS) <i>PAINTERS LOCAL 35 - ZONE 2</i>	07/01/2016	\$50.46	\$7.85	\$16.10	\$0.00	\$74.41
	01/01/2017	\$51.41	\$7.85	\$16.10	\$0.00	\$75.36

Apprentice - PAINTER Local 35 - BRIDGES/TANKS

Effective Date - 07/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.23	\$7.85	\$0.00	\$0.00	\$33.08
2	55	\$27.75	\$7.85	\$3.66	\$0.00	\$39.26
3	60	\$30.28	\$7.85	\$3.99	\$0.00	\$42.12
4	65	\$32.80	\$7.85	\$4.32	\$0.00	\$44.97
5	70	\$35.32	\$7.85	\$14.11	\$0.00	\$57.28
6	75	\$37.85	\$7.85	\$14.44	\$0.00	\$60.14
7	80	\$40.37	\$7.85	\$14.77	\$0.00	\$62.99
8	90	\$45.41	\$7.85	\$15.44	\$0.00	\$68.70

Effective Date - 01/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.71	\$7.85	\$0.00	\$0.00	\$33.56
2	55	\$28.28	\$7.85	\$3.66	\$0.00	\$39.79
3	60	\$30.85	\$7.85	\$3.99	\$0.00	\$42.69
4	65	\$33.42	\$7.85	\$4.32	\$0.00	\$45.59
5	70	\$35.99	\$7.85	\$14.11	\$0.00	\$57.95
6	75	\$38.56	\$7.85	\$14.44	\$0.00	\$60.85
7	80	\$41.13	\$7.85	\$14.77	\$0.00	\$63.75
8	90	\$46.27	\$7.85	\$15.44	\$0.00	\$69.56

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Painter (Spray or Sandblast, New) *	07/01/2016	\$41.36	\$7.85	\$16.10	\$0.00	\$65.31
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used. PAINTERS LOCAL 35 - ZONE 2	01/01/2017	\$42.31	\$7.85	\$16.10	\$0.00	\$66.26

Apprentice - PAINTER Local 35 Zone 2 - Spray/Sandblast - New

Effective Date - 07/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.68	\$7.85	\$0.00	\$0.00	\$28.53
2	55	\$22.75	\$7.85	\$3.66	\$0.00	\$34.26
3	60	\$24.82	\$7.85	\$3.99	\$0.00	\$36.66
4	65	\$26.88	\$7.85	\$4.32	\$0.00	\$39.05
5	70	\$28.95	\$7.85	\$14.11	\$0.00	\$50.91
6	75	\$31.02	\$7.85	\$14.44	\$0.00	\$53.31
7	80	\$33.09	\$7.85	\$14.77	\$0.00	\$55.71
8	90	\$37.22	\$7.85	\$15.44	\$0.00	\$60.51

Effective Date - 01/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.16	\$7.85	\$0.00	\$0.00	\$29.01
2	55	\$23.27	\$7.85	\$3.66	\$0.00	\$34.78
3	60	\$25.39	\$7.85	\$3.99	\$0.00	\$37.23
4	65	\$27.50	\$7.85	\$4.32	\$0.00	\$39.67
5	70	\$29.62	\$7.85	\$14.11	\$0.00	\$51.58
6	75	\$31.73	\$7.85	\$14.44	\$0.00	\$54.02
7	80	\$33.85	\$7.85	\$14.77	\$0.00	\$56.47
8	90	\$38.08	\$7.85	\$15.44	\$0.00	\$61.37

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

Painter (Spray or Sandblast, Repaint)	07/01/2016	\$39.42	\$7.85	\$16.10	\$0.00	\$63.37
PAINTERS LOCAL 35 - ZONE 2	01/01/2017	\$40.37	\$7.85	\$16.10	\$0.00	\$64.32

Apprentice - PAINTER Local 35 Zone 2 - Spray/Sandblast - Repaint

Effective Date - 07/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.71	\$7.85	\$0.00	\$0.00	\$27.56
2	55	\$21.68	\$7.85	\$3.66	\$0.00	\$33.19
3	60	\$23.65	\$7.85	\$3.99	\$0.00	\$35.49
4	65	\$25.62	\$7.85	\$4.32	\$0.00	\$37.79
5	70	\$27.59	\$7.85	\$14.11	\$0.00	\$49.55
6	75	\$29.57	\$7.85	\$14.44	\$0.00	\$51.86
7	80	\$31.54	\$7.85	\$14.77	\$0.00	\$54.16
8	90	\$35.48	\$7.85	\$15.44	\$0.00	\$58.77

Effective Date - 01/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.19	\$7.85	\$0.00	\$0.00	\$28.04
2	55	\$22.20	\$7.85	\$3.66	\$0.00	\$33.71
3	60	\$24.22	\$7.85	\$3.99	\$0.00	\$36.06
4	65	\$26.24	\$7.85	\$4.32	\$0.00	\$38.41
5	70	\$28.26	\$7.85	\$14.11	\$0.00	\$50.22
6	75	\$30.28	\$7.85	\$14.44	\$0.00	\$52.57
7	80	\$32.30	\$7.85	\$14.77	\$0.00	\$54.92
8	90	\$36.33	\$7.85	\$15.44	\$0.00	\$59.62

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (TRAFFIC MARKINGS) LABORERS - ZONE 2	12/01/2016	\$32.40	\$7.45	\$12.65	\$0.00	\$52.50
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For Apprentice rates see "Apprentice- LABORER"

PAINTER / TAPER (BRUSH, NEW) *	07/01/2016	\$39.96	\$7.85	\$16.10	\$0.00	\$63.91
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used. PAINTERS LOCAL 35 - ZONE 2	01/01/2017	\$40.91	\$7.85	\$16.10	\$0.00	\$64.86

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - PAINTER - Local 35 Zone 2 - BRUSH NEW

Effective Date - 07/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.98	\$7.85	\$0.00	\$0.00	\$27.83
2	55	\$21.98	\$7.85	\$3.66	\$0.00	\$33.49
3	60	\$23.98	\$7.85	\$3.99	\$0.00	\$35.82
4	65	\$25.97	\$7.85	\$4.32	\$0.00	\$38.14
5	70	\$27.97	\$7.85	\$14.11	\$0.00	\$49.93
6	75	\$29.97	\$7.85	\$14.44	\$0.00	\$52.26
7	80	\$31.97	\$7.85	\$14.77	\$0.00	\$54.59
8	90	\$35.96	\$7.85	\$15.44	\$0.00	\$59.25

Effective Date - 01/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.46	\$7.85	\$0.00	\$0.00	\$28.31
2	55	\$22.50	\$7.85	\$3.66	\$0.00	\$34.01
3	60	\$24.55	\$7.85	\$3.99	\$0.00	\$36.39
4	65	\$26.59	\$7.85	\$4.32	\$0.00	\$38.76
5	70	\$28.64	\$7.85	\$14.11	\$0.00	\$50.60
6	75	\$30.68	\$7.85	\$14.44	\$0.00	\$52.97
7	80	\$32.73	\$7.85	\$14.77	\$0.00	\$55.35
8	90	\$36.82	\$7.85	\$15.44	\$0.00	\$60.11

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, REPAINT) PAINTERS LOCAL 35 - ZONE 2	07/01/2016	\$38.02	\$7.85	\$16.10	\$0.00	\$61.97
	01/01/2017	\$38.97	\$7.85	\$16.10	\$0.00	\$62.92

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - PAINTER Local 35 Zone 2 - BRUSH REPAINT

Effective Date - 07/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.01	\$7.85	\$0.00	\$0.00	\$26.86
2	55	\$20.91	\$7.85	\$3.66	\$0.00	\$32.42
3	60	\$22.81	\$7.85	\$3.99	\$0.00	\$34.65
4	65	\$24.71	\$7.85	\$4.32	\$0.00	\$36.88
5	70	\$26.61	\$7.85	\$14.11	\$0.00	\$48.57
6	75	\$28.52	\$7.85	\$14.44	\$0.00	\$50.81
7	80	\$30.42	\$7.85	\$14.77	\$0.00	\$53.04
8	90	\$34.22	\$7.85	\$15.44	\$0.00	\$57.51

Effective Date - 01/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.49	\$7.85	\$0.00	\$0.00	\$27.34
2	55	\$21.43	\$7.85	\$3.66	\$0.00	\$32.94
3	60	\$23.38	\$7.85	\$3.99	\$0.00	\$35.22
4	65	\$25.33	\$7.85	\$4.32	\$0.00	\$37.50
5	70	\$27.28	\$7.85	\$14.11	\$0.00	\$49.24
6	75	\$29.23	\$7.85	\$14.44	\$0.00	\$51.52
7	80	\$31.18	\$7.85	\$14.77	\$0.00	\$53.80
8	90	\$35.07	\$7.85	\$15.44	\$0.00	\$58.36

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PANEL & PICKUP TRUCKS DRIVER <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	12/01/2012	\$30.28	\$9.07	\$8.00	\$0.00	\$47.35
PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK) <i>PILE DRIVER LOCAL 56 (ZONE 1)</i> For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2015	\$42.04	\$9.80	\$19.23	\$0.00	\$71.07
PILE DRIVER <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2015	\$42.04	\$9.80	\$19.23	\$0.00	\$71.07

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - PILE DRIVER - Local 56 Zone 1

Effective Date - 08/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.02	\$9.80	\$19.23	\$0.00	\$50.05
2	60	\$25.22	\$9.80	\$19.23	\$0.00	\$54.25
3	70	\$29.43	\$9.80	\$19.23	\$0.00	\$58.46
4	75	\$31.53	\$9.80	\$19.23	\$0.00	\$60.56
5	80	\$33.63	\$9.80	\$19.23	\$0.00	\$62.66
6	80	\$33.63	\$9.80	\$19.23	\$0.00	\$62.66
7	90	\$37.84	\$9.80	\$19.23	\$0.00	\$66.87
8	90	\$37.84	\$9.80	\$19.23	\$0.00	\$66.87

Notes:

Apprentice to Journeyworker Ratio:1:3

PIPEFITTER & STEAMFITTER <i>PIPEFITTERS LOCAL 537 (Local 138)</i>	09/01/2016	\$47.86	\$9.70	\$16.14	\$0.00	\$73.70
	03/01/2017	\$48.86	\$9.70	\$16.14	\$0.00	\$74.70

Apprentice - PIPEFITTER Local 537 (Local 138)

Effective Date - 09/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$19.14	\$9.70	\$5.50	\$0.00	\$34.34
2	45	\$21.54	\$9.70	\$16.14	\$0.00	\$47.38
3	60	\$28.72	\$9.70	\$16.14	\$0.00	\$54.56
4	70	\$33.50	\$9.70	\$16.14	\$0.00	\$59.34
5	80	\$38.29	\$9.70	\$16.14	\$0.00	\$64.13

Effective Date - 03/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$19.54	\$9.70	\$5.50	\$0.00	\$34.74
2	45	\$21.99	\$9.70	\$16.14	\$0.00	\$47.83
3	60	\$29.32	\$9.70	\$16.14	\$0.00	\$55.16
4	70	\$34.20	\$9.70	\$16.14	\$0.00	\$60.04
5	80	\$39.09	\$9.70	\$16.14	\$0.00	\$64.93

Notes:
 ** 1:3; 3:15; 1:10 thereafter / Steps are 1 yr.
 Refrig/AC Mechanic **1:1;1:2;2:4;3:6;4:8;5:10;6:12;7:14;8:17;9:20;10:23(Max)

Apprentice to Journeyworker Ratio:**

PIPELAYER <i>LABORERS - ZONE 2</i>	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75
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For apprentice rates see "Apprentice- LABORER"

PLUMBER <i>PLUMBERS & GASFITTERS LOCAL 12 (Local 138)</i>	09/01/2016	\$47.61	\$11.32	\$15.46	\$0.00	\$74.39
	03/01/2017	\$48.61	\$11.32	\$15.46	\$0.00	\$75.39

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - PLUMBER/GASFITTER - Local 12 (Local 138)

Effective Date - 09/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$16.66	\$11.32	\$5.74	\$0.00	\$33.72
2	40	\$19.04	\$11.32	\$6.49	\$0.00	\$36.85
3	55	\$26.19	\$11.32	\$8.73	\$0.00	\$46.24
4	65	\$30.95	\$11.32	\$10.23	\$0.00	\$52.50
5	75	\$35.71	\$11.32	\$11.72	\$0.00	\$58.75

Effective Date - 03/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$17.01	\$11.32	\$5.74	\$0.00	\$34.07
2	40	\$19.44	\$11.32	\$6.49	\$0.00	\$37.25
3	55	\$26.74	\$11.32	\$8.73	\$0.00	\$46.79
4	65	\$31.60	\$11.32	\$10.23	\$0.00	\$53.15
5	75	\$36.46	\$11.32	\$11.72	\$0.00	\$59.50

Notes:
 Steps are 1 yr
 Step 4 with lic\$55.65 Step5 with lic\$61.89

Apprentice to Journeyworker Ratio:1:5

PNEUMATIC CONTROLS (TEMP.) <i>PIPEFITTERS LOCAL 537 (Local 138)</i>	09/01/2016	\$47.86	\$9.70	\$16.14	\$0.00	\$73.70
	03/01/2017	\$48.86	\$9.70	\$16.14	\$0.00	\$74.70
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
PNEUMATIC DRILL/TOOL OPERATOR <i>LABORERS - ZONE 2</i>	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75
For apprentice rates see "Apprentice- LABORER"						
POWDERMAN & BLASTER <i>LABORERS - ZONE 2</i>	12/01/2016	\$33.40	\$7.45	\$12.65	\$0.00	\$53.50
For apprentice rates see "Apprentice- LABORER"						
POWER SHOVEL/DERRICK/TRENCHING MACHINE <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2016	\$45.38	\$10.00	\$15.25	\$0.00	\$70.63
	06/01/2017	\$46.38	\$10.00	\$15.25	\$0.00	\$71.63
	12/01/2017	\$47.38	\$10.00	\$15.25	\$0.00	\$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (CONCRETE) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2016	\$45.38	\$10.00	\$15.25	\$0.00	\$70.63
	06/01/2017	\$46.38	\$10.00	\$15.25	\$0.00	\$71.63
	12/01/2017	\$47.38	\$10.00	\$15.25	\$0.00	\$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2016	\$31.17	\$10.00	\$15.25	\$0.00	\$56.42
	06/01/2017	\$31.86	\$10.00	\$15.25	\$0.00	\$57.11
	12/01/2017	\$32.55	\$10.00	\$15.25	\$0.00	\$57.80
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
READY-MIX CONCRETE DRIVER <i>TEAMSTERS LOCAL 42</i>	05/01/2016	\$24.15	\$8.49	\$10.68	\$0.00	\$43.32
	04/30/2017	\$24.15	\$8.49	\$11.07	\$0.00	\$43.71
	05/01/2017	\$24.21	\$8.49	\$11.54	\$0.00	\$44.24
	04/30/2018	\$24.21	\$8.49	\$11.96	\$0.00	\$44.66
	05/01/2018	\$24.24	\$8.49	\$12.46	\$0.00	\$45.19
	04/30/2019	\$24.24	\$8.49	\$12.92	\$0.00	\$45.65
RECLAIMERS <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2016	\$44.94	\$10.00	\$15.25	\$0.00	\$70.19
	06/01/2017	\$45.93	\$10.00	\$15.25	\$0.00	\$71.18
	12/01/2017	\$46.92	\$10.00	\$15.25	\$0.00	\$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
RESIDENTIAL WOOD FRAME (All Other Work) <i>CARPENTERS -ZONE 2 (Residential Wood)</i>	06/01/2016	\$25.32	\$9.80	\$16.82	\$0.00	\$51.94
RESIDENTIAL WOOD FRAME CARPENTER **	10/01/2016	\$25.69	\$7.07	\$7.18	\$0.00	\$39.94
** The Residential Wood Frame Carpenter classification applies only to the construction of new, wood frame residences that do not exceed four stories including the basement. <i>CARPENTERS -ZONE 2 (Residential Wood)</i>	04/01/2017	\$26.31	\$7.07	\$7.18	\$0.00	\$40.56
	10/01/2017	\$26.93	\$7.07	\$7.18	\$0.00	\$41.18
	04/01/2018	\$27.35	\$7.07	\$7.18	\$0.00	\$41.60
	10/01/2018	\$27.77	\$7.07	\$7.18	\$0.00	\$42.02
	04/01/2019	\$28.20	\$7.07	\$7.18	\$0.00	\$42.45
	10/01/2019	\$28.63	\$7.07	\$7.18	\$0.00	\$42.88

As of 9/1/09 Carpentry work on wood-frame residential WEATHERIZATION projects shall be paid the RESIDENTIAL WOOD FRAME CARPENTER rate.

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - CARPENTER (Residential Wood Frame) - Zone 2

Effective Date - 10/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$15.41	\$7.07	\$0.00	\$0.00	\$22.48
2	60	\$15.41	\$7.07	\$0.00	\$0.00	\$22.48
3	65	\$16.70	\$7.07	\$7.18	\$0.00	\$30.95
4	70	\$17.98	\$7.07	\$7.18	\$0.00	\$32.23
5	75	\$19.27	\$7.07	\$7.18	\$0.00	\$33.52
6	80	\$20.55	\$7.07	\$7.18	\$0.00	\$34.80
7	85	\$21.84	\$7.07	\$7.18	\$0.00	\$36.09
8	90	\$23.12	\$7.07	\$7.18	\$0.00	\$37.37

Effective Date - 04/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$15.79	\$7.07	\$0.00	\$0.00	\$22.86
2	60	\$15.79	\$7.07	\$0.00	\$0.00	\$22.86
3	65	\$17.10	\$7.07	\$7.18	\$0.00	\$31.35
4	70	\$18.42	\$7.07	\$7.18	\$0.00	\$32.67
5	75	\$19.73	\$7.07	\$7.18	\$0.00	\$33.98
6	80	\$21.05	\$7.07	\$7.18	\$0.00	\$35.30
7	85	\$22.36	\$7.07	\$7.18	\$0.00	\$36.61
8	90	\$23.68	\$7.07	\$7.18	\$0.00	\$37.93

Notes:

Apprentice to Journeyworker Ratio:1:5

RIDE-ON MOTORIZED BUGGY OPERATOR <i>LABORERS - ZONE 2</i>	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75
For apprentice rates see "Apprentice- LABORER"						
ROLLER/SPREADER/MULCHING MACHINE <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2016	\$44.94	\$10.00	\$15.25	\$0.00	\$70.19
	06/01/2017	\$45.93	\$10.00	\$15.25	\$0.00	\$71.18
	12/01/2017	\$46.92	\$10.00	\$15.25	\$0.00	\$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
ROOFER (Inc.Roofer Waterproofing &Roofer Damproofg) <i>ROOFERS LOCAL 33</i>	08/01/2016	\$41.11	\$11.00	\$13.00	\$0.00	\$65.11
	02/01/2017	\$42.26	\$11.00	\$13.00	\$0.00	\$66.26
	08/01/2017	\$43.36	\$11.00	\$13.00	\$0.00	\$67.36
	02/01/2018	\$44.51	\$11.00	\$13.00	\$0.00	\$68.51
	08/01/2018	\$45.61	\$11.00	\$13.00	\$0.00	\$69.61
	02/01/2019	\$46.76	\$11.00	\$13.00	\$0.00	\$70.76

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - ROOFER - Local 33

Effective Date - 08/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.56	\$11.00	\$3.44	\$0.00	\$35.00
2	60	\$24.67	\$11.00	\$13.00	\$0.00	\$48.67
3	65	\$26.72	\$11.00	\$13.00	\$0.00	\$50.72
4	75	\$30.83	\$11.00	\$13.00	\$0.00	\$54.83
5	85	\$34.94	\$11.00	\$13.00	\$0.00	\$58.94

Effective Date - 02/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.13	\$11.00	\$3.44	\$0.00	\$35.57
2	60	\$25.36	\$11.00	\$13.00	\$0.00	\$49.36
3	65	\$27.47	\$11.00	\$13.00	\$0.00	\$51.47
4	75	\$31.70	\$11.00	\$13.00	\$0.00	\$55.70
5	85	\$35.92	\$11.00	\$13.00	\$0.00	\$59.92

Notes: ** 1:5, 2:6-10, the 1:10; Reroofing: 1:4, then 1:1
 Step 1 is 2000 hrs.; Steps 2-5 are 1000 hrs.

Apprentice to Journeyworker Ratio:**

ROOFER SLATE / TILE / PRECAST CONCRETE	08/01/2016	\$41.36	\$11.00	\$13.00	\$0.00	\$65.36
ROOFERS LOCAL 33	02/01/2017	\$42.51	\$11.00	\$13.00	\$0.00	\$66.51
	08/01/2017	\$43.61	\$11.00	\$13.00	\$0.00	\$67.61
	02/01/2018	\$44.76	\$11.00	\$13.00	\$0.00	\$68.76
	08/01/2018	\$45.86	\$11.00	\$13.00	\$0.00	\$69.86
	02/01/2019	\$47.01	\$11.00	\$13.00	\$0.00	\$71.01

For apprentice rates see "Apprentice- ROOFER"

SHEETMETAL WORKER	11/01/2016	\$43.40	\$10.70	\$23.07	\$2.32	\$79.49
SHEETMETAL WORKERS LOCAL 17 - A	02/01/2017	\$44.50	\$10.70	\$23.07	\$2.32	\$80.59
	08/01/2017	\$45.60	\$10.70	\$23.07	\$2.32	\$81.69
	02/01/2018	\$46.75	\$10.70	\$23.07	\$2.32	\$82.84

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - SHEET METAL WORKER - Local 17-A

Effective Date - 11/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$17.36	\$10.70	\$5.24	\$0.00	\$33.30
2	40	\$17.36	\$10.70	\$5.24	\$0.00	\$33.30
3	45	\$19.53	\$10.70	\$10.31	\$1.22	\$41.76
4	45	\$19.53	\$10.70	\$10.31	\$1.22	\$41.76
5	50	\$21.70	\$10.70	\$11.21	\$1.31	\$44.92
6	50	\$21.70	\$10.70	\$11.46	\$1.32	\$45.18
7	60	\$26.04	\$10.70	\$13.02	\$1.49	\$51.25
8	65	\$28.21	\$10.70	\$13.93	\$1.59	\$54.43
9	75	\$32.55	\$10.70	\$15.74	\$1.77	\$60.76
10	85	\$36.89	\$10.70	\$17.05	\$1.94	\$66.58

Effective Date - 02/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$17.80	\$10.70	\$5.24	\$0.00	\$33.74
2	40	\$17.80	\$10.70	\$5.24	\$0.00	\$33.74
3	45	\$20.03	\$10.70	\$10.31	\$1.24	\$42.28
4	45	\$20.03	\$10.70	\$10.31	\$1.24	\$42.28
5	50	\$22.25	\$10.70	\$11.21	\$1.32	\$45.48
6	50	\$22.25	\$10.70	\$11.46	\$1.33	\$45.74
7	60	\$26.70	\$10.70	\$13.02	\$1.51	\$51.93
8	65	\$28.93	\$10.70	\$13.93	\$1.61	\$55.17
9	75	\$33.38	\$10.70	\$15.74	\$1.79	\$61.61
10	85	\$37.83	\$10.70	\$17.05	\$1.97	\$67.55

Notes:
Steps are 6 mos.

Apprentice to Journeyworker Ratio:1:4

SIGN ERECTOR PAINTERS LOCAL 35 - ZONE 2	06/01/2013	\$25.81	\$7.07	\$7.05	\$0.00	\$39.93
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Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - SIGN ERECTOR - Local 35 Zone 2

Effective Date - 06/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$12.91	\$7.07	\$0.00	\$0.00	\$19.98
2	55	\$14.20	\$7.07	\$2.45	\$0.00	\$23.72
3	60	\$15.49	\$7.07	\$2.45	\$0.00	\$25.01
4	65	\$16.78	\$7.07	\$2.45	\$0.00	\$26.30
5	70	\$18.07	\$7.07	\$7.05	\$0.00	\$32.19
6	75	\$19.36	\$7.07	\$7.05	\$0.00	\$33.48
7	80	\$20.65	\$7.07	\$7.05	\$0.00	\$34.77
8	85	\$21.94	\$7.07	\$7.05	\$0.00	\$36.06
9	90	\$23.23	\$7.07	\$7.05	\$0.00	\$37.35

Notes:
Steps are 4 mos.

Apprentice to Journeyworker Ratio:1:1

SPECIALIZED EARTH MOVING EQUIP < 35 TONS <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	12/01/2016	\$32.44	\$10.91	\$10.89	\$0.00	\$54.24
SPECIALIZED EARTH MOVING EQUIP > 35 TONS <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	12/01/2016	\$32.73	\$10.91	\$10.89	\$0.00	\$54.53
SPRINKLER FITTER <i>SPRINKLER FITTERS LOCAL 550 - (Section B) Zone 2</i>	10/01/2016	\$49.93	\$8.52	\$17.05	\$0.00	\$75.50
	01/01/2017	\$49.57	\$8.77	\$17.20	\$0.00	\$75.54
	03/01/2017	\$50.47	\$8.77	\$17.20	\$0.00	\$76.44

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - SPRINKLER FITTER - Local 550 (Section B) Zone 2

Effective Date - 10/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$17.48	\$8.52	\$8.55	\$0.00	\$34.55
2	40	\$19.97	\$8.52	\$8.55	\$0.00	\$37.04
3	45	\$22.47	\$8.52	\$8.55	\$0.00	\$39.54
4	50	\$24.97	\$8.52	\$8.55	\$0.00	\$42.04
5	55	\$27.46	\$8.52	\$8.55	\$0.00	\$44.53
6	60	\$29.96	\$8.52	\$10.05	\$0.00	\$48.53
7	65	\$32.45	\$8.52	\$10.05	\$0.00	\$51.02
8	70	\$34.95	\$8.52	\$10.05	\$0.00	\$53.52
9	75	\$37.45	\$8.52	\$10.05	\$0.00	\$56.02
10	80	\$39.94	\$8.52	\$10.05	\$0.00	\$58.51

Effective Date - 01/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$17.35	\$8.77	\$8.70	\$0.00	\$34.82
2	40	\$19.83	\$8.77	\$8.70	\$0.00	\$37.30
3	45	\$22.31	\$8.77	\$8.70	\$0.00	\$39.78
4	50	\$24.79	\$8.77	\$8.70	\$0.00	\$42.26
5	55	\$27.26	\$8.77	\$8.70	\$0.00	\$44.73
6	60	\$29.74	\$8.77	\$10.20	\$0.00	\$48.71
7	65	\$32.22	\$8.77	\$10.20	\$0.00	\$51.19
8	70	\$34.70	\$8.77	\$10.20	\$0.00	\$53.67
9	75	\$37.18	\$8.77	\$10.20	\$0.00	\$56.15
10	80	\$39.66	\$8.77	\$10.20	\$0.00	\$58.63

Notes: Apprentice entered prior 9/30/10:
40/45/50/55/60/65/70/75/80/85
Steps are 850 hours

Apprentice to Journeyworker Ratio:1:3

STEAM BOILER OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2016	\$44.94	\$10.00	\$15.25	\$0.00	\$70.19
	06/01/2017	\$45.93	\$10.00	\$15.25	\$0.00	\$71.18
	12/01/2017	\$46.92	\$10.00	\$15.25	\$0.00	\$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2016	\$44.94	\$10.00	\$15.25	\$0.00	\$70.19
	06/01/2017	\$45.93	\$10.00	\$15.25	\$0.00	\$71.18
	12/01/2017	\$46.92	\$10.00	\$15.25	\$0.00	\$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

TELECOMMUNICATION TECHNICIAN <i>ELECTRICIANS LOCAL 103</i>	09/01/2016	\$35.35	\$13.00	\$15.57	\$0.00	\$63.92
	03/01/2017	\$36.25	\$13.00	\$15.60	\$0.00	\$64.85
	09/01/2017	\$36.96	\$13.00	\$15.62	\$0.00	\$65.58
	03/01/2018	\$37.86	\$13.00	\$15.65	\$0.00	\$66.51
	09/01/2018	\$38.75	\$13.00	\$15.67	\$0.00	\$67.42
	03/01/2019	\$39.65	\$13.00	\$15.70	\$0.00	\$68.35

Apprentice - TELECOMMUNICATION TECHNICIAN - Local 103

Effective Date - 09/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$14.14	\$13.00	\$0.42	\$0.00	\$27.56
2	40	\$14.14	\$13.00	\$0.42	\$0.00	\$27.56
3	45	\$15.91	\$13.00	\$11.53	\$0.00	\$40.44
4	45	\$15.91	\$13.00	\$11.53	\$0.00	\$40.44
5	50	\$17.68	\$13.00	\$11.80	\$0.00	\$42.48
6	55	\$19.44	\$13.00	\$12.07	\$0.00	\$44.51
7	60	\$21.21	\$13.00	\$12.36	\$0.00	\$46.57
8	65	\$22.98	\$13.00	\$12.63	\$0.00	\$48.61
9	70	\$24.75	\$13.00	\$13.91	\$0.00	\$51.66
10	75	\$26.51	\$13.00	\$14.19	\$0.00	\$53.70

Effective Date - 03/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$14.50	\$13.00	\$0.44	\$0.00	\$27.94
2	40	\$14.50	\$13.00	\$0.44	\$0.00	\$27.94
3	45	\$16.31	\$13.00	\$12.54	\$0.00	\$41.85
4	45	\$16.31	\$13.00	\$12.54	\$0.00	\$41.85
5	50	\$18.13	\$13.00	\$12.81	\$0.00	\$43.94
6	55	\$19.94	\$13.00	\$13.09	\$0.00	\$46.03
7	60	\$21.75	\$13.00	\$13.37	\$0.00	\$48.12
8	65	\$23.56	\$13.00	\$13.65	\$0.00	\$50.21
9	70	\$25.38	\$13.00	\$13.93	\$0.00	\$52.31
10	75	\$27.19	\$13.00	\$14.21	\$0.00	\$54.40

Notes:

Apprentice to Journeyworker Ratio:1:1

TERRAZZO FINISHERS	08/01/2016	\$49.70	\$10.18	\$19.22	\$0.00	\$79.10
BRICKLAYERS LOCAL 3 - MARBLE & TILE	02/01/2017	\$50.27	\$10.18	\$19.22	\$0.00	\$79.67

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - TERRAZZO FINISHER - Local 3 Marble & Tile

Effective Date - 08/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.85	\$10.18	\$19.22	\$0.00	\$54.25
2	60	\$29.82	\$10.18	\$19.22	\$0.00	\$59.22
3	70	\$34.79	\$10.18	\$19.22	\$0.00	\$64.19
4	80	\$39.76	\$10.18	\$19.22	\$0.00	\$69.16
5	90	\$44.73	\$10.18	\$19.22	\$0.00	\$74.13

Effective Date - 02/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.14	\$10.18	\$19.22	\$0.00	\$54.54
2	60	\$30.16	\$10.18	\$19.22	\$0.00	\$59.56
3	70	\$35.19	\$10.18	\$19.22	\$0.00	\$64.59
4	80	\$40.22	\$10.18	\$19.22	\$0.00	\$69.62
5	90	\$45.24	\$10.18	\$19.22	\$0.00	\$74.64

Notes:

Apprentice to Journeyworker Ratio:1:3

TEST BORING DRILLER <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2016	\$38.20	\$7.45	\$14.00	\$0.00	\$59.65
For apprentice rates see "Apprentice- LABORER"						
TEST BORING DRILLER HELPER <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2016	\$36.92	\$7.45	\$14.00	\$0.00	\$58.37
For apprentice rates see "Apprentice- LABORER"						
TEST BORING LABORER <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2016	\$36.80	\$7.45	\$14.00	\$0.00	\$58.25
For apprentice rates see "Apprentice- LABORER"						
TRACTORS/PORTABLE STEAM GENERATORS <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2016	\$44.94	\$10.00	\$15.25	\$0.00	\$70.19
	06/01/2017	\$45.93	\$10.00	\$15.25	\$0.00	\$71.18
	12/01/2017	\$46.92	\$10.00	\$15.25	\$0.00	\$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TRAILERS FOR EARTH MOVING EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	12/01/2016	\$33.02	\$10.91	\$10.89	\$0.00	\$54.82
TUNNEL WORK - COMPRESSED AIR <i>LABORERS (COMPRESSED AIR)</i>	12/01/2016	\$49.08	\$7.45	\$14.40	\$0.00	\$70.93
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) <i>LABORERS (COMPRESSED AIR)</i>	12/01/2016	\$51.08	\$7.45	\$14.40	\$0.00	\$72.93
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR <i>LABORERS (FREE AIR TUNNEL)</i>	12/01/2016	\$41.15	\$7.45	\$14.40	\$0.00	\$63.00
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR (HAZ. WASTE) <i>LABORERS (FREE AIR TUNNEL)</i>	12/01/2016	\$43.15	\$7.45	\$14.40	\$0.00	\$65.00
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
VAC-HAUL <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	12/01/2016	\$32.44	\$10.91	\$10.89	\$0.00	\$54.24
WAGON DRILL OPERATOR <i>LABORERS - ZONE 2</i>	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75
For apprentice rates see "Apprentice- LABORER"						
WASTE WATER PUMP OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2016	\$45.38	\$10.00	\$15.25	\$0.00	\$70.63
	06/01/2017	\$46.38	\$10.00	\$15.25	\$0.00	\$71.63
	12/01/2017	\$47.38	\$10.00	\$15.25	\$0.00	\$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
WATER METER INSTALLER <i>PLUMBERS & GASFITTERS LOCAL 12 (Local 138)</i>	09/01/2016	\$47.61	\$11.32	\$15.46	\$0.00	\$74.39
	03/01/2017	\$48.61	\$11.32	\$15.46	\$0.00	\$75.39
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						
Outside Electrical - East						
CABLE TECHNICIAN (Power Zone) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/28/2016	\$26.61	\$7.50	\$1.80	\$0.00	\$35.91
	09/03/2017	\$27.14	\$7.75	\$1.81	\$0.00	\$36.70
For apprentice rates see "Apprentice- LINEMAN"						
CABLEMAN (Underground Ducts & Cables) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/28/2016	\$37.70	\$7.50	\$8.87	\$0.00	\$54.07
	09/03/2017	\$38.45	\$7.75	\$9.53	\$0.00	\$55.73
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN CDL <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/28/2016	\$31.05	\$7.50	\$8.89	\$0.00	\$47.44
	09/03/2017	\$31.66	\$7.75	\$9.44	\$0.00	\$48.85
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN -Inexperienced (<2000 Hrs) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/28/2016	\$24.39	\$7.50	\$1.73	\$0.00	\$33.62
	09/03/2017	\$24.88	\$7.75	\$1.75	\$0.00	\$34.38
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class A CDL) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/28/2016	\$37.70	\$7.50	\$12.95	\$0.00	\$58.15
	09/03/2017	\$38.45	\$7.75	\$13.61	\$0.00	\$59.81
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class B CDL) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/28/2016	\$33.26	\$7.50	\$9.63	\$0.00	\$50.39
	09/03/2017	\$33.92	\$7.75	\$10.21	\$0.00	\$51.88
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/28/2016	\$24.39	\$7.50	\$1.73	\$0.00	\$33.62
	09/03/2017	\$24.88	\$7.75	\$1.75	\$0.00	\$34.38
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN -Inexperienced (<2000 Hrs.) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/28/2016	\$19.96	\$7.50	\$1.60	\$0.00	\$29.06
	09/03/2017	\$20.35	\$7.75	\$1.61	\$0.00	\$29.71
For apprentice rates see "Apprentice- LINEMAN"						
JOURNEYMAN LINEMAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/28/2016	\$44.35	\$7.50	\$15.83	\$0.00	\$67.68
	09/03/2017	\$45.23	\$7.75	\$16.61	\$0.00	\$69.59

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - LINEMAN (Outside Electrical) - East Local 104

Effective Date - 08/28/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$26.61	\$7.50	\$3.30	\$0.00	\$37.41
2	65	\$28.83	\$7.50	\$3.36	\$0.00	\$39.69
3	70	\$31.05	\$7.50	\$3.43	\$0.00	\$41.98
4	75	\$33.26	\$7.50	\$5.00	\$0.00	\$45.76
5	80	\$35.48	\$7.50	\$5.06	\$0.00	\$48.04
6	85	\$37.70	\$7.50	\$5.13	\$0.00	\$50.33
7	90	\$39.92	\$7.50	\$7.20	\$0.00	\$54.62

Effective Date - 09/03/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$27.14	\$7.75	\$3.31	\$0.00	\$38.20
2	65	\$29.40	\$7.75	\$3.38	\$0.00	\$40.53
3	70	\$31.66	\$7.75	\$3.45	\$0.00	\$42.86
4	75	\$33.92	\$7.75	\$5.02	\$0.00	\$46.69
5	80	\$36.18	\$7.75	\$5.09	\$0.00	\$49.02
6	85	\$38.45	\$7.75	\$5.15	\$0.00	\$51.35
7	90	\$40.71	\$7.75	\$7.22	\$0.00	\$55.68

Notes:

Apprentice to Journeyworker Ratio:1:2

TELEDATA CABLE SPLICER
OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104 01/01/2016 \$28.98 \$4.25 \$3.12 \$0.00 \$36.35

TELEDATA LINEMAN/EQUIPMENT OPERATOR
OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104 01/01/2016 \$27.31 \$4.25 \$3.07 \$0.00 \$34.63

TELEDATA WIREMAN/INSTALLER/TECHNICIAN
OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104 01/01/2016 \$27.31 \$4.25 \$3.07 \$0.00 \$34.63

TREE TRIMMER
OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104 01/31/2016 \$18.51 \$3.55 \$0.00 \$0.00 \$22.06

This classification applies only to tree work done: (a) for a utility company, R.E.A. cooperative, or railroad or coal mining company, and (b) for the purpose of operating, maintaining, or repairing the utility company's equipment, and (c) by a person who is using hand or mechanical cutting methods and is not on the ground. This classification does not apply to wholesale tree removal.

TREE TRIMMER GROUNDMAN
OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104 01/31/2016 \$16.32 \$3.55 \$0.00 \$0.00 \$19.87

This classification applies only to tree work done: (a) for a utility company, R.E.A. cooperative, or railroad or coal mining company, and (b) for the purpose of operating, maintaining, or repairing the utility company's equipment, and (c) by a person who is using hand or mechanical cutting methods and is on the ground. This classification does not apply to wholesale tree removal.

Additional Apprentices Information:

Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the pre-determined hourly wage rate established by the Commissioner under the provisions of the M.G.L. c. 149, ss. 26-27D. Apprentices ratios are established by the Division of Apprenticeship Training pursuant to M.G.L. c. 23, ss. 11E-11L.

All apprentices must be registered with the Division of Apprenticeship Training in accordance with M.G.L. c. 23, ss. 11E-11L.

All steps are six months (1000 hours.)

Ratios are expressed in allowable number of apprentices to journeymen or fraction thereof, unless otherwise specified.

** Multiple ratios are listed in the comment field.

*** APP to JM; 1:1, 2:2, 2:3, 3:4, 4:4, 4:5, 4:6, 5:7, 6:7, 6:8, 6:9, 7:10, 8:10, 8:11, 8:12, 9:13, 10:13, 10:14, etc.

**** APP to JM; 1:1, 1:2, 2:3, 2:4, 3:5, 4:6, 4:7, 5:8, 6:9, 6:10, 7:11, 8:12, 8:13, 9:14, 10:15, 10:16, etc.

WEEKLY PAYROLL RECORDS REPORT & STATEMENT OF COMPLIANCE

In accordance with Massachusetts General Law c. 149, §27B, a true and accurate record must be kept of all persons employed on the public works project for which the enclosed rates have been provided. A Payroll Form is available from the Department of Labor Standards (DLS) at www.mass.gov/dols/pw and includes all the information required to be kept by law. Every contractor or subcontractor is required to keep these records and preserve them for a period of three years from the date of completion of the contract.

On a weekly basis, every contractor and subcontractor is required to submit a certified copy of their weekly payroll records to the awarding authority; this includes the payroll forms and the Statement of Compliance form. The certified payroll records must be submitted either by regular mail or by e-mail to the awarding authority. Once collected, the awarding authority is required to preserve those records for three years from the date of completion of the project.

Each such contractor and subcontractor shall furnish weekly **and** within 15 days after completion of its portion of the work, to the awarding authority directly by first-class mail or e-mail, a statement, executed by the contractor, subcontractor or by any authorized officer thereof who supervised the payment of wages, this form, accompanied by their payroll:

STATEMENT OF COMPLIANCE

_____, 20_____

I, _____,
(Name of signatory party) (Title)

do hereby state:

That I pay or supervise the payment of the persons employed by

_____ on the _____
(Contractor, subcontractor or public body) (Building or project)

and that all mechanics and apprentices, teamsters, chauffeurs and laborers employed on said project have been paid in accordance with wages determined under the provisions of sections twenty-six and twenty-seven of chapter one hundred and forty nine of the General Laws.

Signature _____

Title _____

MASSACHUSETTS WEEKLY CERTIFIED PAYROLL REPORT FORM



Company's Name:		Address:		Phone No.:		Payroll No.:												
Employer's Signature:		Title:		Contract No:		Work Week Ending:												
Awarding Authority's Name:		Public Works Project Name:		Public Works Project Location:		Min. Wage Rate Sheet Number												
General / Prime Contractor's Name:		Subcontractor's Name:		"Employer" Hourly Fringe Benefit Contributions														
Employee Name & Complete Address	Work Classification:	Employee is OSHA 10 certified (?)	Appr. Rate (%)	Hours Worked							Project Hours (A) All Other Hours	Hourly Base Wage (B)	Health & Welfare Insurance (C)	ERISA Pension Plan (D)	Supp. Unemp. (E)	Total Hourly Prev. Wage (F)	Project Gross Wages	Check No. (H)
				Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.								

Are all apprentice employees identified above currently registered with the MA DLS's Division of Apprentice Standards? YES NO

For all apprentices performing work during the reporting period, attach a copy of the apprentice identification card issued by the Massachusetts Department of Labor Standards / Division of Apprentice Standards.

NOTE: Pursuant to MGL c. 149, s. 27B, every contractor and subcontractor is required to submit a **true and accurate** copy of their certified weekly payroll records to the awarding authority by first-class mail or e-mail. In addition, each weekly payroll must be accompanied by a statement of compliance signed by the employer. Failure to comply may result in the commencement of a criminal action or the issuance of a civil citation.

Date Received by Awarding Authority _____ / _____ / _____

SECTION 01 01 00

SUMMARY OF WORK

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. The General Conditions of the Contract for Construction and the General Requirements are hereby made part of this specification.

1.02 SECTION INCLUDES

- A. The work of this section consists of ***Scope of Work, Codes/Standards & Permits, Contractor's Use of Premises, Examination of Site, Discovery, Authority to Stop Work, Owner Occupancy.***

1.03 SCOPE OF WORK

- A. The work contemplated by the Contract Documents includes the Work of all trades required and all labor, equipment, materials and supervision necessary and incidental to the Work indicated. The work of this contract includes selective demolition and renovations of existing construction. The work required by the Contract Documents includes the Work of all trades required and all labor, equipment, materials and supervision necessary and incidental to the Work indicated. The following descriptions of the Work represent a brief summary of the Project. For additional and more complete information refer to the Project Manual and Drawings. The Drawings indicate and show limits of construction for this Project. The Drawings and Project Manual are complementary to each other and both shall be followed to complete the Work.
- B. The project scope consists of roofing replacement and repairs. The intent is to provide a sound roofing system that is leak free and weathertight. At project completion, Contractor shall provide a written guarantee that covers all defects in workmanship and materials for a period of two (2) years from date of acceptance, and a roofing system manufacturer's twenty (20) year system warranty. General Bidders are to be DCAMM certified in Roofing. Filed Sub-Bidders are to be DCAMM certified in HVAC and Electrical. The Roofing Contractor shall be the General Contractor. The general scope of the construction work is as follows:
 - 1. **Base Bid Work** - Re-roofing of the existing low-sloped roofing systems utilizing a "tear-off" application. A new adhered PVC roof membrane system (60-mil minimum thickness) is specified and detailed complete with a manufacturer's 20-year full system warranty. Removal of the existing EPDM

roof membrane system and installation of an adhered PVC roof membrane system to include rigid board roof insulation (polyisocyanurate), flashings (membrane & sheetmetal), roof drainage replacement and repairs, sealant replacement at parapet stones and other select locations, and skylight replacement.

2. **Alternate No. 1 Bid Work (Filed Sub-bid Required)** - Removal and replacement of two (2) old (circa 1991) rooftop units seven (7) old (circa 1991) exhaust fans.

The Filed Sub-Bid work is being bid as Alternate No. 1 Bid; the work includes HVAC work as specified and detailed as follows:

- a. Specification Section 23 00 00 HVAC and Drawings H-1, H-2, H-3 & H-4.
- b. Specification Section 26 00 00 ELECTRICAL and Drawings E-1, E-2 & E-3.

C. The General Contractor shall provide and maintain proper supervision of the labor force for project duration. The General Contractor shall provide, for project duration, **a competent full-time, Project Superintendent who shall remain on site, full-time every workday.** The Project Superintendent shall be responsible for providing full-time supervision of the labor force, including but not limited to his employees, his subcontractors, his material suppliers, and his equipment suppliers. His responsibilities shall also include general coordination and management of the job and his attendance is required at all project meetings. He shall not work as a foreman, mechanic, laborer, or tradesman, except with the written permission of the Engineer.

D. Project Schedule is as follows:

Project out to bid..... January 11, 2017
PreBid Meeting January 19, 2017 at 11:00 a.m.
Filed Sub-Bids Due January 26, 2017 at 2:00 p.m.
General Bids Due..... February 2, 2017 at 2:00 p.m.

Construction Phase

A contract is expected to be promptly awarded to the lowest responsible and eligible bidder. The construction phase is expected to commence on or before April 3, 2017 and be completed by May 31, 2017. The work hours shall be as follows: Monday through Saturday 8:00 am to 5:00 pm.

1.04 CODES, STANDARDS AND PERMITS

A. All work under this Contract shall conform to all codes and standards in effect as of the date of receipt of Bids, which are applicable to this Project. All work shall further conform to specific requirements and interpretations of local authorities having jurisdiction over the Project. These codes, standards and authorities are

referred to collectively as "the governing codes and authorities", and similar terms, throughout the Specifications. Determination of applicable codes and standards, and authorities having jurisdiction, shall be the responsibility of the General Contractor, as shall be the analysis of all such codes and standards in regard to their applicability to the Project for the purposes of determining necessary construction to conform to such code requirements, securing all approvals and permits necessary to proceed with construction, and to obtain all permits necessary for the Owner to occupy the facilities for their intended use. In the case of conflicts between the requirements of different codes and standards, the most restrictive or stringent requirements shall be met.

The General Contractor shall maintain at the site, for the duration of the construction operations at the site, two (2) copies of all relevant codes and standards listed herein or determined to be applicable to the work. One copy of such codes shall be for the exclusive use of the Owner and Engineer and its consultants, and shall be kept in the Construction Manager's site office.

- B. Code Enforcement and Approvals: The General Contractor shall secure the general building permit for the work, and the General Contractor shall conform to all conditions and requirements of the permit and code enforcement authority. The General Contractor shall provide names and license numbers of its responsible representatives to complete application for permit, and shall receive permit and promptly distribute copies thereof to Owner and Engineer.
- C. The General Contractor shall identify all permits (other than general building permit) required from authorities having jurisdiction over the Project for the construction and occupancy of the work, shall prepare the necessary applications and submit required plans and documents to obtain such permits in a timely manner, and shall pay all fees and charges in connection therewith.
 - 1. The General Contractor shall display all permit cards as required by the authorities, and shall deliver photocopies of all permits to the Owner and Engineer promptly upon receipt.
 - 2. The General Contractor shall arrange for all inspections, testing and approvals required for all permits, and shall notify the Engineer and Owner of such inspections at least three business days in advance, so they may arrange to observe.
 - 3. The General Contractor shall comply with all conditions and provide all notices required by all permits.
 - 4. The General Contractor shall perform and/or arrange for and pay for all testing and inspections required by governing codes and authorities, other than those provided by the Owner, and shall notify Engineer and Owner of such inspections at least three business days in advance of all such testing or inspection, so they may arrange to observe.

5. Where inspecting authorities require corrective work in conjunction with applicable codes and authorities, the General Contractor shall promptly comply with such requirements, except in cases in which requirements clearly exceed the requirements of the Contract Documents in which case the Contractors shall proceed in accordance with the procedures for modifications or changes in the work established in the Contract Documents, as amended.

1.05 CONTRACTOR'S USE OF PREMISES

- A. The existing building and site will be occupied for the entire construction period. At all times during the demolition, construction, and alterations, the General Contractor shall provide adequate and safe means of egress for all work forces in the building and at the same time provide security of the building. "Means of Egress" also includes safe and adequate paths on the site.
- B. Prior to beginning work of the Contract, the General Contractor shall meet with the Owner and the Engineer to determine procedures regarding access to and use of site, exterior staging, parking, and storage areas, tree protection, special site conditions, and any other restrictions regarding the use of the site areas surrounding the construction.
- C. Where work on public roads or walks, or other work on municipal property or easements is done, all such work shall conform to applicable portions of this Specification and the rules, regulations, and specifications of the public agencies having jurisdiction. Wherever work on or obstruction to a public street is done, a City special duty police officer must be present arranged and paid for by the General Contractor at no change in contract price. All permits and fees in relation to such off-site work shall be obtained and paid for by the General Contractor.
- D. The General Contractor shall keep all public and private access roads and walks clear of debris caused by their work during the entire term of the Contract. They shall repair all public and private streets, drives, curbs, walks, and other improvements where disturbed by work of, or related to, building operations, leaving them in as good condition after completion of the work as before operations started, in accordance with rules, regulations, and specifications of the public agencies having jurisdiction.
- E. Access roads and fire-lanes on and about the site shall be kept open and free at all times.
- F. A reasonable sum (cost of equivalent replacement) will be deducted from the Contract Sum for any permanent damage to existing trees or plantings, which are outside the construction site area but on the Owner's property or are within the construction site area and are designated to be protected. Damage to trees and plants off the Owner's property shall be fully the responsibility of the General Contractor.

- G. The General Contractor shall endeavor at all times to maintain as low a level of construction noise as practicable in order not to create a disturbance in the neighborhood. The General Contractor shall provide and maintain portable noise barriers for compressors and generators. Compressors and generators shall be located to prevent fumes from entering occupied space (including abutter properties).
1. All workers on the project are required to conduct themselves in a professional manner. Abusive or obscene language will not be tolerated. No obscene gestures, whistles, or cat-calls will be allowed. No soliciting or harassing of neighborhood residents for any reason will be permitted. The Owner reserves the right to have any worker barred from the construction site.
 2. Use of alcohol or drugs on the property is prohibited.
 3. Workers shall wear shirts at all times.
 4. Smoking is prohibited on the property.
- H. The intent of the specifications is that required work shall be performed with a minimum of interference with the public and the Owner's operations. To achieve this end, the General Contractor shall prosecute the work to its completion as soon as possible with full crews of workers during regular working hours, with multiple shift work or overtime hours as indicated in their Progress Schedule as approved. All work at other than regular hours shall be subject to prior approval by Owner.
- I. The General Contractor shall confine his apparatus, storage of materials, and operations of his workers to areas as required by the Owner, and shall not unreasonably encumber the premises with his materials. The General shall keep corridors and exits clear of debris, stored materials, etc. At all times, to provide for normal and fire egress from the building. The premises shall be maintained in a safe, orderly condition at all times.
- J. Site Cleaning and Maintenance:
1. Before the start of any work it is required that an inspection is made to determine the existing conditions of the site around the work areas, including areas outside of the Site boundaries in which operations of the Contractors may occur. This should be performed jointly by representatives of each Contractor and Engineer.
 2. Unless otherwise specified in the various technical specification Sections, the General Contractor shall take all necessary precautions to prevent the spreading of dirt and dust throughout the area of the work. During demolition and other work, the General Contractor shall take all measures

necessary to contain dust and other debris from the work within the limits of the site under their control. The General Contractor shall be responsible for promptly cleaning up all dirt, dust and debris escaping from the work areas or dropped from vehicles traveling to and from the work. All vehicles used for removal of material from the site shall be equipped with covers, in good condition, adequate to contain dust and debris within lawful and acceptable limits. The General Contractor shall provide all facilities for preventing spread of objectionable matter outside of the site areas through washing of vehicles and vehicle wheels, decontamination of vehicles transporting hazardous waste containing materials including asbestos, lead, or other matter, and all other means necessary.

3. Prior to final completion of the Contract, The General Contractor shall remove all spots, stains, dirt and dust from all surfaces, including areas within other buildings and any portion of property of others, which were the result of the work of this Project to the satisfaction of the Owner.
 4. Any damage to the present quarters or equipment of the Owner caused by the General Contractor or their Subcontractors shall be corrected, as directed by the Engineer, at the expense of the Contractors.
- K. As a condition of Engineer's certification for Final Completion, restore site areas and areas off the site damaged by work under this Contract to their condition existing at the start of the work unless otherwise directed by the Owner.

1.06 EXAMINATION OF SITE

- A. Prior to bidding the General Contractor shall carefully examine the site and the Contract Documents to ensure their knowledge of conditions and requirements affecting the work. No claim for extra compensation or extension of time will be allowed for by the Contractor's failure to comply with this requirement nor will any condition at the site, whether or not in agreement with conditions shown or called for on the Contract Documents, be allowed as a basis or such claims, except as otherwise specifically provided for.

1.07 DISCOVERY

- A. If during the demolition, excavation, disposal, or other work, articles of unusual value, or of historical or archaeological significance are encountered the ownership of such articles is retained by the Owner, and information regarding their discovery shall be immediately furnished to the Engineer. If the nature of the article is such that the work cannot proceed without danger of damaging same, work in that area shall be immediately discontinued until the Engineer has decided the proper procedure to be followed. Any time lost thereby shall be a condition for which the time of the Contract may be extended. All costs incurred after discovery in the salvaging of such articles shall be borne by the Owner.

1.08 AUTHORITY TO STOP WORK

- A. The Engineer, the Owner, or their authorized representatives shall retain the right to stop work on the project when, in their judgment, the specifications, the manufacturer's requirements, drawings or similar requirements and conditions are not being fully complied with by the General Contractor or subcontractors.
- B. The Engineer, the Owner, or their authorized representatives shall retain the right to stop work on the project when, in their judgment, unforeseen conditions require field changes. The General Contractor shall make watertight the area in construction and the Engineer shall develop the necessary modifications to the design.
- C. No claims by the General Contractor for additional compensation or extension of contract schedules shall be allowed due to a suspension of the work ordered by the Owner or Engineer because of the Contractor's failure to comply with the Contract Documents or due to unforeseen conditions that require field changes.
- D. If work is suspended on the project due to the Contractor's failure to comply with the Contract Documents, the Contractor shall immediately take whatever measures are necessary to bring his work on the project into compliance and to resume work.
- E. If the Contractor neglects or refuses to bring his work into full compliance with the Contract Documents, the Owner shall retain the right to terminate the Contract.

1.09 OWNER OCCUPANCY

- A. The Owner intends to fully occupy the building during the project. Contractors (under separate contracts) may also be on site during the construction period. The work sequence must be coordinated and approved with the Owner and others working on-site. The General Contractor is to cooperate with the Owner to minimize conflict and to facilitate the Owner's operations.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

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SECTION 01 02 50
MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. The General Conditions of the Contract for Construction and the General Requirements are hereby made part of this specification.

1.02 SECTION INCLUDES

- A. The work of this section consists of ***Project Pricing, Lump Sum Prices, Unit Prices, Alternate Work Prices, Unit Price Quantity Measurement, Schedule of Values, Application for Payment, Waivers of Mechanics Liens.***

1.03 PROJECT PRICING

- A. Bidder shall complete the Form for General Bid including all requested information.
- B. Project pricing is lump sum. Estimated quantities relative to repairs of anticipated deteriorated conditions are included in the lump sum price. Unit prices are requested for any adds or deducts to these estimated quantities.

1.04 LUMP SUM PRICES

- A. Lump Sum Prices shall include all costs to provide and install the Work including, but not limited to labor, materials, equipment, supervision, overhead, profit.

1.05 UNIT PRICES

- A. Unit Prices shall include all costs to provide and install the Work including, but not limited to labor, materials, equipment, supervision, overhead, profit.
- B. Estimated quantities relative to repairs of anticipated deteriorated conditions are included in the lump sum price (refer to the Form for General Bid and Technical Specifications). Unit Prices are requested (refer to Form for General Bid) for any adds or deducts to these estimated quantities. Should the quantities of certain classes be increased or decreased from those, on which the Lump Sum Price is based, the unit prices will be the basis of payment or credit for such addition, increase or decrease in the work. Unit Prices given shall represent the exact net amount per unit to be added to the Price inclusive of General Conditions (in the case of additions or increases) or to be refunded to the Owner (in the case of decreases). The owner shall have the right to reject any or all proposed Unit prices at any time prior to signing the agreement for performance of the work.

1.06 ALTERNATE WORK PRICES

- A. Alternate Work Prices shall include all costs to provide and install the Work including, but not limited to labor, materials, equipment, supervision, overhead, profit.
- B. Bidders shall submit their price for each alternate work item identified in the technical specifications. The amount of each alternate work price shall be stipulated in the space provided in the Form for General Bid.
- C. The Awarding Authority reserves the right to select or reject the alternate work, based on the prices received. The alternates are ranked numerically in order of priority.

1.07 UNIT PRICE QUANTITY MEASUREMENT

- A. Owner reserves the right to reject the Contractor's measurement of work-in-place that involves use of estimated quantities and established unit prices, and to have this Work measured and/or verified by an independent qualified engineer acceptable to the Contractor at the Owner's expense.
- B. The Contractor shall perform unit price work only when approved by the Engineer. Quantity measurements shall be performed as described in the technical specifications or as shown on the drawings. The Contractor shall properly document that the work has been completed. Proper documentation shall include photos and locations shown on the roof plan. Quantity tabulation shall be done on a daily basis by the contractor and reported at the construction meetings, or more often as requested by the engineer.
- C. Contractor shall maintain drawing sepias locating all unit price repairs performed. Contractor shall submit copy of sepia identifying current quantities with each payment request. Work being invoiced must be properly identified. These sepias shall be incorporated into the As-Built Drawings set required by Section 01700.
- D. If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are so changed in a proposed Change Order or Construction Change Directive that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

1.08 SCHEDULE OF VALUES

- A. The Contractor shall prepare a Schedule of Values for the Work as required by the General Conditions. Use the Form for General Bid as a guide to establish the format for the Schedule of Values.
- B. Submit the Schedule of Values to the Engineer at the earliest feasible date, but in no case later than seven days before the date scheduled for submittal of the Applications for Payment.

- C. Update and resubmit the Schedule of Values when change orders result in a change in the contract sum.

1.09 APPLICATION FOR PAYMENT

- A. On or before the last day of each calendar month, the Contractor shall submit to the Engineer an itemized Application for Payment showing value of all work completed and material or equipment for inclusion in the work delivered to the site during the previous month.

1. Application for Payment: Contractor shall submit to the Engineer the Contractor's Application for Payment which shall state the amount to which each subcontractor, supplier of materials and workman is then entitled and which shall incorporate the following documents:
 - a. An Affidavit in the form of Exhibit "A" (Application for Payment).
 - b. Waivers of Lien in the form of Exhibit "B" (Discharge of Lien by Subcontractor) from each material supplier and subcontractor to whom payment has been made, according to the affidavit.
 - c. Waiver of Lien by the Contractor in the form of Exhibit "C" (Discharge of Lien by Contractor).
 - d. Satisfactory bills of sale for all materials and equipment, etc. for which payment is requested and which have not yet been incorporated in the work; said bills of sale to evidence ownership of such material to the Owner.

Application for payment shall not be accepted unless all information requested by the Engineer is provided. Contractor shall use only forms provided by the Engineer. Others forms, invoices, waivers, etc. shall not be acceptable (see Supplements to Contract Forms).

2. Any amount paid to the Contractor by the Owner pursuant to such Application for Payment shall be made to the Contractor for each purpose, in the first instance, and before any other use of such amount by the Contractor, of enabling the Contractor to pay any subcontractor, supplier of materials or workman who has not there-to-fore been paid the amount to which he is entitled to as shown in said application, and the Contractor shall forthwith upon receipt of such amount from the Owner shall make all such payments. The Contractor agrees that he shall, with respect to the entire amount so paid to him, be a Trustee, for the benefit of the Owner, each unpaid subcontractor, supplier of materials and/or workman, subject to all the obligations customarily imposed upon Trustees by the Law of that State in which the work is to be performed and in addition to such obligations, the Contractor, as Trustee, shall make such payment to such subcontractors, supplier of materials and workmen, shall furnish to the Owner such releases or waivers of lien and such indication of title as the Owner may reasonably require.

3. Failure of the Engineer in any particular instance to require full compliance with the provisions of the first paragraph of this Article shall not constitute a waiver of Contractor's obligations to comply in full in any other instance, and Contractor's acceptance of any payment for which application has not been made in the manner described above shall constitute (i) a warranty and representation by Contractor that all workmen have been paid for the work so done by them which is covered by such payments and that all subcontractors and suppliers of materials have been paid, or shall forthwith be paid, out of the proceeds of such payment to the Contractor, and (ii) a binding agreement by the Contractor to hold and apply such payment subject to and upon all of the terms and conditions set forth in the next preceding paragraph of this Article.
 4. Owner reserves the right, to be exercised in Owner's sole and absolute discretion, to make the whole or any part of any payment required hereunder directly to any subcontractor or material man entitled to payment for any work done or materials or equipment supplied for the completion of the contract or to make payments jointly to Contractor and any subcontractor or material man, and any payment so made by Owner shall be credited toward any amount payable by Owner to Contractor.
 5. Contractor shall have one separate item for the group of general conditions, overhead and profit and shall prorate this on monthly and final requisitions in an equitable fashion. He shall show only true subcontracted costs, and in the event of dispute shall show signed subcontracts and invoices to Engineer.
- B. Upon receipt of each complete and properly filled out Application for Payment, the Engineer will verify quantities of labor, material and equipment and the amount therefore and shall certify for payment that portion of total amount of application that he finds to be due.
1. The properly filled in certificate for payments will be approved and submitted to the Owner by the Engineer within seven days of receipt by him of same.
 2. Contractor shall be responsible for the submission of complete information, including waivers of lien, on the forms provided by the Engineer. Neither Engineer nor Owner shall be responsible for delay in payments due to the Contractor's failure to comply with the Contract Documents.
- C. Within thirty days after the approval by the Engineer of the Contractor's Application for Payment, the Owner shall make payment to the Contractor of such sum as together with previous amount paid to him shall equal 90% of the amount of said applications approved for payments. The monies retained by the Owner hereunder shall not be due the Contractor until final completion of the Project.
1. Payments by the Owner shall not constitute acceptance of the work nor waivers or rights or redress against the Contractors for any failure to comply with contract documents.

2. Payments may be withheld by the Owner on account of a) defective work not remedied; b) claims or liens filed; or c) unsatisfactory prosecution of the Work by the Contractor.

1.10 WAIVERS OF MECHANICS LIENS

- A. With each Application for Payment submit waivers of mechanics liens from subcontractors or sub-subcontractors and suppliers for the construction period covered by the previous application.
- B. Submit partial waivers on each item for the amount requested, prior to deduction for retainage, on each item.
- C. When an application shows completion of an item, submit final or full waivers.
- D. The Owner reserves the right to designate which entities involved in the Work must submit waivers.
- E. Submit waivers of lien on forms, and executed in a manner acceptable to the Owner.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 04 00

COORDINATION

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. The General Conditions of the Contract for Construction and the General Requirements are hereby made part of this specification.

1.02 SECTION INCLUDES

- A. The work of this section consists of ***Project Coordination, Project Superintendence, Project Meetings and Project Progress Schedules.***

1.03 PROJECT COORDINATION

- A. The Project Coordination Administrator shall be the Owner's Project Manager as employed and directed by the Owner. The Contractor shall cooperate fully with the Administrator in allocation of mobilization areas, protection, field offices, storage sheds/areas, traffic and parking facilities.
- B. Contractor shall coordinate all aspects of the work (including his and any of his subcontractors), including but not limited to: scheduling, submittals, shop drawings, and permitting so as to ensure efficient and orderly sequencing of the construction.
- C. Contractor shall verify that utility requirements of all project related required machinery and equipment are compatible with the building's utilities. Contractor shall coordinate for installing, connecting to, and placing in service, all such required machinery and equipment.
- D. Contractor shall coordinate completion and clean up of work on a daily basis, including maintaining water-tightness for project duration.

1.04 PROJECT SUPERINTENDENCE

- A. The Contractor shall provide and maintain proper supervision of the labor force for project duration. To this end, the Contractor shall provide, for project duration, a competent full-time, *Project Superintendent* who shall remain on site, full-time every workday. The Project Superintendent shall be responsible for providing full-time supervision of the labor force, including but not limited to his employees, his subcontractors, his material suppliers, and his equipment suppliers. His responsibilities shall also include general coordination and management of the job and his attendance is required at all project meetings. He shall not work as a foreman, mechanic, laborer, or tradesman, except with the written permission of the Engineer.

- B. Prior to the pre-construction meeting, the Contractor shall provide the Project Superintendent's resume to the Engineer for approval. The Engineer shall have the right, by written notice sent to the Contractor at any time to disapprove such Project Superintendent. The Contractor shall then appoint a new and approved Project Superintendent within one (1) day of receipt of notice. The Contractor shall not remove the Project Superintendent without the Engineer's written approval.
- C. The Contractor shall provide appropriate and adequate labor for this project and such labor will work in harmony with all other elements of labor employed or groups taking part in, or concerned with this facility. The Contractor shall promptly remove from work on this project any employee who, in the opinion of the Engineer, is incompetent, unskillful, disruptive or disorderly. Any such person so removed from the work shall not be re-employed on this project without the Engineer's written approval.

1.05 PROJECT PROGRESS MEETINGS

- A. Project Progress Meetings will be held on-site for project duration. The Engineer will schedule them in advance. Representatives directly concerned with the work shall be in attendance, including but not limited to, Owner, Engineer, Contractor (including Project Superintendent), Manufacturer's representative, test agencies, governing authorities and Owner's insurers. The Engineer will maintain a record of the meetings and shall distribute a copy of this record to all participants.
- B. Prior to the commencement of the work, a *pre-construction meeting* will be held with the above-mentioned representatives in attendance. The Engineer will maintain a record of the meeting and shall distribute a copy of this record to all participants. A copy of this record shall be incorporated into the Contract Documents. The objectives and agenda of the pre-construction meeting shall include:
 - 1. The execution and distribution of Contract Documents.
 - 2. The execution and distribution of required bonds and insurance certificates.
 - 3. The execution and distribution of required permits.
 - 4. Review the required submittals and shop drawings, including but not limited to: product lists, subcontractors list, schedule of values and construction schedule.
 - 5. Review project assigned personnel, including emergency phone numbers.
 - 6. Review procedures related to permits, submittals, shop drawings, field changes, product substitutions, applications for payments, change orders and contract closeout procedures.

7. Review construction progress schedule including sequencing of events and hours of operation, verify the availability of materials, installer's personnel, and the equipment and facilities needed to make progress and avoid delays.
8. Review Owner's requirements, his occupancy and use of premises (by both Owner and Contractor); including accessing the work areas, locations of dumpsters and set-up areas, the use of electrical power supplied by the Owner and toilet facilities.
9. Review the technical specifications and drawings, the application requirements, construction facilities, utilities, security, protection, material storage, and housekeeping procedures.
10. Review procedures for all required inspections, testing, certifying and material usage accounting procedures, including maintaining record documents and as-built drawings.
11. Tour representative areas of construction, inspect and discuss the condition of the facility and the Contractor's project approach.
12. Review the notification procedures for weather or non-working days, including procedures for coping with unfavorable conditions and maintaining watertightness on a daily basis.

1.06 PROJECT PROGRESS SCHEDULES

- A. Contractor shall prepare and provide his Project Progress Schedule, prior to the preconstruction meeting, to the Engineer for review. The schedule shall show the complete sequence of construction by activity, with dates for beginning and completion of each element of construction. Identify each item by specification Section number. Provide sub-schedules to define critical portions of the entire schedule. Coordinate content with Schedule of Values.
- B. The Project Progress Schedule will be reviewed at the preconstruction meeting and will be updated at each construction meeting, or more often as needed. Contractor shall update the schedule after each meeting, identifying changes since previous version, and submit to all parties in advance of the next scheduled construction meeting, or as directed by the Engineer.
- C. The Project Progress Schedule shall utilize one of the following acceptable formats: a horizontal bar chart or a computer generated network analysis diagram using the critical path method, generally as outlined in Associated General Contractors of America publication "The Use of CPM in Construction - A Manual for General Contractors and Construction Industry".
- D. Contractor shall also provide a separate schedule of submittal dates for shop drawings, product data, and samples, prior to the preconstruction meeting, to the

Engineer for review. The schedule shall indicate dates reviewed submittals will be required from Engineer and anticipated delivery dates for products.

- E. The above referenced schedules shall indicate revisions as they occur including projected completion date of each activity, activities modified since previous submittal, major changes in scope, and other identifiable changes. The schedules shall provide narrative reports to define problem areas, anticipated delays, and impact on schedule. Report corrective action taken, or proposed, and its effect including the effect of changes on schedules of separate contractors.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 06 00

REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. The General Conditions of the Contract for Construction and the General Requirements are hereby made part of this specification.

1.02 SECTION INCLUDES

- A. The work of this section consists of ***Project Authorizations and Sales Tax.***

1.03 PROJECT AUTHORIZATIONS

- A. The Contractor shall obtain all necessary authorizations, including but not limited to permits, licenses, and easements, for permanent structures and changes, give all necessary notices, pay all legal fees, and comply with all regulations of all authorities having jurisdiction, including, State, County, and City Building and Sanitary Laws, Rules, Ordinances, or Regulations, relating to the building or preservation of public health. The Contractor shall pay all fees and costs as required including filing, inspection and re-inspection costs. No work shall begin until all required project authorizations are obtained and a copy of the building permit, provided by the building department, shall be posted on-site, in view and protected from the weather, for project duration.

1.04 SALES TAX

- A. Sales Tax shall be not included in the cost for any and all materials used on this project. The Contractor shall not include the cost of any or all taxes in his bid for all materials to be used for this project.
- B. Contractor employed by the City of Salem, shall be exempt from state sales tax and will be provided with the tax-exempt number or certificate.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 33 00

SUBMITTALS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. The General Conditions of the Contract for Construction and the General Requirements are hereby made part of this specification.
- B. Work on the project, which requires submittals, shall not commence and materials shall not be ordered until all necessary submittals including shop drawings, product data, and samples are reviewed and approved in writing by the Engineer.

1.02 SECTION INCLUDES

- A. The work of this section consists of ***Schedule, Procedures and Product Data, Shop Drawings, Samples, Contractor's Responsibilities, Submission Requirements, and Engineer's Responsibilities.***

1.03 SCHEDULE

- A. Contractor shall provide a schedule of submittal dates for shop drawings, product data, and samples, prior to the preconstruction meeting, to the Engineer for review. The schedule shall indicate dates reviewed submittals will be required from Engineer and anticipated delivery dates for products.
- B. The above referenced schedule shall indicate revisions as they occur including projected completion date of each activity, activities modified since previous submittal, major changes in scope, and other identifiable changes. The schedule shall provide narrative reports to define problem areas, anticipated delays, and impact on schedule. Report corrective action taken, or proposed, and its effect including the effect of changes on schedules of separate contractors.
- C. Refer to Section 01 04 00 - COORDINATION, 1.06 Project Progress Schedules for information pertaining to the construction sequence schedule.

1.04 PROCEDURES AND PRODUCT DATA

- A. Contractor shall submit to the Engineer copies of Manufacturer's Spec and Product Data Sheets, Health and Safety Data Sheets (MSDS sheets to remain on site for project duration and additional copies to be supplied to Owner as requested), and recommended installation procedures, temperature limitations, mix designs for materials, and any other information as required by the technical specifications .
- B. Submit six (6) copies of the manufacturer's printed data all stamped with the Contractor's approval and stating its intended use to the Engineer for review.

After review of the manufacturer's printed data, the Engineer will stamp one (1) copy, noting, if necessary, any further action required, and return the copy to the Contractor.

1.05 SHOP DRAWINGS

- A. Contractor shall submit Shop Drawings as required by the technical sections of the Specifications. Check and approve Shop Drawings before submitting to the Engineer. Submit checked Shop Drawings stamped with the approval of the Contractor, to the Engineer for review per the accepted schedule of Shop Drawing submissions. Engineer shall review, stamp and return Shop Drawings to the Contractor within ten (10) working days from the date of receipt of Shop Drawings at the Engineer's office.
- B. Shop Drawings shall demonstrate that the Contractor understands the intent of the design as detailed and specified in the Contract Documents and show materials (kinds, quality, shapes and sizes), details (fabrication, construction, assembly, and installation) and all required dimensions and measurements. All Shop Drawings shall bear the Contractor's stamp of approval certifying that they have been so checked. Any Shop Drawings submitted without this stamp of approval and Shop Drawings which, in the opinion of the Engineer, are incomplete or have not been checked adequately will be returned without review by the Engineer for resubmission by the Contractor.
- C. From Suppliers receive one (1) sepia and three (3) prints of all Shop Drawings for checking and approval. Contractor shall submit one (1) sepia and two (2) prints, all stamped with the Contractor's approval, and stating its intended use to the Engineer for review. After review of the Shop Drawings, Engineer shall stamp each sepia, noting, if necessary, any further action required, and return the sepias to the Contractor. All Shop Drawings shall have final review by Engineer before materials are ordered or fabrication is begun. Contractor shall provide the Engineer with three (3) prints of the final Shop Drawings, reproduced from the corrected original, and provide as many other prints as are required to expedite the Work. Contractor shall only use unmarked final approved Shop Drawings in the field.

1.06 SAMPLES

- A. Contractor shall submit samples as required by technical sections of the Specifications. Receive, check, approve and stamp all samples before submitting to the Engineer.
- B. Label each sample, giving a complete description of the material, the intended use and the name of the entity submitting the sample. Allow ample time before samples are required for the Work.

1.07 CONTRACTOR'S RESPONSIBILITIES

- A. Contractor shall review Shop Drawings, Product data and Samples and affix Contractor's stamp prior to submitting to the Engineer.
- B. Contractor shall verify existing conditions, field dimensions, catalogue numbers, quantities and similar data.
- C. Contractor shall coordinate each submittal with requirements of the Work and of the Contract Documents.
- D. Contractor's responsibility for errors and omissions in submittals is not relieved by Engineer's review of submittals. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by Engineer's review of submittals, unless Engineer gives written acceptance of specific deviations.
- E. Contractor shall thoroughly check all Shop Drawings for completeness, for correctness with respect to field conditions, and for compliance with the Contract Documents before submitting to the Engineer. Notify Engineer in writing, at the time of submission, of deviations in submittals from requirements of Contract Documents.

1.08 SUBMISSION REQUIREMENTS

- A. Submittals shall be submitted in an orderly sequence and sufficiently in advance of construction requirements so as to allow ample time for review, resubmitting and rechecking. Accompany submittals with transmittal letter, in duplicate. Shop Drawings: one (1) reproducible transparency and three (3) blueline prints. Product Data: six (6) copies.
- B. Submittals shall include the following minimum information:
 - 1. Date and revision dates
 - 2. Project Title and Project Number
 - 3. Names of: Engineer, Contractor, Subcontractor, Supplier, Manufacturer
 - 4. Identification of product or material
 - 5. Field dimension clearly defined as such. Relation to adjacent structure or
 - 6. Materials.
 - 7. Specification Section Number.
 - 8. Applicable standards- ASTM or Federal Spec.
 - 9. Blank 3"X4" space for Engineer's stamp, located in bottom right hand corner.
 - 10. Identification of deviations from the Contract Documents.
 - 11. Contractor's stamp signed certifying as to review of submittal, verification of existing conditions and field dimensions and compliance with Contract Documents.

- C. Contractor shall revise the initial submittal as required and resubmit as specified for the initial submittal. Clearly indicate by clouding and use of revision level number in triangular symbol, all changes which have been made including those requested by the Engineer.
- D. Contractor shall distribute copies of Product Data and Shop Drawings that carry Engineer's stamp to the following:
 - 1. Contractor's file.
 - 2. Job site file.
 - 3. Record documents file.
 - 4. Owner's representative.
 - 5. Fabricator.
 - 6. Supplier.
 - 7. Subcontractors.
 - 8. Local Building Inspector (if required).
- E. Contractor shall distribute Samples as required in the technical specifications, but at a minimum they shall be distributed to the Engineer.

1.09 ENGINEER'S RESPONSIBILITIES

- A. Engineer shall review submittals and transmit to the Contractor within ten (10) working days after receipt of submittal at the Engineer's office, for Contractor distribution. Engineer shall review for design concept of Project and information provided in the Contract Documents.

PART 2 - PRODUCT (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 40 00

QUALITY CONTROL

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. The General Conditions of the Contract for Construction and the General Requirements are hereby made part of this specification.

1.02 SECTION INCLUDES

- A. The work of this section consists of ***Quality Assurance, References and Standards, and Cutting and Patching.***

1.03 QUALITY ASSURANCE

- A. All materials used as a component of the roofing system shall be supplied or approved in writing by the roofing system manufacturer. All materials shall be installed to serve their intended function.
- B. A licensed contractor approved by the roofing system manufacturer and employing personnel experienced and skilled in the application of the manufacturer's roofing system shall install the complete roofing and flashing system. The Contractor shall have a minimum of five (5) years experience installing the system.
- C. All roofing work shall be applied in strict accordance with the provisions of the technical specification. No deviations shall be permitted without written consent from the Engineer. Should a conflict between this specification and the manufacturer's requirements arise, the most restrictive provision, as determined by the Engineer, shall govern.
- D. At least one week prior to construction work, a conference shall be held and attended by the Engineer, the Contractor, and the roofing system manufacturer. The purpose of this conference is to review the specifications, details, application requirements, storage area and work to be completed before construction operations begin.
- E. Upon completion of the installation, an inspection shall be made by a representative of the roofing system manufacturer to ascertain that the roofing system has been installed according to the specifications and details and will be accepted by the manufacturer and that the manufacturer will issue the specified warranty.

1.04 REFERENCES AND STANDARDS

- A. Contractor shall comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- B. Contractor shall conform to the most current referenced standard and/or reference.
- C. Contractor shall obtain and maintain copies of references and standards as required by the Contract Documents. If specified standards or references conflict with Contract Documents, Contractor shall request clarification from Engineer before proceeding.

1.05 CUTTING AND PATCHING

- A. All cutting, patching, and drilling shall be the responsibility of the Contractor. Contractor shall repair all cutting, patching, and drilling so as to match the existing surrounding surfaces as required by the Engineer. Contractor is responsible to ensure that the project progress will not be interrupted and that the structural and architectural integrity of the project shall not be altered by misplaced or incorrectly sized penetrations.
- B. Contractor shall submit written request in advance of cutting or altering elements that affects the structural integrity, maintenance, efficiency, quality or safety of such elements.
- C. Contractor shall perform cutting and patching so as to:
 - 1. Remove and replace defective and non-conforming Work.
 - 2. Remove samples of installed Work for testing.
 - 3. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- D. Contractor shall execute work by methods that will avoid damage to other Work, and provide proper surfaces to receive new products and/or repairs.
- E. Contractor shall maintain integrity of building components and shall refinish surfaces to match adjacent surfaces.
- F. Contractor shall identify any hazardous substance or condition exposed during the work to the Engineer for decision or remedy.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 50 00

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. The General Conditions of the Contract for Construction and the General Requirements are hereby made part of this specification.
- B. All temporary facilities shall be installed, maintained, and removed, leaving the existing permanent facilities, utilities and grounds in their original condition, at the expense of the Contractor. Temporary facilities shall at all times comply with all applicable regulations and shall not create or contribute to a safety, fire, health or other hazard.
- C. The Contractor must not interfere with the operations of the facility in any way including personnel, customers, and vehicles. The Contractor must fully cooperate with the Owner and Engineer.
- D. No Smoking shall be allowed at any time on the Project site.
- E. Maintain strict supervision of use of temporary services. Enforce conformance with applicable standards. Enforce safe practices. Prevent abuse of services and systems. Prevent damages to finishes. Prevent wasteful use of water. Maintain service and clean facilities.
- F. Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on the Project site.
- G. All work on the project is to be conducted from areas of the building designated by the Engineer and Owner. The Contractor shall take care not to block any travel lanes, fire lanes, access for fire apparatus, any means of egress, and any shipping/receiving areas of the facility and shall not interfere with the normal operation of the facility.
- H. Contractor shall access the project site by his own means, utilizing ladders, staging, etc. No access from the interior will be allowed except with the written permission of the Engineer. Contractor shall be allowed to enter the building during construction to perform visual surveys of his work and during emergency situations.

1.02 SECTION INCLUDES

- A. The work of this section consists of ***Temporary Utilities- Electrical, Lighting, Telephone, Water, Sanitary, and Fire Protection; Dust and Fume Control, Debris Control, Rodent and Pest Control, Noise Control, First Aid, Parking Areas, Barricades, Security, Temporary Project Offices and Enclosures, Thermometer, Existing Drawings and Construction Documents, Protection of Existing Landscaping and Pavement, Protection of Work, Project Representation, Emergency Repairs.***

1.03 TEMPORARY UTILITIES

- A. ***Electrical:*** Contractor shall provide his own generator for electrical power. Facility's electrical power is not available to the Contractor except for small tools. Owner shall provide power for small tools only at no cost to Contractor for energy, but Contractor must employ a licensed electrician satisfactory to Owner to make all connections and do all work including removal of temporary wiring. Temporary power service shall comply with OSHA Standards. Contractor shall maintain these temporary services in good order throughout the project until Work is complete. The Contractor requiring power shall provide all extension cords.
- B. ***Lighting:*** Contractor shall provide all temporary lighting for the Project. Adequate illumination shall be provided for the Work being performed; for safe movement of authorized persons through the project; for public safety and special warning lighting for hazardous conditions; and as required protecting the Project site from unauthorized entry.
- C. ***Telephone:*** Contractor shall provide the Project Superintendent with a cellular phone so that he can be reached at all times for Project duration. Engineer and Owner shall be provided with the phone number.
- D. ***Water:*** The Owner shall permit the Contractor to use the existing exterior water facilities' providing this does not interfere in any way with the normal daily operations of the facility or normal maintenance operations. If special temporary hook-ups or plumbing is required the Contractor shall be solely responsible for the cost incurred. The Contractor shall provide drinking water for all personnel working on the project. The Contractor's use of water on the project shall comply with all federal, state, county and municipal requirements, regulations and restrictions.
- E. ***Sanitary:*** The Contractor shall, at his own expense, provide the necessary toilet facilities for his men in a location approved by the Engineer. These facilities shall be open to the use of other Subcontractors and their employees. The toilet shall be removed upon completion of work, and the premises left in a clean and odorless condition. All temporary toilet facilities shall comply with the requirements of the State, County and City. The Contractor or his Subcontractors shall not use the toilet facilities in the facility.

- F. **Fire Protection:** Contractor shall provide adequate fire protection and fire prevention for the Project and in no case less than that is required by applicable City, County, State and Federal laws. No open flames or similar sources of ignition shall be allowed in related work or storage areas. Fire extinguishers shall be kept at all times in the immediate work area in all storage and disposal areas, and wherever flammable or combustible materials, or sources of ignition are present. All personnel on the project site shall be informed of the phone number of the local fire department and the location of the nearest telephone and shall be instructed in emergency procedures. Contractor shall instruct all personnel on the project site on the dangers of the materials being installed as well on the combustibility of the existing materials and shall insure that extreme caution is used at all times.

1.04 DUST AND FUME CONTROL

- A. Contractor shall take all necessary precautions to (1) keep dust confined in the present work area and (2) prevent hazardous accumulations of dust, fumes, mists, vapors, or gases in areas occupied during construction.
- B. Contractor shall submit to the Engineer, for approval, proposed methods used to contain dust and fumes in the work area. At a minimum, Contractor shall provide adequate protection at air intake units so as to prevent dust, fumes, vapors or gases from entering the facility. Contractor shall employ an industrial hygienist to monitor air quality during application of hazardous or volatile materials.

1.05 DEBRIS CONTROL

- A. Provide adequate number and size of dumpsters; refuse containers, trucks, chutes, etc. for proper execution of demolition work. All demolition removal containers shall be properly protected and maintained on a daily basis. Owner must approve locations of dumpsters/refuse containers. Contractor shall submit to the Engineer, for approval, proposed methods used to conduct demolition operations and debris control.
- B. Contractor shall remove all debris from the project site and shall legally dispose of all debris generated by the project. Debris shall be properly protected (and totally covered at the end of each work day) while on site and shall be properly secured and totally covered before it is transported. Debris shall be removed from the project site on a weekly basis or more often as required to maintain a neat clean site. Project site shall be broom swept on a daily basis.
- C. Contractor shall be responsible for any damages to the building; its contents, and any vehicles as a result of his negligence during the demolition and/or construction process.

1.06 RODENT AND PEST CONTROL

- A. Contractor is responsible to provide rodent and pest control as necessary or as required preventing infestation of construction and temporary project offices and enclosures. Employ methods and use materials that will not adversely affect conditions at the Project site or on adjacent properties. Submit copies of proposed program contractor will utilize including products to be used, manufacturer's instructions, areas to be treated, and pollution preventive measures.

1.07 NOISE CONTROL

- A. All demolition and construction work that creates excessive noise shall be reviewed with the Owner as to the types of equipment that is intended for use during normal business hours and obtain Owner's approval for such use. Noise limits shall conform to the requirements of the local governing body.

1.08 FIRST AID

- A. Contractor shall provide a first aid kit with adequate provisions for the materials being used on site. All Health and Safety Data Sheets for materials being used on site shall be located within the first aid kit.

1.09 PARKING AREAS

- A. The Contractor is responsible to provide parking for his employees and Subcontractor's employees. On-site parking is allowed. Contractor's field trailer, parking for trucks and trailers, dumpsters, etc. shall be located by the Contractor, at the Contractor's cost.
- B. Contractor shall at all time keep fire lanes, access for fire apparatus, and fire protection and fire equipment clear and unobstructed. Contractor is responsible for the protection and safety of pedestrians and vehicles on the Project site in the areas of construction.

1.10 BARRICADES

- A. The Contractor shall provide and maintain suitable barriers as required to prevent public entry, and to protect the work, existing facilities, trees and plants from public construction operations; remove when no longer needed or at completion of Work. Barriers shall conform to city and state laws, ordinances and permit requirements.
- B. All work areas shall be protected and well marked with fences or barriers and as required by public officials. Provide such barricades, safety and traffic control equipment, and police officer as shall be necessary to restrict traffic from work areas and protect all pedestrians, Owners, tenants, and visitors during construction. Contractor shall provide and maintain all necessary temporary barricades for safe conduct of his work, or as required by federal, state or local

laws or ordinances and in accordance with OSHA requirements and other requirements of this specification.

- C. The Contractor shall confine his apparatus, the storage of materials, parking and the operations of his workmen to those areas designated or as directed. The Contractor shall cause the minimum possible interference with the operation of the facility, shall not bar or block off any access ways, interfere with any egress ways or exits in or around the building, or move or operate to interfere with any utility lines servicing the building, except as scheduled with and approved by the Owner in advance. During the progress of work the Contractor shall phase construction so as to provide continuous access to the facility during regular operational hours. Barriers shall be provided to limit access to all work areas during construction. Contractor shall provide protection above doorways and walks in the construction area. Parking as required to deliver materials, or otherwise shall be the minimum possible. The Contractor shall confine his operations to the immediate work areas, and shall enter other areas only as specifically directed.

1.11 SECURITY

- A. Contractor shall at all times comply with the security measures established by the Owner and Engineer. Contractor shall be responsible for the security of his work and equipment. The Owner is not responsible for losses due to theft.
- B. Contractor shall thoroughly familiarize himself with the security measures contemplated by the Owner before submitting his bid as no claims for additional monies due to these security measures will be allowed.
- C. Contractor and/or his employees or Subcontractors shall not enter the facility without notifying and receiving permission from the Owner's representative.
- D. The Owner, his employees and agents shall not be responsible for the protection and security of the Contractor's equipment, facilities, tools and materials. Contractor shall provide his own security measures, if in his opinion, they are warranted. Contractor's security measures shall be approved by the Engineer and the Owner and shall not interfere or pose a hazard to the Owner, his employees, agents, visitors, customers, the facility or its contents and grounds.

1.12 TEMPORARY PROJECT OFFICES AND ENCLOSURES

- A. The Contractor may provide temporary field offices and other temporary enclosures for storage, tools, employee clothes, change convenience and other activities that may be required. Coordinate location with Owner. Area is to be kept clean and must not interfere with safe pedestrian and vehicle flow.
- B. The construction office and all storage shall be in secured temporary enclosures. Provide and maintain fire-fighting equipment for all temporary buildings and enclosures. Upon completion of the Project, remove temporary buildings and

enclosures from the site assuming all costs in connection with their removal and proper clean-up.

1.13 THERMOMETER

- A. Install an official project outdoor thermometer in a shaded-from-the-sun, conveniently readable location, which will give reasonably accurate readings of the actual temperatures, and which can be reached easily for resetting. Thermometer shall be resettable type indicating daily maximum and minimum temperature. Contractor shall keep a permanent daily log of those readings.

1.14 EXISTING DRAWINGS AND CONSTRUCTION DOCUMENTS

- A. The Owner shall provide the Contractor with three (3) sets of construction Drawings and Specifications. Additional sets will be provided upon request at cost.
- B. Contractor shall keep on the job site at all times the following items:
 - 1. The most revision of the Drawings and Specifications, including all changes made by addenda, sketches, bulletins, and change orders.
 - 2. Health and Safety Data Sheets (MSDS sheets).
 - 3. The most recent issue of approved submittals. Obsolete or unapproved submittals and Health and Safety Data Sheets shall not be kept at the job site.
 - 4. All material evaluation reports.

1.15 PROTECTION OF LANDSCAPING AND PAVEMENT

- A. Contractor shall protect existing landscaping and pavement areas as necessary or as required. Do not stockpile/store construction materials or debris materials in such a manner that it will permanently harm the landscaping or the pavement. Provide temporary protection to protect landscaping and pavement.
- B. Contractor shall bring back to its original conditions (repair or replace in a manner acceptable to the Engineer and Owner) any portion of the landscaping (including lawns, trees, bushes and plantings), parking areas and pavements or equipment that is damaged by the Contractor or his Subcontractors' operations.

1.16 PROTECTION OF WORK

- A. Contractor shall protect the project site including the building, its contents, all streets, walls, underground and overhead utilities. All areas shall be left in a watertight condition in their entirety at all times. Contractor shall provide protective measures and materials to assure that each element will be without damage or deterioration throughout the entire construction period up to the date of final completion. Any defective elements shall be removed and replaced at the Contractor's expense and to the satisfaction of the Engineer and Owner.

Remove protective coverings and materials at the appropriate time, but no later than final cleaning operations.

- B. No work shall take place during inclement weather. No work shall take place when moisture is present on the work area or in any of the materials. The Engineer may order the work stopped when, in his opinion, the weather conditions warrants him to do so. Contractor shall take such measures as necessary to dry out work surfaces so that the work can continue with minimum delay.
- C. Contractor shall cover and protect all walls, windows, projections, soffits, etc. where material is to be hoisted or removed from the roof deck. Contractor shall be responsible for all scrapes, stains, and damage to the walls and shall repair or replace any walls, windows, siding, etc., which are damaged by his operations, to the satisfaction of the Engineer and Owner. Any areas damaged shall be restored or cleaned, to the satisfaction of the Owner by the Contractor at no cost to the Owner.
- D. Whenever the possibility exists that debris or materials may fall causing a hazard to persons inside or outside the building, the Contractor shall post one or more of his employees to temporarily close these hazardous areas. The person in charge of the facility shall be notified prior to the commencement of work which may pose this type of hazard. Proper barricades shall be provided to prevent normal access to or around these areas.
- E. Contractor shall properly protect all areas where falling debris or dust is expected due to his operations. Contractor shall be responsible for providing adequate personnel to clean and protect these areas. Contractor shall include these costs in the bids.
- F. Contractor shall provide measures to ensure that water does not flow beneath a completed section of roof by temporarily sealing the loose edge of the new membrane over the edge of the insulation at the completion of each day's work. Protect finished sections from damage due to roofing operations.
- G. Protect the building interior, contents, Owner's employees and customers from all hazards associated with the Contractor's operations.
- H. Any damage to the interior of the building or its contents due to the Contractor's operations or to leaks during the Contractor's operations shall be corrected at the Contractor's expense to the satisfaction of the Owner and the Engineer.
- I. Any damage to the exterior of the building or any roof top equipment due to the Contractor's operations shall be corrected at the Contractor's expense or to the satisfaction of the Owner and the Engineer.
- J. No member of the roof shall be overstressed due to construction loads.

- K. Contractor is to provide any necessary protection to the installed work prior to acceptance by the Owner and Engineer. The Contractor at no additional cost to the Owner shall correct any damage incurred during this period.
- L. Contractor is to provide any and all necessary protection to the entire roof area to maintain watertightness during the project duration, including existing roof areas not yet roofed. Any interior damages that occur as a result of the Contractor's negligence shall become the Contractor's responsibility and he shall promptly repair and/or replace the damaged items.

1.17 PROJECT REPRESENTATION

- A. Contractor covenants and agrees with Owner that it will not make any use whatsoever of or cause others to make or assist others in making any use whatsoever of, any photograph, drawing or other representation of the structure which is the subject matter of this agreement and will not make any use whatsoever of the corporate or trade names, of Owner, or any portion thereof, or any of its trademarks, or any portion thereof, in connection with any advertising, promotion, publicity or other printed material. It is expressly understood and agreed that Contractor's obligation under this provision shall survive performance of the terms of this agreement, its rescission or other termination and that this provision shall remain in full force and effect and shall be deemed severable from an independent of the other provisions of this agreement.
- B. Contractor shall not place, erect, hang or otherwise display any type of advertising or sign on the project site without the written permission of the Owner.

1.18 EMERGENCY REPAIRS

- A. Contractor shall provide Owner and Engineer with the name, address, and home telephone number of the Project Superintendent and at least two tradesmen that can be called in an emergency basis, including nights and other times when the Contractor is not working on the job, to take care of leaks on an emergency basis.
- B. Such emergency work will be done at no additional cost to the Owner if such leaks are a result of the Contractor's negligence. If for any reason the Contractor's representatives cannot be reached within two hours, others will make temporary repairs and the Contractor will be backcharged for this work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 60 00

MATERIAL AND EQUIPMENT

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. The General Conditions of the Contract for Construction and the General Requirements are hereby made part of this specification.
- B. Work on the project, which requires submittals, shall not commence and materials shall not be ordered until all necessary submittals including shop drawings, product data, and samples are reviewed and approved in writing by the Engineer.

1.02 SECTION INCLUDES

- A. The work of this section consists of ***Products, Transportation and Handling, Storage and Protection, Weather and Temperature Requirements, Substitutions.***

1.03 PRODUCTS

- A. Products are defined as new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.
- B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

1.04 TRANSPORTATION AND HANDLING

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to assure that 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.

1.05 STORAGE AND PROTECTION

- A. Contractor shall follow the recommended storage procedures of the manufacturer of the materials being used. No storage on or within the building will be allowed without written permission from the Owner. Any materials brought to the roof for daily operations or storage shall be evenly distributed on the roof to prevent concentrated loads and shall not overload the structure.

- B. All moisture sensitive materials shall be stored in weatherproof trailers or temporary protective shelters and shall be stored at least 4 in. above the ground on stable pallets or skids and shall at all times be completely covered and secured. Tarpaulins or a similar "breathable" material shall be used to cover materials. Rubber or plastic materials shall not be acceptable. Factory applied "shrink packs" or plastic wrappings shall not be acceptable.
- C. Materials stored on the ground shall be thoroughly secured against moisture and wind. Materials and their coverings shall be tied and/or weighted to prevent uncovering or blowing of material by the wind. Contractor shall be responsible for damages caused by blowing and improperly stored material and equipment.
- D. Materials shall be handled with care and shall not be installed if they have been damaged in any way due to handling, storage or manufacturing defects. Contractor shall promptly mark and remove from the site any damaged or improperly stored materials when so requested by the Engineer.
- E. All materials are to be stored at the recommended temperature range as specified by the manufacturer. Contractor shall provide manufacturer's information to the Engineer concerning storage and handling of flammable or volatiles materials. The "shelf life" materials shall be provided with the date of manufacturer of all perishables. Materials that becomes congealed, thick, non-uniform or otherwise unsuitable for proper application shall be removed from the project site and replaced with new properly stored and tested materials.
- F. Provisions for placement of the Contractor's equipment must be planned by the Contractor and submitted to the Owner and the Engineer for approval.
- G. Provide off-site storage and protection when site does not permit on-site storage or protection.

1.06 WEATHER AND TEMPERATURE REQUIREMENTS

- A. Work shall not commence or proceed, with the exception of the completion of necessary temporary measures to make the building weathertight, when the ambient air temperature is below 32°F unless otherwise specified.
- B. Work shall not commence or proceed, with the exception of the completion of necessary temporary measures to make the building weathertight, when precipitation of any kind, or winds in excess of 20 miles per hour are present or imminent or when, in the sole judgment of the Engineer or his authorized representatives, conditions are unfavorable or detrimental to the proper installation of the systems.
- C. Work shall not commence or proceed, with the exception of the completion of necessary temporary measure to make the building weathertight, when water, ice or frost is present on or within the materials or surfaces to which materials are to be applied.

- D. Work shall not commence or proceed with the exception of the completion of necessary temporary measures to make the building weathertight when the temperature is too hot to allow proper installation, or when existing or previously installed work is being damaged by the application, or when temperature conditions present a health or safety hazard to the workers on the site.

1.07 SUBSTITUTIONS

- A. Whenever the proposal of substitute material, equipment or process is permitted by the Specifications, the proposed substitute material, equipment or process shall be submitted in accordance with the General Conditions and subject to the requirements contained herein and the construction regulations and laws of the Commonwealth of Massachusetts.
- B. After the start of construction, the proposal of substitute material, equipment or process will be considered only for one of the following reasons:
 - 1. The manufacture or production of the specified material, equipment or process has been discontinued.
 - 2. The specified material, equipment or process is not available in sufficient quantity or quantities to complete the work. Failure of the Contractor to award subcontracts in sufficient time, or failure of the Contractor and/or subcontractor to place orders for material, equipment or process so as to insure delivery or execution without delaying the Work shall not establish cause for approval of substitutions.
 - 3. Delays beyond the control of the Contractor, such as but not limited to, strikes, lockouts, storms, fires, or earthquakes, which preclude the procurement and delivery of materials or equipment for the Project as included in Contractor's proposal.
 - 4. Advancement of the delivery date provided this advances the overall progress of the Work.
 - 5. Improvement in quality or function of the material, equipment or process.
- C. The Contractor must submit a separate request in writing for each proposed substitution, supported with complete data with drawings, specifications, samples as appropriate, including:
 - 1. Comparison of the qualities of the proposed substitution with that specified.
 - 2. Changes required in other elements of the Work because of substitution.
 - 3. Effect on the construction schedule.
 - 4. Cost data comparing the proposed substitution with the product specified.
 - 5. Any required license fees or royalties.
 - 6. Availability of maintenance service and source of replacement materials.
- D. Any proposed substitute material, equipment or process shall be subject to the following conditions:
 - 1. Submittal of the proposed substitute material, equipment or process per the General Conditions.

2. Submittal of the request for a substitute early enough to allow ample lead time for the Engineer's review, preparation of the submittals, fabrication and delivery, without delaying the Work.
 3. Approval of substitution by the Engineer and Owner.
- E. A request for substitution constitutes a representation that the Contractor:
1. Has investigated proposed product and determined that it is equal to or superior in all respects to that specified.
 2. Will provide the same warranty for the Substitution as for the 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 Owner.
 4. Waives claims for additional costs or time extension, which may subsequently become apparent.
 5. Will reimburse Owner for review or redesign services associated with approval.
- F. 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 the Contract Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 70 00

CONTRACT CLOSEOUT

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. The General Conditions of the Contract for Construction and the General Requirements are hereby made part of this specification.

1.02 SECTION INCLUDES

- A. The work of this section consists of ***Final Cleaning and Closeout, Project Record Documents, Warranties and Bonds.***

1.03 FINAL CLEANING AND CLOSEOUT

- A. Each Subcontractor or Contractor, in addition set forth in the General Conditions, shall at all time keep the premises free from accumulation of waste materials or rubbish caused by his employees or work.
- B. At the completion of the Project, the Contractor shall restore or replace all property damaged by his Work and shall remove all spots, paint, smears, soil, concrete, mortar, sealant, adhesives, asphalt, writing, droppings, or other foreign materials, from all Work. Remove all temporary protection from all the Work. Final cleaning shall include as a minimum:
 - 1. Clean site; sweep paved areas, rake clean landscaped surfaces.
 - 2. Remove waste and surplus materials, rubbish, and construction facilities from the site.
 - 3. The Contractor shall clean all walls, windows or other building and grounds elements that have been affected by his work.
 - 4. Repair, patch and touch-up marred surfaces to specified finish to match adjacent surfaces.
- C. Contractor shall submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is substantially complete in accordance with Contract Documents and ready for Engineer's inspection. Engineer shall issue a punchlist consisting of unacceptable Work and items. Contractor shall immediately make acceptable such punchlist items to the satisfaction of the Engineer and Owner. Contractor shall then notify, in writing, the Engineer that all such punchlist items are complete and he is ready for reinspection. Any subsequent costs relative to reinspections that are required due to the Contractor not properly correcting the punchlist items shall be paid for by the Contractor, and will be deducted from his final application for payment.

- D. Contractor shall not remove crews or equipment until the project is totally completed, including punch list items, without the written permission of the Engineer.
- E. If the Contractor fails to totally complete the project by the completion date required by the Contract Documents and as modified by any change orders, the Contractor shall pay all Engineering and Observation costs incurred from this project by the Owner after Contract Completion Date. These costs will be deducted from the Contractor's Final Requisition for Payment.
- F. If the Contractor feels that he cannot properly complete the work during the given time constraints, then he shall make provisions for and submit his plans and requirements for working a double shift and/or weekends in order to complete the project by the date given in the Contract Documents.
- G. Contractor shall submit Final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- H. Contractor shall submit as-built drawings after substantial completion of the Project. The as-builts shall include, but not be limited to, the sepias of the Drawings incorporating all changes and bulletins (enclosed in clouds), location and size of unit price work, all shop drawings incorporating all changes (enclosed in clouds), and all approved submittals.
- I. Closeout submittals include, but are not limited to the following:
 - 1. Project Record Documents.
 - 2. Operation and Maintenance Data.
 - 3. Maintenance Manuals.
 - 4. As-built Drawings.
 - 5. Manufacturer's inspection reports and punchlist.
 - 6. Warranties and Guarantees.
 - 7. Evidence of payments and release of liens, including but not limited to:
 - a. Contractor's Affidavit of Payment of Debts and Claims-AIA G706.
 - b. Contractor's Affidavit of Release of Liens-AIA G706A, with Consent of Surety to Final Payment (AIA G707), and Contractor's release of waivers of lien for subcontractors, suppliers and others with lien rights against property of Owner, together with a list of those parties.

1.04 PROJECT RECORD DOCUMENTS

- A. Maintain on site, one set of the following record documents; record actual revisions to the Work: 1. Contract Drawings; 2. Project Manual, including addenda; 3. Specifications; 4. Approved shop drawings; 5. Change Orders and other Modifications to the Contract; 6. Field change authorizations.
- B. Store Record Documents separate from documents used for construction. Maintain documents in clean, dry, legible condition; do not use record documents

for construction purposes. Make documents available at all times for inspection by Engineer and Owner.

- C. Record information concurrent with construction progress.
- D. Specifications and Addenda: Legibly mark to record:
 - 1. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and Modifications.
- E. Record Documents and Shop Drawings: Legibly mark the record set of Contract Documents using a red pencil for all graphic work and red ink for all written work to record actual construction:
 - 1. Field changes of dimension and detail.
 - 2. Location and extent of all repairs.
 - 3. Details not on original Contract Drawings.
 - 4. Changes not made by change order and field change authorization.
- F. Legibly mark shop drawings to record changes made after approval.
- G. Submit record documents to Engineer at completion of project.

1.05 WARRANTIES AND BONDS

- A. The act of the Contractor in executing the Contract or the Work shall be considered as his acceptance of the following guarantees covering the Project:
 - 1. Any materials, workmanship or equipment furnished as part of this Project which prove defective or fail to operate properly, within two (2) years, or as otherwise specified in the Contract Documents, of the date of acceptance of the Work, shall be repaired and/or replaced by the Contractor promptly upon notification from the Owner and without cost to the Owner. Also reference Divisions 2 through 16 for additional warranties and guarantees.
 - 2. Date of acceptance will be established by the Owner and Engineer upon finding all items of this Project have achieved final completion as to quality of workmanship and materials.

PART 2 - PRODUCTS (Not used)

PART 3 - PRODUCTS (Not Used)

END OF SECTION

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SECTION 02 41 00

DEMOLITION

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. The General Conditions of the Contract for Construction and the General Requirements are hereby made part of this specification.
- B. Maintain a copy of all applicable drawings, specifications, shop drawings, and approved submittals at the site at all times during the Work.

1.02 SECTION INCLUDES

- A. The work of this section consists of the demolition and legal disposal of materials to be removed at specified locations as required to accomplish the work, as specified and detailed.
- B. Demolition work shall include, but is not limited to, the following:
 - 1. The EPDM roof membrane system that exists at the low-sloped Roof Areas are to be replaced utilizing a “tear-off” application. Demolition work shall include complete removal of all stone ballast, membranes, flashings, insulation, pitch pockets, abandoned roof top penetrations, deteriorated wood blocking, deteriorated roof decking, and roof drains.
- C. The Contractor shall use extreme caution during the roof removal and replacement operations. The Contractor is responsible for maintaining the roofs in a watertight condition during the roof removal and replacement process. The Contractor is responsible for preventing any construction related material from entering the building and the roof drainage system(s) during the roof removal and replacement process.
- D. The Contractor shall use caution during construction operations. The building is operational and contains personnel, furniture, fixtures and equipment. Mechanical equipment such as lighting, electrical conduits, junction boxes, ceiling attachments, etc. may exist in the vicinity of or on the underside of the roof decking. Contractor shall take all necessary precautions so as not to cause any damages. Any damages that interrupt service and/or require repairs to the building, furniture, fixtures or equipment shall be the responsibility of the Contractor at no additional cost to the Owner and shall be repaired immediately.
- E. The Contractor shall use extreme caution during the entire construction period. The Contractor is responsible for maintaining the building in a watertight/weathertight condition during the entire construction period. The Contractor is responsible for preventing any construction related material from

entering the building and the roof drainage system(s) during the during the entire construction period.

- F. The existing roofing system composition information has been compiled from a variety of sources (Reference is made to the Drawings). Plans and dimensions under which the Work is to be performed are derived from a variety of sources. The existing conditions are provided for general information only. Actual conditions may vary. Contractor is required to verify existing roofing system composition, conditions, and dimensions prior to submitting his bid. No additional compensation or time extension will be made for dimensional errors or discoverable inaccuracies related to existing conditions in the contract documents.
- G. The drawings indicate and show limits of construction for this project. The specifications specify material and work requirements for this project. Both are complementary to each other and both shall be followed to complete the work.

1.03 RELATED WORK

- A. Section 04 50 00 – Masonry Restoration
- B. Section 05 31 00 – Steel Deck Repairs
- C. Section 06 10 63 – Rough Carpentry
- D. Section 07 22 00 – Roof Insulation
- E. Section 07 54 00 – Roofing & Flashing
- F. Section 07 72 00 – Roof Accessories
- G. Section 22 00 01 – Plumbing – Roof Drains
- H. Section 23 00 00 – HVAC (Filed Sub-Bid)
- I. Section 23 00 01 – Temporary Mechanical Disconnects
- J. Section 26 00 00 – Electrical
- K. Section 26 00 01 – Temporary Electrical Disconnects

1.04 PROJECT COORDINATION

- A. The Project Coordination Administrator shall be the Owner's Project Manager as employed and directed by the Owner. The Contractor shall cooperate fully with the Administrator in all aspects of the demolition, including but not limited to, the following: allocation of demolition areas, demolition equipment, dumpsters, dump trucks, chutes, protection; hours of operation, and traffic flow.
- B. It is the responsibility of the Contractor to coordinate the work of this Section with all other work on the project.
- C. The Contractor shall make all necessary arrangements to limit travel on the existing roof systems. Where it is necessary to travel on the existing roofing system the contractor shall provide all necessary temporary protection needed to protect the existing roofing system so as to ensure no leaks into the facility. Any damage to the existing roofing system caused by work of this contract shall be repaired at no cost to the owner. The Contractor shall maintain the building in a watertight condition through the duration of the contract.

- D. Contractor shall coordinate completion and clean up of work on a daily basis, including maintaining water-tightness for project duration.

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1.05 PROJECT PROGRESS SCHEDULES

- A. Contractor shall prepare and provide his Project Progress Schedule, prior to the preconstruction meeting, to the Engineer and the Owner's Project Manager for review. The schedule shall show the complete sequence of construction by activity, with dates for beginning and completion of each element of construction. Identify each item by specification Section number. Provide sub-schedules to define critical portions of the entire schedule. Coordinate content with Schedule of Values.
- B. The Project Progress Schedule will be reviewed at the preconstruction meeting and will be updated at each construction meeting, or more often as needed. Contractor shall update the schedule after each meeting, identifying changes since previous version, and submit to all parties in advance of the next scheduled construction meeting, or as directed by the Engineer and the Owner's Project Manager.

1.06 SUBMITTALS

- A. The Contractor shall submit for approval the complete sequence of operations for demolition and show how it is coordinated with all other aspects of the job. Work shall not begin until such a schedule has been approved by the Engineer and the Owner.
- B. The Contractor shall submit a description of all procedures and equipment to be utilized to perform the demolition work, debris control and disposal. No heavy mobile equipment shall be permitted on the roof deck structures.
- C. Contractor shall submit to the Engineer, for approval, proposed methods used to contain dust and fumes in the work area.
- D. Submit copies of proposed rodent and pest control program that Contractor will utilize (if it becomes necessary) including products to be used, manufacturer's instructions, areas to be treated, and pollution preventive measures.
- E. The Contractor shall perform an existing condition survey of the building, grounds and adjacent areas prior to work commencement. The Contractor shall provide existing conditions documentation (photos and/or DVD) and a list of damaged or deteriorated elements to the Owner and Architect. The Contractor shall be responsible for repair or replacement of damaged or deteriorated items, not on that list, when the operations of the Contractor are complete, to the satisfaction of the Owner and Architect, at no change in contract price.

- F. The Contractor shall submit proposed methods and required procedures used to remove and legally dispose of the identified asbestos containing materials contained within the roofing products

1.07 HAZARDOUS MATERIALS

- A. If any hazardous waste materials, or materials suspected to contain hazardous waste are encountered during construction, demolition, or cutting and patching the Contractor shall stop and notify the Engineer and Owner immediately. The Contractor shall provide the Owner with these procedures prior to any demolition. The Contractor shall also provide the Owner all information related to the safe disposal of such upon project completion (i.e. dumping slips, manifestation reports, etc.).
- C. If the Contractor or Subcontractor disturbs, removes, disposes, or encapsulates these materials without written authorization and instructions from the Owner or Architect; or disturbs, removes, disposes, or encapsulates these materials in a manner not in accordance with the authorizations and instructions, the Contractor and Subcontractor shall indemnify, defend, and hold harmless the Owner and Architect against any loss, damage, or liability arising or resulting from such unauthorized improper acts of the Contractor and Subcontractor; and further, the Owner and Engineer shall not be responsible for any such loss, damage, or liability arising or resulting from the Contractor's or Subcontractor's acts.

1.08 CONTRACTOR'S USE OF PREMISES

- A. Contractor shall limit its use of the site for work and for storage to allow for:
 - 1. Owner occupancy and use of the building during construction.
 - 2. Public use of walks, parking lots, and driveways.
- B. Do not block exits at any time. Provide protected entranceways at each entrance when working in these areas.
- C. Coordinate work on the roof, use of the site, storage areas, and staging areas with the Owner. Limit use of the site and working hours to dates, times, and locations approved by the Owner.
- D. Cooperate with the Owner's scheduling requirements for working at the building. Work under this Section shall not interfere with the operation of the building or building occupants at any time.
- E. The Contractor is responsible for protecting all materials and equipment stored on the site.
- F. Smoking is not permitted on the grounds.
- G. Dispose of all trash and debris in a legal manner off-site. Do not throw debris from access equipment or staging. Conduct debris to approved containers on

the ground. Locate debris containers only in locations approved by the Owner in advance

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Provide adequate number and size of dumpsters, refuse containers, trucks, chutes, staging, access equipment, demolition equipment, etc. for proper execution of demolition work.
- B. All demolition removal containers shall be properly protected and maintained on a daily basis. Owner must approve locations of dumpsters/refuse containers. Contractor shall submit to the Owner and Engineer, for approval, proposed methods used.

PART 3 – EXECUTION

3.01 DUST AND FUME CONTROL

- A. Contractor shall take all necessary precautions to (1) keep dust confined in the present work area and (2) prevent hazardous accumulations of dust, fumes, mists, vapors, or gases in areas occupied during construction.
- B. Contractor shall submit to the Engineer, for approval, proposed methods used to contain dust and fumes in the work area. At a minimum, Contractor shall provide adequate protection at air intake units so as to prevent dust, fumes, vapors or gases from entering the facility. Contractor shall employ an industrial hygienist to monitor air quality during application of hazardous or volatile materials, if required.

3.02 DEBRIS CONTROL

- A. Contractor shall remove all debris from the project site and shall legally dispose of all debris generated by the project. Debris shall be properly protected (and totally covered at the end of each work day) while on site and shall be properly secured and totally covered before it is transported. Debris shall be removed from the project site on a weekly basis or more often as required to maintain a neat clean site. Project site shall be broom swept on a daily basis.
- B. Contractor shall be responsible for any damages to the building; it's contents, and any vehicles as a result of his negligence during the demolition and/or construction process.

3.03 RODENT AND PEST CONTROL

- A. Contractor is responsible to provide rodent and pest control as necessary or as required preventing infestation of construction, the building, and temporary

project offices and enclosures. Employ methods and use materials that will not adversely affect conditions at the Project site or on adjacent properties.

3.04 NOISE CONTROL

- A. All demolition and construction work that creates excessive noise shall be reviewed with the Owner as to the types of equipment that is intended for use during normal business hours and obtain Owner's approval for such use. Noise limits shall conform to the requirements of the local governing body.

3.05 BARRICADES

- A. The Contractor shall provide and maintain suitable barriers as required to prevent public entry, and to protect the work, existing facilities, trees and plants from public construction operations; remove when no longer needed or at completion of Work. Barriers shall conform to city and state laws, ordinances and permit requirements.
- B. All work areas shall be protected and well marked with fences or barriers and as required by public officials. Provide such barricades, safety and traffic control equipment, and police officer as shall be necessary to restrict traffic from work areas and protect all pedestrians, Owners, tenants, and visitors during construction. Contractor shall provide and maintain all necessary temporary barricades for safe conduct of his work, or as required by federal, state or local laws or ordinances and in accordance with OSHA requirements and other requirements of this specification.

3.06 PROTECTION OF LANDSCAPING AND PAVEMENT

- A. Contractor shall protect existing landscaping and pavement areas as necessary or as required. Do not stockpile/store construction materials or debris materials in such a manner that it will permanently harm the landscaping or the pavement. Provide temporary protection to protect landscaping and pavement.
- B. Contractor shall bring back to its original conditions (repair or replace in a manner acceptable to the Engineer and Owner) any portion of the landscaping (including lawns, trees, bushes and plantings), parking areas and pavements or equipment that is damaged by the Contractor or his Subcontractors' operations. Site repair shall be performed promptly after the operations have moved to a different location on the site. Site repair shall not be delayed until substantial completion of the entire project.

3.07 PROTECTION OF WORK

- A. Contractor shall protect the project site including the building, its contents, all streets, walls, underground and overhead utilities. All areas shall be left in a watertight condition in their entirety at all times. Contractor shall provide protective measures and materials to assure that each element will be without

damage or deterioration throughout the entire construction period up to the date of final completion. Any defective elements shall be removed and replaced at the Contractor's expense and to the satisfaction of the Engineer and Owner. Remove protective coverings and materials at the appropriate time, but no later than final cleaning operations.

- B. No work shall take place during inclement weather. No work shall take place when moisture is present on the work area or in any of the materials. The Engineer may order the work stopped when, in his opinion, the weather conditions warrants him to do so. Contractor shall take such measures as necessary to dry out work surfaces so that the work can continue with minimum delay.
- C. Contractor shall cover and protect all walls, windows, projections, soffits, etc. where material is to be hoisted or removed from the roof deck. Contractor shall be responsible for all scrapes, stains, and damage to the walls and shall repair or replace any walls, windows, siding, etc., which are damaged by his operations, to the satisfaction of the Engineer and Owner. Any areas damaged shall be restored or cleaned, to the satisfaction of the Owner by the Contractor at no cost to the Owner.
- D. Whenever the possibility exists that debris or materials may fall causing a hazard to persons inside or outside the building, the Contractor shall post one or more of his employees to temporarily close these hazardous areas. The person in charge of the facility shall be notified prior to the commencement of work that may pose this type of hazard. Proper barricades shall be provided to prevent normal access to or around these areas.
- E. Contractor shall properly protect all areas where falling debris or dust is expected due to his operations. Contractor shall be responsible for providing adequate personnel to clean and protect these areas. Contractor shall include these costs in the bids.
- F. Protect the building interior, contents, Owner's employees and customers from all hazards associated with the Contractor's operations.
- G. Any damage to the interior of the building or its contents due to the Contractor's operations or to leaks during the Contractor's operations shall be corrected at the Contractor's expense to the satisfaction of the Owner and the Engineer.
- H. Any damage to the exterior of the building or any roof top equipment due to the Contractor's operations shall be corrected at the Contractor's expense or to the satisfaction of the Owner and the Engineer.
- I. No member of the roof shall be overstressed due to construction loads and demolition operations. The Owner assumes no responsibility for the actual condition of the structure.

3.08 REPAIR OF DAMAGES

- A. Damage to any portion of the building which results in disruption of or inconvenience to the Owner or his employees shall be immediately repaired or replaced by the Contractor. If such restitution is not promptly made, the Owner shall have the necessary work performed by an outside agency at the Contractor's expense.

3.09 CLEANING

- A. The building and adjacent areas shall be left in a broom-clean condition at the end of each day. On completion of the work of this section and after removal of all debris, the site shall be left in a clean condition satisfactory to the Owner and to the Engineer.
- B. At the completion of the Project, the Contractor shall restore or replace all property damaged by his Work and shall remove all spots, paint, smears, soil, concrete, mortar, sealant, adhesives, asphalt, writing, droppings, or other foreign materials, from all Work. Remove all temporary protection from all the Work.
- C. Final cleaning shall include as a minimum:
 - 1. Clean site; sweep paved areas, rake clean landscaped surfaces.
 - 2. Remove waste and surplus materials, rubbish, and construction facilities from the site.
 - 3. The Contractor shall clean and repair all walls, windows or other building and grounds elements that have been affected by his work.
 - 4. Repair, patch and touch-up marred surfaces to specified finish to match adjacent surfaces.
 - 5. The Contractor shall clean the surface of the new PVC roof membrane to the satisfaction of the Engineer, Manufacturer, and Owner.

END OF SECTION

SECTION 04 50 00

MASONRY RESTORATION

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. The General Conditions of the Contract for Construction and the General Requirements are hereby made part of this specification.
- B. Maintain a copy of all applicable drawings, specifications, shop drawings, and approved submittals at the site at all times during the Work.

1.02 SECTION INCLUDES

- A. The work of this Section consists of completing the work as indicated on Drawings and specified herein. This work includes, but is not limited to the following:
 - 1. Remove and replace brick masonry and associated throughwall flashings as required to install new throughwall flashings, at above roofline masonry walls at locations indicated on the Drawings.
- B. All work shall be performed in a first class, workmanlike manner. The Contractor shall schedule and coordinate the work with the Owner to minimize any inconvenience to the building occupants, to ensure weathertightness throughout the project duration and to prevent any disruption of the normal use of the building.
- C. All materials shall be verified by Contractor to be proper for each intended use, and the entire work of this Section shall be done in such a manner that each installation will perform its intended purpose as applicable, in the finished work.
- D. The drawings indicate and show limits of construction for this project. The specifications specify material and work requirements for this project. Both are complementary to each other and both shall be followed to complete the work.
- E. Plans and dimensions under which the Work is to be performed are derived from a variety of sources. The existing conditions are provided for information only. Actual conditions may vary. Contractor is required to verify existing system composition, conditions, and dimensions prior to submitting his bid. No additional compensation or time extension will be made for dimensional errors or discoverable inaccuracies related to existing conditions in the contract documents.

1.03 RELATED WORK

- A. Section 02 41 00 – Demolition
- B. Section 05 31 00 – Steel Deck Repairs
- C. Section 06 10 63 – Rough Carpentry
- D. Section 07 22 00 – Roof Insulation
- E. Section 07 54 00 – Roofing & Flashing
- F. Section 07 72 00 – Roof Accessories
- G. Section 23 00 00 – HVAC (Filed Sub-Bid)
- H. Section 23 00 01 – Temporary Mechanical Disconnects
- I. Section 26 00 00 – Electrical
- J. Section 26 00 01 – Temporary Electrical Disconnects

1.04 PROJECT COORDINATION

- A. The Project Coordination Administrator shall be the Engineer and the Owner's Project Manager (OPM) as employed and directed by the Owner. The Contractor shall cooperate fully with the Administrator and OPM in all aspects of the work.
- B. The Contractor shall make all necessary arrangements to limit travel on the existing roof. Where it is necessary to travel on the existing roof the Contractor shall provide all necessary temporary protection needed to protect the existing roofing system so as to ensure no leaks into the facility. Minimum protection at areas adjacent to masonry work shall include 10 mil poly covering the affected roof area, with 2" rigid insulation over the poly, and 1/2" plywood as a working surface. Any damage to the existing roofing system caused by Work of this contract shall be repaired by the Contractor at no cost to the Owner. The Contractor shall maintain the building in a watertight condition through the duration of the contract. Where at all possible, all work above roofs to be replaced, should be completed prior to commencing roof replacement procedures.
- C. Contractor shall coordinate completion and clean up of work on a daily basis, including maintaining weather/weather tightness for project duration.

1.05 SUBMITTALS

- A. Submit shop drawings and product data listed below under provisions of Section 01 33 00:
- B. Qualification Data: Submit qualification data for firm and personnel specified in "Quality Assurance" Article that demonstrates that both firm and personnel have capabilities and experience complying with requirements specified. For firm and foreman, provide a list of at least three (3) completed projects within the New England Region similar in size and scope to work required on this project. For each project list project name, address, architect, conservator, supervising preservation agency, scope of Contractor's work, and other specified information.

- C. Product Literature: Manufacturer's published technical data for each product to be used in work of this Section including requirements for application and use. Include test reports and certificates verifying that product complies with specified requirements.
- D. Program of Work: Submit a written program.
 - 1. Include detailed description of materials, methods, and equipment to be used for each type of work.
 - 2. Include written descriptions, drawings, and diagrams, outlining proposed methods and procedures for protection of personnel, the public, and the existing construction during work of this Section.
 - 3. If alternate methods and materials to those specified are proposed for any phase of masonry restoration, provide written description. Show evidence of successful use on comparable projects and demonstrate effectiveness for use on this project.
- E. Samples:
 - 1. Mortar: Cured mortar samples set in 1/2 in. by 6 in. plastic or aluminum channels for approval of color and texture.
- F. Prepare quality control panels as specified in Article "Quality Control Panels," below.
- G. The Contractor shall submit a description of all procedures and equipment to be utilized to perform the demolition work and debris control.
- H. The Contractor shall submit the proposed methods used to contain dust and fumes in the work area.
- I. Material Safety Data Sheets of all specified products.

1.06 QUALITY CONTROL PANELS

- A. General: Before beginning the Work, prepare quality control panels to provide standards for work of this Section. Do not proceed with the Work until Engineer has approved relevant quality control panels.
 - 1. Locate quality control panels as directed by Engineer.
 - 2. Provide 48 hours notice to Engineer prior to start of each quality control panel.
 - 3. Engineer will monitor quality control panels. Panels not performed in presence of Engineer will be rejected.

4. Perform quality control panels using crew that will be executing the work and following requirements of this Section.
 5. Repeat quality control panels as necessary to obtain approval of Engineer.
 6. Protect approved quality control panels to ensure that they are without damage, deterioration, or alteration at time of Substantial Completion.
 7. Approved quality control panels in undamaged condition at time of Substantial Completion may be incorporated into the Work.
 8. Approved quality control panels will represent minimum acceptable standards for masonry restoration. Subsequent masonry restoration work that does not meet standards of approved quality control panels will be rejected.
- B. Prepare the following quality control panels:
1. Joint Preparation in Brick Masonry: One (1) panel, minimum four (4) SF.
 2. Pointing of Brick Masonry: One (1) panel, minimum four (4) SF.
 3. Cleaning Sample encompassing cleaning soiling from Brick Masonry: Two (2) panels, 25 sq. ft. minimum each.
- C. All masonry exposed to view in the finished work, including brick materials, mortar joints, shall match the existing materials of this project in color, size, and texture, etc. The decision of the Engineer shall be final in determining whether proposed materials constitute an adequate match.

1.07 QUALITY ASSURANCE

- A. A licensed Masonry Contractor employing personnel experienced and skilled in masonry restoration work shall implement the specified masonry restoration work. The Masonry Contractor shall have a minimum of five (5) years experience performing the specified masonry restoration work. Contractor shall demonstrate to Owner's satisfaction that, within previous five (5) years, he has successfully performed and completed in a timely manner at least three (3) projects similar in scope and type.
1. Foreman: A fulltime foreman with Masonry Restoration experience shall directly supervise Masonry Restoration. Foreman shall be on site daily for duration of work of this Section. Same foreman shall remain on project throughout work unless his performance is deemed unacceptable.
 2. Mechanics: Masonry Restoration shall be carried out by a steady crew of skilled mechanics who are thoroughly experienced with materials and methods specified, have a minimum of three (3) years experience with work on similar buildings, and are familiar with design requirements.

Contractor shall certify that mechanics employed for work of this Section fully understand project requirements. In acceptance or rejection of work of this Section, no allowance will be made for workers' incompetence or lack of skill.

4. Subcontractors: Subcontractors are bound by same requirements as Masonry Contractor. No Subcontractors shall be employed unless approved in writing by Engineer
- B. Source of Materials: Obtain materials from a single source for each type of material required to ensure uniform quality, color, and texture.
- C. Alternate Cleaning Methods: If Contractor proposes use of cleaning procedures and products other than those specified and Engineer gives preliminary approval following required submittals, Contractor shall create quality control panels demonstrating ability of proposed products and procedures to produce specified cleaning results and for comparison with specified quality control panels at no additional cost to Owner. No alternate method shall be permitted until it has been approved by Engineer.
- D. Field Supervised Construction: Notify Engineer before beginning any of the work, including, joint preparation, mortar preparation, masonry repair or repointing, through wall flashing replacement, brick replacement, sealant replacement, and cleaning.
- E. Erector: Company specializing in performing the Work of this section with minimum 5 years experience.

1.08 HAZARDOUS MATERIALS

- A. If any hazardous waste materials, or materials suspected to contain hazardous waste are encountered during construction, demolition, or cutting and patching the Contractor shall contact the appropriate Massachusetts State Agency and the appropriate Federal Agency concerning all questions and the latest procedures for the safe removal, disposal, or encapsulation of these materials and shall adhere to all procedures. The Contractor shall provide the Owner with these procedures prior to any demolition. The Contractor shall also provide the Owner all information related to the safe disposal of such upon project completion (i.e. dumping slips, manifestation reports, etc.).
- B. If the Contractor or Subcontractor disturbs, removes, disposes, or encapsulates these materials without written authorization and instructions from the Owner or Engineer; or disturbs, removes, disposes, or encapsulates these materials in a manner not in accordance with the authorizations and instructions, the Contractor and Subcontractor shall indemnify, defend, and hold harmless the Owner and Architect against any loss, damage, or liability arising or resulting from such unauthorized improper acts of the Contractor and Subcontractor; and further, the Owner and Engineer shall not be responsible for any such loss, damage, or liability arising or resulting from the Contractor's or Subcontractor's acts.

1.09 CODES AND STANDARDS

- A. Except as modified by the requirements of other governing codes and by this specification, the work shall conform to the provisions and recommendations of the following codes and standards:
1. American Society for Testing and Materials (ASTM);
 - ASTM C144 - Aggregate for Masonry Purposes
 - ASTM C150 - Portland Cement
 - ASTM C207 - Hydrated Lime for Masonry Purposes
 - ASTM C270 - Mortar for Unit Masonry
 - ASTM E514 "Water Permeance of Masonry"
 2. Federal Specifications (FS).
 3. Occupational Safety and Health Administration (OSHA) - Construction Standards.
 4. Brick Institute of America (BIA).
 5. IMIAC – Recommended practices and specifications for cold weather masonry construction.
 6. ACI 530 – Building code requirements for masonry structures.
 7. ACI 530.1 – Specifications for masonry structures.
 8. MA State Building Code, latest revision.

1.10 PRODUCT DELIVERY, HANDLING AND STORAGE

- A. All materials shall be new and of the best quality. All materials shall be delivered to the site in the Manufacturer's unopened containers with Manufacturer's labels intact.
- B. Materials shall be delivered to the site in sufficient quantities to allow continuity of the work.
- C. All materials shall be handled and stored in strict accordance with the Manufacturer's requirements. All materials shall be stored in dry locations, protected from the weather and elevated off the ground.
- D. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Follow precautions outlined on containers or supplied by material Manufacturer/supplier.
- E. The Contractor shall provide all storage facilities. The buildings shall not be used as storage areas.

- F. The location of all storage facilities and staging shall be coordinated with the Owner.

1.11 JOB CONDITIONS

- A. Protection of Building during Cleaning: Protect all building elements and finishes from damage or deterioration caused by masonry work using all means necessary. Repair any damage to materials or finishes resulting from work of this Section to satisfaction of Engineer at no additional cost to Owner.
 - 1. Adjacent Materials: Protect adjacent materials, including but not limited to masonry, metals, glass, paint, and sealants, from cleaning solutions that might damage such materials. Repair or replace materials damaged as a result of work of this Section to Engineer's satisfaction at no additional cost to Owner.
 - 2. Spread of Cleaning Solutions: Do not clean masonry during winds of sufficient force to spread cleaning solutions to unprotected surfaces. Cease cleaning operations when winds may carry chemicals, rinse water, or run-off from chemical cleaning to unprotected areas.
 - 3. Window and Door Openings and Other Penetrations in Building Skin: Use all means necessary to prevent dust, cleaning solutions, and waste products from entering behind building. Provide reversible temporary seals that will prevent dust, water, and chemicals from entering openings and that will not damage or deteriorate substrate. Remove temporary seals following cleaning. Restore substrates to same condition as before installation of temporary seal.
 - a. Infiltration: If Contractor notices that water, chemicals, or chemical fumes or odors are penetrating building skin or if Contractor is told that water, chemicals, or chemical fumes or odors are penetrating to interior of building, he shall cease operations immediately. Operations shall not proceed until cause of infiltration has been eliminated.
 - 4. Collect and dispose of runoff from cleaning operations by legal means and in manner that prevents soil erosion, undermining of paving and foundations, damage to sidewalks, water penetration into building interiors, and any harm to buildings, landscape elements, and natural bodies of water or groundwater table.
- C. Contractor shall review and confirm all building mechanical intake vents, exhaust vents and louvers at or adjacent to all work areas. Coordinate with Owner's facilities department regarding disconnect and/or temporary protective covering prior to commencement of work.
- D. Maintain materials and surrounding air temperatures to minimum 40 degrees F and rising prior to, during, and 48 hours after completion of masonry restoration

work. Masonry materials shall be protected from the elements at all times. All protection to achieve this requirement shall be done in a manner approved first by the Engineer. In no case shall uncured masonry work be exposed to freezing temperatures.

- E. Do not erect masonry when air temperatures exceed 99 degrees F in the shade and relative humidity is less than 40 percent, unless work is prevented from drying out for not less than 48 hours after having been installed by a method first approved by the Engineer.
- F. Remove masonry work damaged by climatic conditions or insufficient covering or protection and reconstruct as directed by Engineer at no additional compensation. Make adequate provisions during construction to prevent damage by wind.

1.12 COLLECTION AND DISPOSAL OF WASTE PRODUCTS

- A. General: Collect, contain, test, and dispose of solid and liquid wastes in accordance with applicable federal, state, and local laws and regulations.
- B. Provide gutters and troughs to collect runoff from cleaning operations for pretreatment prior to disposal. Do not allow waste materials from cleaning operations to flow or drop onto adjacent roofs, setbacks, sidewalks, plantings, soil, or structures. Direct waste materials to collection vessels for treatment.
- C. Neutralize all cleaning waste products to a pH of between 5.0 and 9.5. Propose specific methods and materials for neutralization in Waste Disposal Program submission.
- D. Dispose of cleaning run-off by legal means that prevent: erosion, undermining, damage to plant material, and water penetration into building.
 - 1. Install protection and waste collection systems before general cleaning begins.
 - 2. Test all drains and other water removal systems to ensure that they are functioning properly before cleaning operations begin. Notify Owner immediately if any drains or systems are stopped or blocked. Do not begin work of this Section until drains are in good working order.
 - 3. Provide filtration to prevent suspended solids such as masonry residue from entering drains and drain lines. Contractor shall be responsible for cleaning out any drain or drain line that becomes blocked or filled with sand or other solids as a result of work performed under this Section.
- E. Dispose of all waste products at regular intervals. Do not allow waste products to accumulate on site.

1.13 CONTRACTOR'S USE OF PREMISES

- A. Contractor shall limit its use of the site for work and for storage to allow for:
 - 1. Owner occupancy and use of the building during construction.
 - 2. Public use of walks, parking lots, and driveways.
- B. Do not block exits at any time. Provide protected entranceways at each entrance when working in these areas.
- C. Coordinate use of the site, storage areas, and staging areas with the Owner. Limit use of the site and working hours to dates, times, and locations approved by the Owner.
- D. Cooperate with the Owner's scheduling requirements for working at an occupied building. Work under this Section shall not interfere with the operation of the building or building occupants at any time.
- E. The Contractor is responsible for protecting all materials and equipment stored on the site.
- F. Smoking is not permitted on the grounds.
- G. Dispose of all trash and debris in a legal manner off-site. Do not throw debris from roof, access equipment, or staging. Conduct debris to approved containers on the ground. Locate debris containers only in locations approved by the Owner in advance.

1.14 COORDINATION

- A. Coordinate all work of this section with other trades. Perform all work in a timely manner as not to delay other trades. The Contractor shall coordinate all work to prevent exposure of the building to inclement weather and leaks at all times.

1.15 WARRANTY

- A. At project completion, Contractor shall provide a written guarantee that covers all defects in workmanship and materials for a period of two (2) years from date of acceptance. Guarantee shall stipulate that if any of his work is found to be defective, is not sound and durable, is not leak free and weathertight, or otherwise not in accordance with the contract documents within two (2) years of final completion, the Contractor shall repair and/or remove and replace the defective work at no cost to the Owner.

PART 2 - PRODUCTS

2.01 BRICK MASONRY UNITS

- A. Flat and Molded Brick: Replacement face brick shall match existing face brick in hardness and weatherability, size, color, and surface texture and reflectance. Provide replacement molded brick custom made to match existing bricks as

required to provide an exact match to existing units, in accordance with ASTM Standards ASTM C216, Grade SW.

- B. Owner shall select from manufacturer's select range face brick. Only brick samples that resemble very closely existing brick will be considered for use.
- C. Shipments shall include the approved percentages of the various grades, properly blended at the factory and equal in all respects to the samples approved for color range, size, texture and quality.

2.02 MORTAR

- A. White Portland Cement: Type 1, ASTM C 150.
- B. Portland Cement: Type I or Type II, ASTM C 150, nonstaining. Do not use masonry cement.
- C. Hydrated Lime: ASTM C 207, Type S.
- D. Sand: Clean sharp sand, free of loam, silt, soluble salts, organic matter, and other deleterious substances and graded in compliance with ASTM C 144. Where mortar is to match existing mortar, select sand or other aggregate to provide mortar matching color and texture of original mortar (with minimum addition of pigment). Mix sand and aggregates as required to provide mortar matching original mortar.
- E. Water: Clean and free of substances deleterious to mortar and masonry.
- F. No additives or admixtures other than those specified shall be used. No chlorides or aggressive corrosive chemicals shall be used.
- G. Colored Mortar Pigments:
 - a) Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes.
 - b) Use only pigments with record of satisfactory performance in masonry mortars.
 - c) Products - Subject to compliance with requirements: Solomon Grind-Chem Services Inc. Model SGS Mortar Colors, Davis Colors Model True Tone Mortar Colors, Consolidated Brick and Building Supplies Inc. Model SE-0.

2.03 MORTAR MIXES

- A. Mortars for Setting and Pointing Masonry: Mortars specified hereinafter shall comply with ASTM C 270, "Standard Specification for Mortar for Unit Masonry." Type "N" Mortar strength; in general, shall be consistent with a low standard deviation, and a 28 day cube compressive strength of a minimum of 750 psi and a maximum of 1799 psi. Mortar mixes may change and may require adjustment before and during construction in accordance with preconstruction conformance testing, field testing, and evaluation thereof by Architect.

1. Type "N" Mortar for Setting and Repointing Masonry (brick & stone):
 - a. 1 part by volume white Portland cement (Type 1)
 - b. 1 part by volume hydrated lime (Type S)
 - c. 5 parts "00" sand (Selected to match sand in original mortar)
 - d. Oxide pigments as needed to match existing mortar color.

2.04 MIXING OF MORTAR

- A. Measure mortar ingredients carefully so that proportions are controlled and maintained throughout all work periods.
- B. Mix mortar in an approved type of power operated batch mixer. Mix for time required to produce a homogeneous plastic mortar and not less than five minutes: approximately two minutes for mixing dry materials and not less than three minutes for mixing after water has been added.
- C. Use minimum amount of water to produce a workable consistency for mortar's intended purpose. Mortar for Pointing: As dry a consistency as will produce a mortar sufficiently plastic to be worked into joints.
- D. Where mortar or grout is required in small batches of less than one cubic yard and Architect specifically approves, mortar may be mixed by hand in clean wooden or metal boxes prepared for that purpose provided that mixing boxes and methods of mixing and transferring mortar are approved by Architect.
- E. After mixing, mortars for pointing or setting shall sit for 20 minutes prior to use to allow for initial shrinkage. Mortar shall be placed in final position within two (2) hours of mixing. Retempering of partially hardened material is not permitted.

2.05 MASONRY ANCHORS

- A. Masonry Veneer Anchor:
 1. Comply with requirements indicated below for basic materials and with requirements indicated under each form of joint reinforcement, tie and anchor for size and other characteristics.
 2. Provide ties and anchors to withstand tension and compression perpendicular to wall of 250 lb. without yielding relative to anchor bolts.
 3. Two-piece assemblies which permit vertical and horizontal differential movement between wall and framework, parallel to, but resist tension and compression forces perpendicular to, plane of wall.
 4. Consisting of stainless steel wire tie section and galvanized metal anchor section for attachment.

5. Wire Size: 3/16 in. diameter.
6. Wire Tie Shape: Trapezoidal.
7. Anchor Section: Galvanized metal, type as detailed.
8. Channel Anchor: 11 gage.
9. Collar Joint Anchor: 12 gage with one expansion anchor.

B. Miscellaneous Masonry Accessories:

1. Joint Fillers:
 - a. Pressure sensitive adhesive on one face to restrict misalignment during construction.
 - b. Closed-cell expanded neoprene, ASTM D1056, Grade RE41E1, SCE41, 12 to 35 lb. per cu. ft. density, 25 percent compression under max. 5 psi.
 - c. Product - Subject to Compliance with Requirements: Williams Products Inc. Model Everlastic.
2. Weep slots shall be clear butyrate plastic 3/8" x 1-1/2" x 3-1/2".

2.06 MASONRY CLEANING MATERIALS

- A. General Brick Cleaning: General Purpose cleaner shall be SURE KLEAN-600 Detergent as manufactured by ProSoCo, Inc., Diedrich #202 as manufactured by Diedrich Technologies Inc., iClean as manufactured by Chemical Products Industries, Inc., or approved equal.

2.07 FLASHING MATERIALS

- A. Through wall flashing shall be constructed of self-adhering bituminous membrane such as Permabarrier by W R Grace; CCW-705 by Carlisle Coatings & Waterproofing Inc.; TW Flashing Membrane by Tamko Building Products, Inc.; or approved equal.
- B. Termination bar shall be 1/8" x 1" copper with pre-punched holes at 6" on center.
- C. Throughwall flashing pan shall be formed of 20 oz. copper.

2.08 TOOLS

- A. Hand Tools: Chisels, hammers, and mallets.

1. Thickness of Chisels: Chisels used to remove mortar from and to otherwise prepare joints shall have a maximum thickness of 5/8 times joint width extending back from tip of chisel a minimum of two (2) times depth at which chisel will be inserted into joint.
 2. Special Tools: Provide special knives or special thin cutter blades for use in joints less than 1/8 in. wide.
- B. Power Tools: Small, hand-held electric grinders with diamond or abrasive blades no greater than 3/32 in. thick and a maximum of 4-1/2 in. in diameter may be used to cut joints. Masonry cutting saws shall have a vacuum attachment for collecting dust or a constant water spray attachment for limiting dust generation. It is a primary concern to limit dust generation to the greatest extent practicable.
- C. Brushes: Stiff, natural bristle brushes.
- D. Trowels for Pointing: Long, thin pointing trowels that are narrower than joints being pointed. Fabricate special trowels for pointing if necessary to provide for proper insertion and compaction of mortar.

2.09 SEALANT

- A. Single Component Urethane: ASTM C 920, Type S, Grade NS, Class 100/50, Uses NT & O; single component, moisture curing, non-staining, non-bleeding. Color of sealant shall match color of adjacent materials, and as approved by the Owner.
- B. Backer rod shall be closed cell polyethylene foam backer rod of proper size to provide 25 % compression when installed. Backer rod shall be Ethafoam SB Brand sealant backer rod as manufactured by Dow Chemical or approved equal.
- C. Bond breaker tape shall be one-sided adhesive tape for use in joints with inadequate depth or configuration for use of backer rod. Bond breaker tape shall be 470 Tape as manufactured by 3M company or approved equal.
- D. All accessories for sealant materials shall be same manufacturer or approved by the manufacturer, and shall include the following: primer, solvents, cleaners, and masking materials.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Verify items provided by other sections of work are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry

work.

3.02 DEMOLITION AT THROUGHWALL FLASHING REPLACEMENT AREAS

- A. Carefully remove existing brick masonry as required to perform the work without damaging building components to remain.
- B. Provide and install temporary shoring as required to prevent settlement of masonry above.
- C. Remove existing throughwall flashings, counterflashings, and sealants as required to perform the work.
- D. Contractor shall provide adequate protection of ALL existing roof areas adjacent to the work area, and to be trafficked to complete the work. This protection shall include a layer of 10 mil polyethylene, 1/2" minimum compressible rigid insulation and 1/2" OSB sheathing.
- E. Provide protection at all times during construction to maintain watertightness.
- F. Contractor shall properly protect all areas where falling debris or dust is expected due to his operations. Contractor shall be responsible for providing adequate personnel to clean and protect these areas. Contractor shall include these costs in the bids.
- G. Protect the building interior, contents, Owner's employees and customers from all hazards associated with the Contractor's operations.
- H. Any damage to the interior of the building or its contents due to the Contractor's operations or to leaks during the Contractor's operations shall be corrected at the Contractor's expense to the satisfaction of the Owner and the Engineer.
- I. Any damage to the exterior of the building, roof membrane, or any roof top equipment due to the Contractor's operations shall be corrected at the Contractor's expense to the satisfaction of the Owner and the Engineer.

3.03 MASONRY PREPARATION

- A. Clean dirt, debris, oil, grease, and other foreign substances that would affect bond of mortar, from all surfaces to receive mortar.
- B. Lay-out brick courses to establish accurate spacing of bond pattern and ensure uniform joint widths. Arrange units in manner that will result in few or no units to be cut.
- C. Wet brick having absorption rates in excess of 0.025 ounces per square inch per minute, when tested in accordance with ASTM C67, so that rate of absorption does not exceed that rate when brick is installed.

- D. Ensure that each brick, immediately before installed, has moisture levels in accordance with ASTM C67, but with dry surfaces.
- E. Verify that field conditions are acceptable and are ready to receive work. Verify that built in items are in proper location and ready for roughing into masonry work.
- F. Beginning of installation means installer accepts existing conditions.
- G. Bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.04 THROUGHWALL FLASHING

- A. Finish work to be free from water leakage under all weather conditions.
- B. Throughwall flashing shall be installed as specified and detailed. Place metal flashing pan to extend across wall cavity. Install self-adhering flashing over flashing pan and extend up wall. End dams shall be formed at the ends of all flashing runs extending past the roof below by 12" by folding and not cutting the flashing to form a 2" tall end dam. End dam shall extend out of the masonry and shall be cut flush once the masonry has cured.
- C. Throughwall flashing shall extend out of the wall construction by 1/2" and shall be cut off even with the face of masonry only after approval by the Engineer.
- D. Tops of throughwall flashing shall be adhered to the back-up wall. Height of rear leg to be 8" minimum. The tops of flashings shall be terminated with a continuous termination bar assembly, sealed along the top edge and counterflashed with existing flashing, where it presently exists.

3.05 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement. Match coursing of existing walls whenever new wall abuts existing wall.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Masonry joints shall be tooled to match existing to give a smooth joint (to match existing profile) of uniform width. Joints shall be concave and shall not be raked. Mortar shall "set-up" enough to have no surface liquid showing, but still be in somewhat plastic state when tooled.

3.06 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work. All brick shall be laid in such a manner that joints are completely filled with mortar. End joints must be filled by shoving the unit into place with sufficient mortar to squeeze out on both sides. "Slushing" end joints

after unit is in place is not acceptable. The bed joint must also be completely filled.

- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
- D. Remove excess mortar as work progresses.
- E. At corners interlock courses leaving no vertical joints.
- F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- H. Stagger alternate courses.
- I. Build-in related items as the masonry work progresses.
- J. Masonry ties between veneer brick and backup shall be spaced no more than 16" on center vertical and 24" on center horizontally. Tie spacing may be adjusted to meet existing conditions with the approval of the Engineer, provided there is at least one tie for each 3.6 square feet of wall area.
- K. Weep slots shall be installed in head joints of masonry course immediately above flashing level, every 24" on center, max.

3.07 TOLERANCES

- A. Maximum Variation From Alignment of Columns: 1/4 inch.
- B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- C. Maximum Variation from Plane of Wall: 3/16 inch in 10 ft.
- D. Maximum Variation from Plumb: 1/4 inch. in 10 ft.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft. (and 1/4 inch in 10 ft.).
- F. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.
- G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.08 MORTAR JOINT TOOLING

- A. Tooling: After final layer of mortar is "leather hard," tool joints with a flat rule jointer, or as directed by Architect.

- B. Profile: Tool joints to match original joint profiles. Solidly compress mortar so that it adheres well to masonry on both sides and forms a dense surface. Premature or late tooling will result in unacceptable finishes that will be rejected.
- C. Duplicate existing finish on adjacent historic joints by brushing newly pointed joints with a nonmetallic natural fiber bristle brush to produce a slight texture.

3.09 MASONRY CURING

- A. Keep newly pointed joints damp for at least 48 hours after mortar has been inserted. Do not apply a direct stream of water to joints for at least 24 hours after mortar has been placed.
- B. Ensure masonry temperature remains as required by specifications until mortar is thoroughly cured.

3.10 MASONRY WALL CLEANING

- A. The Contractor is to clean all masonry wall areas of throughwall flashing replacement with the specified General Purpose Cleaner. The Contractor is to follow recommendations of the cleaning material manufacturer as to the cleaning procedures required in cleaning the exterior masonry components with each of the materials specified. Any dilution of cleaning materials shall be with clean water according to the instructions on the manufacturer's printed label (container label).
- B. Surfaces shall be cleaned of all mortar droppings, stains and foreign substances with general purpose masonry cleaner specified. Marred, cracked, scratched or chipped surfaces will not be accepted. Water run-off during saw-cutting and masonry cleaning shall not be permitted to stain existing building, roofs, sidewalks, curbs, etc.
- C. Non-masonry surfaces shall be protected from contact with the cleaning solution. Wooden and/or painted surfaces shall be protected with sheets of polyethylene, or other proven protective materials, firmly fixed and sealed to the surface. Non-masonry surfaces, which are not protected, shall be kept running-wet with clean water throughout the cleaning process of adjacent masonry.
- D. Pressure applications of the general cleaning materials is not allowed. This practice may drive the cleaning compounds deep into the masonry surface making it impossible to rinse treated surfaces free of all cleaning residues. High pressure spray application of cleaning materials may result in scumming, efflorescence, burning, and severe metallic staining. If spray application of the cleaning solution is desired, apply cleaning agents with low pressure (50 PSI maximum) spray equipment.
- E. Removal of excess mortar and job dirt shall be performed in the following manner unless otherwise indicated by testing.

1. Scrape off excess mortar deposits with sections of brick, wooden scrapers or other non-metallic scraping devices.
 2. Thoroughly pre-wet a large area of the masonry surface to be cleaned.
 3. Using a densely packed, soft fibered masonry washing brush and low pressure water spray, clean the newly installed brick surface of all excess mortar and job dirt.
 4. Rinse treated surfaces thoroughly with fresh water employing full city water pressure or pressure washing equipment, removing all dirt, mortar, etc. from masonry surfaces.
 5. Repeat as necessary.
- F. Clean masonry prior to final setting of mortar. Remove mortar and stains from face of brickwork with dry, stiff-bristle brushes. Additional cleaning procedures may be required by Engineer, if masonry staining occurs. Keep walls clean as work progresses. After mortar has cured, perform final cleaning, using clean water only and stiff fiber brushes.
- G. Water Washing: Wash pointed masonry with clean filtered water and nonabrasive hand tools to remove mortar debris from masonry surfaces.
1. Wash within 48 hours following completion of pointing.
 2. Use blunt-edged wood scrapers, stiff natural bristle brushes, and rough towels along with water to remove mortar debris. Do not use wire brushes.
- H. Repair of Pointed Joints: As cleaning progresses, examine joints to locate cracks, holes, and other defects. Carefully point up and fill such defects with mortar. Where necessary in opinion of Engineer, cut out joints and refill with pointing mortar exercising extreme care to ensure that color matches that of original pointing work. Exposed joint surfaces shall be free from protruding mortar, holes, pits, depressions, and other defects.

3.11 SEALANT PREPARATION

- A. Existing sealant shall be removed in its entirety at all joints indicated. The level of preparation at sealant joint substrate areas shall be reviewed by both the technical representative of the sealant Manufacturer and the Engineer. Sealant pulls tests shall be performed at each specific type of substrate/sealant joint included in the project. Sealant pull tests shall be performed by the sealant Manufacturer in the presence of the Engineer. No sealant installation work shall commence until all joint preparation and sealant pull tests are approved by the Engineer. Please note that sealant primer may be required to obtain the required bond to pass the sealant pull tests.

- B. All joints to receive caulking or sealant shall be dry and free of loose particles, oil or grease, or other material that would prevent or interfere with full adhesion of the caulk or sealant.

3.12 SEALANT INSTALLATION

- A. Do not apply caulking when the ambient air temperature or the temperature of surface to be caulked or sealed is below 50°F or above 100°F. Do not apply caulking or sealant during rain or snow.
- B. Mask off the edges of joints to prevent staining unless it can be demonstrated that the quality of workmanship is high enough so that this protection is not needed.
- C. Backer rod shall be installed at all joints and elsewhere as indicated on the drawings. Install backer rod carefully with approximately 30% compression avoiding tearing, twisting, or stretching. Splices shall be butted tightly. Install backer rod to provide a depth-to-width ratio for the sealant joint of 1:2.
- D. Bond Breaker Tape: Where backer rod is not practical, and where approved by the Engineer, install bond breaker tape to the back of the sealant joints neatly, such that sealant will adhere only to sides of the joint when installed.
- E. Force sealant tightly into the joint, forcing out all air pockets and filling the void completely. Nozzle size shall be of the proper size to the particular joint.
- F. Sealant shall be dry-tooled immediately after application to provide a smooth, uniform surface of the recommended profile.
- G. All surfaces stained, soiled or discolored during caulking or sealing shall be cleaned or restored.
- H. Smears and excess caulking and sealant shall be removed with a cleaning agent as recommended by the sealant manufacturer.

3.13 FIELD INSPECTION

- A. The Engineer and the Owner's Project Manager will be on site periodically to observe the work progress and to monitor contract compliance. Any items observed not in compliance with the contract documents shall be identified and promptly corrected by the Contractor.
- B. Prior to the final project completion, inspections shall be made by representatives of the Engineer, and Owner's Project Manager. A punch list will be developed by each and copies will be forwarded to the Contractor. Contractor shall immediately correct all punch list items. Deviations from the specifications and/or details must be corrected immediately. Warranty shall be issued upon final acceptance of the work.

- C. Contractor is to provide any and all necessary protection to maintain watertightness during the project duration. Any interior damages that occur as a result of the Contractor's negligence shall become the Contractor's responsibility and he shall promptly repair and/or replace all damaged items to the satisfaction of the Engineer and Owner.

3.14 CLEANING

- A. The building and adjacent areas shall be left in a broom-clean condition at the end of each day. On completion of the work of this section and after removal of all debris, the site shall be left in a clean condition satisfactory to the Owner and to the Engineer.
- B. At the completion of the Project, the Contractor shall restore or replace all property damaged by his Work and shall remove all spots, paint, smears, soil, concrete, mortar, sealant, adhesives, asphalt, writing, droppings, and other foreign materials, from all Work. Remove all temporary protection from all the Work. Final cleaning shall include as a minimum:
 1. Clean site; sweep paved areas, rake clean landscaped surfaces.
 2. Remove waste and surplus materials, rubbish, and construction facilities from the site.
 3. The Contractor shall clean all walls, windows, roofs, and other building and grounds elements that have been affected by his work.
 4. Repair, patch and touch-up marred surfaces to specified finish to match adjacent surfaces.

END OF SECTION

SECTION 05 31 00

STEEL DECK REPAIR

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. The Drawings, the Contract for Construction, and General Conditions and General Requirements are hereby made part of this Section.
- B. Maintain a copy of all applicable drawings, specifications, shop drawings, and approved submittals at the site at all times during the Work.

1.02 SECTION INCLUDES

- A. The work of this Section consists of furnishing and installing all steel roof deck repair and replacement products and related items as indicated on the Drawings and specified herein, required to complete the work. Provide unit prices for for the specified work listed in this section on the Form for General Bid.
- B. All materials shall be verified by Contractor to be proper for each intended use, and the entire work of this Section shall be done in such a manner that each installation will perform its intended purpose as applicable, in the finished work.
- C. The drawings indicate and show limits of construction for this project. The specifications specify material and work requirements for this project. Both are complementary to each other and both shall be followed to complete the work.
- D. Plans and dimensions under which the Work is to be performed are derived from a variety of sources. The existing conditions are provided for information only. Actual conditions may vary. Contractor is required to verify existing roofing system composition, conditions, and dimensions prior to submitting his bid. No additional compensation or time extension will be made for dimensional errors or discoverable inaccuracies related to existing conditions in the contract documents.

1.03 RELATED WORK

- A. Section 02 41 00 – Demolition
- B. Section 04 50 00 – Masonry Restoration
- C. Section 06 10 63 – Rough Carpentry
- D. Section 07 22 00 – Roof Insulation
- E. Section 07 54 00 – Roofing & Flashing
- F. Section 22 00 01 – Plumbing
- G. Section 23 00 00 – HVAC (Filed Sub-Bid)

- H. Section 23 00 01 – Temporary Mechanical Disconnects
- I. Section 26 00 00 – Electrical
- J. Section 26 00 01 – Temporary Electrical Disconnects

1.04 DESIGN REQUIREMENTS

- A. Design steel decking in accordance with AISI publication, “Specification” for the Design of Cold-formed Steel Structural Members” except as otherwise shown or specified.

1.05 SUBMITTALS

- A. Submit the following under the provisions of Section 01300:
 - 1. Manufacturer's literature and data sheets for of each type of fasteners used for steel deck repair identified with brand type, size, finish, and other descriptive information.
 - 2. One piece of steel deck proposed for use in repair of existing steel deck (if requested by the Engineer).
 - 3. Manufacturer's literature and data sheets on steel deck replacement.

1.06 REFERENCES

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American Society for Testing and Materials (ASTM): A446/a446M-93 Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality A525-93 General Requirements for Steel Sheet, Zinc Coated (Galvanized) by the Hot-Dip Process. A611-94 Steel, Sheet, Carbon, Cold-Rolled, Structural Quality
- C. American Welding Society (AWS):
D1.3-89 Structural Welding Code - Sheet Steel
- D. Military Specifications (Mil. Spec.):
MIL-P-21035B Paint, High Zinc Dust Content, Galvanizing Repair
- E. American Iron and Steel Institute (AISI) Publication:
Specification for the Design of Cold-Formed Steel Structural Members (1986)
- F. Conform to applicable local building code requirements.

1.07 UNIT PRICES

- A. Provide unit prices for the specified work listed in this section to the Owner.

1. Random removal and replacement of existing deteriorated steel roof decking. Quantities shall be determined by calculation of actual square footage installed with no allowance for waste. The Contractor shall include 600 square feet (SF) as the Base Bid quantity.
 2. Random wire brushing and painting of existing rusted steel roof decking. Quantities shall be determined by calculation of actual square footage installed with no allowance for waste. The Contractor shall include 600 square feet (SF) as the Base Bid quantity.
 3. Random installation of galvanized steel sheet over existing steel roof decking. Quantities shall be determined by calculation of actual square footage installed with no allowance for waste. The Contractor shall include 600 square feet (SF) as the Base Bid quantity.
 4. Random installation of necessary fasteners for proper steel roof deck securement.
- B. The Contractor shall notify the Engineer immediately upon uncovering existing steel deck showing signs of deterioration or excessive deflection.
- C. The Contractor shall perform unit price work only when approved by the Engineer and Owner. The Contractor shall properly document that the work has been completed. Proper documentation shall include photos and locations shown on the roof plan. Quantity tabulation shall be done on a daily basis by the Contractor and reported at the construction meetings, or more often as requested by the Engineer and Owner.

1.08 CONTRACTORS USE OF PREMISES

- A. Contractor shall limit its use of the site for work and for storage to allow for:
1. Owner occupancy and use of the building during construction.
 2. Public use of walks, parking lots, and driveways.
- B. Do not block exits at any time. Provide protected entranceways at each entrance when working in these areas
- C. Coordinate work on the roof, use of the site, storage areas, and staging areas with the Owner. Limit use of the site and working hours to dates, times, and locations approved by the Owner.
- D. Cooperate with the Owner's scheduling requirements for working at an occupied building. Work under this Section shall not interfere with the operation of the building or building occupants at any time.

- E. The Contractor is responsible for protecting all materials and equipment stored on the site.
- F. Smoking is not permitted on the grounds.
- G. Dispose of all trash and debris in a legal manner off-site. Do not throw debris from access equipment or staging. Conduct debris to approved containers on the ground. Locate debris containers only in locations approved by the Owner in advance.

1.09 WARRANTY

- A. The Contractor shall supply the Owner with a minimum two-year workmanship and leak-free warranty. In the event any work related to this section is found to be defective, is not watertight, or otherwise not in accordance with the contract documents within two (2) years of final completion, the Contractor shall repair and/or remove and replace at no cost to the Owner.

PART 2 - PRODUCTS

2.01 STEEL DECKING

- A. Steel Decking and Accessories: ASTM A653, Grade 33, coating class G60
- B. Galvanizing: ASTM A525, G90.
- C. Galvanizing Repair Paint: Mil. Spec. MIL-P-21035B.

2.02 FASTENERS

- A. Sidelap or Steel Sheet Fasteners: For new or existing steel deck shall be #12 x 3/4 zinc-plated hex-washer head self-drilling sheet metal screw with the following minimum properties:

Min. Tensile Strength (installed in 1/8" steel)	1,575 pounds failure
Min. Torsional Strength	80 in. lbs.
Min. Shear Strength (20 ga.)	1,200 pounds
Acceptable for Average Pullout Strength	450 pounds

Approvals: Factory Mutual & Steel Deck Institute

- B. Endlap Fasteners: For new or existing steel deck shall be #12 x 1-1/4" zinc-plated hex-washer head self--drilling sheet metal screw designed for fastening to structural steel with the following minimum physical properties:

Min. Tensile Strength (installed in	1,575 pounds failure
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1/8" steel)	
Min. Torsional Strength	80 in. lbs.
Min. Shear Strength (20 ga.)	900 pounds
Min. Pullover Strength (20 ga.)	1,200 pounds
Average Pullout Strength	1,000 - 2,000 pounds (min.)

Approvals: Factory Mutual & Steel Deck Institute

C. Powder Actuated Fasteners: Fasteners shall be Hilti fasteners or an approved equal.

1. Hilti X-EDNK22 THQ12 (steel support thickness 1/8" up to and including 1/4")
2. Hilti X-EDN19 THQ12 (steel support thickness 3/16" up to and including 3/8")
3. Hilti X-ENP-19 L15 (steel support thickness 1/4" or thicker)

2.03 REQUIREMENTS

A. Unless otherwise noted steel decking shall be 20 ga. 1-1/2 in. deep, wide ribbed roof deck, with minimum effective section properties as follows:

Moment of Inertia.....	0.20 in4/ft
Section Modulus.....	0.25 in3/ft

B. Effective section properties shall be calculated in accordance with AISI publication, "Specification for the Design of Cold-formed Steel Structural Members"

C. Decking accessories shall be the same gauge as the decking unless otherwise noted.

PART 3 - EXECUTION

3.01 PROTECTION

A. The Contractor shall use extreme caution during roof deck replacement operations. The facility is operational and contains personnel, furniture, fixtures and equipment.

1. Contractor shall properly protect all areas from falling materials, debris, or dust due to his operations. Contractor shall be responsible for providing adequate personnel to protect, barricade, clean and protect these areas.
2. Protect the building interior, contents, Owner's employees and customers from all hazards associated with the Contractor's operations.
3. Equipment such as lighting, electrical conduits, junction boxes, ceiling tiles and associated attachment components may exist in the vicinity of or on the underside of the roof decking. Contractor shall take all necessary

precautions so as not to cause any damages. Any damages that interrupt service and/or require repairs to the building furniture, fixtures or equipment shall be the responsibility of the Contractor at no additional cost to the Owner and shall be repaired immediately.

4. During steel deck replacement and repair operations, the Contractor shall post one or more of his employees inside the facility to temporarily close the affected areas. The person in charge of the facility shall be notified by the Contractor prior to the commencement of this work. Proper barricades shall be provided by the Contractor to prevent normal access to or around these areas.
- B. Any damage to the interior of the building or its contents due to the Contractor's operations or to leaks during the Contractor's operations shall be corrected at the Contractor's expense to the satisfaction of the Owner and the Architect.

3.02 STEEL DECK REPLACEMENT

- A. Sections of existing steel roof deck to be replaced and sections of new steel roof deck to be installed shall be cut out square and neat. Cut ends of deck at bearing supports.
- B. Wherever practical, new sections of steel roof deck shall span at least two supports; however, single span conditions are acceptable where spacing of supports is less than four (4) feet.
- C. Where new sections of steel deck will abut existing deck over a support, existing deck shall be cut to the centerline of the support if the support is a joist or a beam. If support is a masonry wall, cut back existing deck to provide at least 3 inches of bearing for new deck and leave not less than 3 inches of bearing for existing deck.
- D. When removing existing deck, take care not to cut or otherwise damage the existing supports. Damage to supports shall be repaired by the Contractor to the satisfaction of the Engineer without cost to the Owner.
- E. Fasten roof deck as specified.
- F. Where deck replacement is required at a roof drain, coordinate with roof drainage requirements as specified.
 1. After decking is secured, cut to receive the drain sump pan being careful not to oversize the cut. Cutting shall be done with a portable, hand-held, reciprocating jigsaw provided with a sharp blade. No burning will be permitted.
 2. Install the sump pan using not less than 12 fasteners located 3 to each side.

3.03 FASTENING OF NEW OR EXISTING STEEL DECK

- A. Sections of new steel decking to be installed shall be cut square and neat. Contractor shall note the location of all conduit, light supports, etc., prior to installation of new steel decking.
- B. Place steel decking units at right angles to supporting members. End laps of sheets shall be a minimum of 2 inches and shall occur over supports.
- C. Roof deck shall be fastened to adjacent panels and to supports by mechanical fasteners in accordance with the following:

Panel Ends.....	6" o.c. and at end ribs
End Laps.....	6" o.c. and at end ribs
Intermediate Supports.....	12" o.c. and at end ribs
Longitudinal Edges Between Supports.....	3'-0" o.c. max.

3.04 INSTALLATION OF STEEL SHEET

- A. Sheet steel shall lap the area requiring reinforcing by a minimum of 12 in. in all directions.
- B. Fasten steel sheet at 6 inches on center at the perimeter and 12 inches on center in the field of the sheet.

3.05 PRIMING OF RUSTED DECK

- A. Wire brush all rusted areas as recommended by the primer manufacturer.
- B. Thoroughly clean the deck of all debris, loose material, grease, oil, or other deleterious materials.
- C. Do not apply primer when deck has surface moisture or frost, or when the temperature is less than 50° unless such condition is acceptable to the primer manufacturer and approved by the Engineer.

END OF SECTION

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SECTION 06 10 63

ROUGH CARPENTRY

PART 1- GENERAL

1.01 GENERAL REQUIREMENTS

- A. The General Conditions of the Contract for Construction and the General Requirements are hereby made part of this specification.
- B. Maintain a copy of all applicable drawings, specifications, shop drawings, and approved submittals at the site at all times during the Work.

1.02 SECTION INCLUDES

- A. The work of this Section consists of furnishing and installing all rough carpentry and related items as indicated on the Drawings and specified herein, required to complete the work, including but not limited to the following:
 - 1. New wood blocking shall be installed as required to accomplish the work as specified and detailed. Contractor shall refasten existing wood blocking, that is scheduled to remain, as required for a complete and thorough job.
 - 2. New plywood shall be installed at vertical surfaces as an acceptable substrate for flashing materials, required to accomplish the work as specified and detailed.
 - 3. Deteriorated wood blocking shall be replaced with new wood blocking. Random removal and replacement of existing deteriorated wood blocking (base layer). Reference paragraph 1.07 Unit Prices for bid quantities. Provide unit prices for changes in the bid quantity for the specified work listed in this section on the Form for General Bid.
- B. All materials shall be verified by Contractor to be proper for each intended use, and the entire work of this Section shall be done in such a manner that each installation will perform its intended purpose as applicable, in the finished work.
- C. The drawings indicate and show limits of construction for this project. The specifications specify material and work requirements for this project. Both are complementary to each other and both shall be followed to complete the work.
- D. Plans and dimensions under which the Work is to be performed are derived from a variety of sources. The existing conditions are provided for information only. Actual conditions may vary. Contractor is required to verify existing roofing system composition, conditions, and dimensions prior to submitting his bid. No

additional compensation or time extension will be made for dimensional errors or discoverable inaccuracies related to existing conditions in the contract documents.

1.03 RELATED WORK

- A. Section 02 41 00 – Demolition
- B. Section 04 50 00 – Masonry Restoration
- C. Section 05 31 00 – Steel Deck Repairs
- D. Section 07 22 00 – Roof Insulation
- E. Section 07 54 00 – Roofing & Flashing
- F. Section 22 00 01 – Plumbing – Roof Drains
- G. Section 23 00 00 – HVAC (Filed Sub-Bid)
- H. Section 23 00 01 – Temporary Mechanical Disconnects
- I. Section 26 00 00 – Electrical
- J. Section 26 00 01 – Temporary Electrical Disconnects

1.04 SUBMITTALS

- A. Submit the following under the provisions of Section 01 33 00:
 - 1. Manufacturer's or applicator's specification for wood preservative treatment and treatment procedure to be sure that a satisfactory treatment will be obtained.
 - 2. Manufacturer's specification data sheets for all fasteners to be used, clearly identifying such as their intended use.
 - 3. Material Certificates: (1) For lumber specified to comply with minimum allowable unit stresses, indicate species and grade selected for each use and design values approved by ALSC's Board of review; (2) For preservative-treated wood products, indicate type of preservative used and net amount of preservative retained; (3) For products receiving a waterborne treatment, include statement that the moisture content of treated materials was reduced to levels specified before shipment to Project site.
 - 4. Certificates of Inspections: Issued by lumber-grading agency for exposed wood products not marked with grade stamp.
 - 5. Shop drawings of all blocking and other wood assemblies, including anchorage to existing structure. Coordinate Shop Drawings with all relevant work of other trades specified in other Sections. Show compliance with FM Global Loss Prevention Data Sheets 1-29 and 1-49 for all wood nailers at roof edges.
 - 6. Shop drawings of roof edge blocking elevation, coordinated with the approved tapered insulation layout shop drawings.

1.05 CODES AND STANDARDS

- A. Except as modified by the requirements of other governing codes and by this specification plywood sheathing, wood decking, wood blocking and its installation shall conform to the provisions and recommendations of the following codes and standards:
1. Factory Mutual Loss Prevention Data Bulletins 1-29 and 1-49.
 2. APA: American Plywood Association.
 3. American Softwood Lumber Standard P.S. 20-70
 4. AWPA: (American Wood Preservers Association) C1-A11 Timber Products Preservation Treatment by Pressure Process.
 5. Conform to applicable local building code requirements.
 6. Wood Blocking shall not be less than 2"x6" nominal (1 1/2"x5 1/2").
 7. ANSI/SPRI/FM 4435/ES-1; Wind Design Standard for Edge Systems Used with Low-Slope Roofing Systems.
 8. NRCA Roofing & Waterproofing Manual.
 9. SPIB: Southern Pine Inspection Bureau.
 10. NELMA: Northeastern Lumber Grading Association.
 11. NLGA: National Lumber Grading Association.
 12. NDS: National Design Specification for Wood Construction

1.06 CONTRACTOR'S USE OF PREMISES

- A. Contractor shall limit its use of the site for work and for storage to allow for:
1. Owner occupancy and use of the building during construction.
 2. Public use of walks, parking lots, and driveways.
- B. Do not block exits at any time. Provide protected entranceways at each entrance when working in these areas.
- C. Coordinate work on the roof, use of the site, storage areas, and staging areas with the Owner. Limit use of the site and working hours to dates, times, and locations approved by the Owner.
- D. Cooperate with the Owner's scheduling requirements for working at an occupied building. Work under this Section shall not interfere with the operation of the building or building occupants at any time.
- E. The Contractor is responsible for protecting all materials and equipment stored on the site.
- F. Smoking is not permitted on the grounds.
- G. Dispose of all trash and debris in a legal manner off-site. Do not throw debris from access equipment or staging. Conduct debris to approved containers on

the ground. Locate debris containers only in locations approved by the Owner in advance.

1.07 UNIT PRICES

- A. Provide unit prices for changes in the Contract Quantities for the specified work listed in this section on the Form for General Bid. The Contractor shall include in all lump sum bids (contract price) his price for the following:
 - 1. Random removal and replacement of existing deteriorated wood blocking. Quantities shall be determined by calculation of actual board footage installed with no allowance for waste. The Contractor shall include 50 board feet as the Base Bid quantity.
- B. The Contractor shall notify the Engineer immediately upon uncovering existing wood blocking and plywood showing signs of deterioration, including water damage, rot, warping or excessive deflection.
- C. The Contractor shall perform unit price work only when approved by the Engineer. The Contractor shall properly document that the work has been completed. Proper documentation shall include photos and locations shown on the roof plan. Quantity tabulation shall be done on a daily basis by the Contractor and reported at the construction meetings, or more often as requested by the Engineer.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Protect the existing building and its contents; the premises, including access drives and parking areas; interior finishes; and all site work (landscaping) during all demolition, removal, and repair operations against all risks associated with this work. Replace damaged components at no charge to the Owner and to the satisfaction of the Owner using mechanics skilled in the appropriate trade including all site work.
- B. Do not damage existing materials scheduled to remain. Provide adequate protection of the window glass to prevent breakage, scratches, staining, etching, and any other damage during work associated with this Section.
- C. Schedule and execute all work to avoid exposing the building and its contents to inclement weather. Prevent water intrusion through the temporary protection.
- D. Check all specified items upon Contract signing, and order early so the work is not delayed. Certain materials may require considerable lead-time for delivery.
- E. Coordinate with the Owner's representative regarding roof access and hoist or crane locations.
- F. Season all wood prior to use by neatly stacking on dunnage in a manner to avoid distortion of wood. Cover with breathable, waterproof, and flame-retardant

canvas tarpaulins (not polyethylene) arranged to allow air movement beneath the covers. Do not use any stock with excessive twist or bow. Moisture content shall not exceed 19% at time of installation; 17% for plywood. Store in a secure area assigned by the Owner's representative.

- G. Avoid traffic over completed roofing surfaces. Do not use new roof surfaces for storage or work areas. Protect new and existing roof surfaces with smooth 5/8 in. thick (minimum) plywood runways where access is required, and ensure full protection of new and existing roofing surfaces against mechanical damage. Notify the Engineer immediately, and in writing, if anyone abuses or damages roofing or flashing components.
- H. Promptly remove from the site all materials or incomplete waterproofing work exposed to any moisture anywhere, at any time, during transportation, storage, handling and installation, or rejected by the Owner.

1.09 WARRANTY

- A. The Contractor shall supply the Owner with a minimum two-year workmanship and leak-free warranty. In the event any work related to this section is found to be defective, is not watertight, or otherwise not in accordance with the contract documents within two (2) years of final completion, the Contractor shall repair and/or remove and replace at no cost to the Owner.

PART 2 - PRODUCTS

2.01 DIMENSIONAL LUMBER

- A. Blocking materials shall be of sound stock, new, straight, of consistent size, free of stains and mildew.
- B. Blocking materials shall be kiln dried to a moisture content of not more than 19%. Pressure treated lumber shall be kiln dried a second time after treatment.
- C. Blocking materials shall be surfaced four sides and shall bear the grade and trademark of the association under whose rules it is produced, and a mark of mill identification. Materials shall be construction grade Douglas Fir, Hem-Fir, West Coast Hemlock, West Coast Fir, or Southern Yellow Pine.
- D. Blocking shall be furnished in the longest practicable lengths with respect to each intended use - at least twelve feet unless shorter lengths are required and/or are specified. Single length pieces shall be used whenever possible. Wood blocking shall not be less than 2"x6" nominal.
- E. All new wood blocking and nailers shall be pressure-treated with waterborne salt preservatives that will have no deleterious effect on the roofing materials. Treatment shall be 0.40 lbs. per cubic foot of retention. Treatment shall leave a noticeable tint to wood so that treated wood can be visually differentiated from

untreated wood. No oil-based pentachlorophenol or creosote treatments shall be permitted.

2.02 PLYWOOD

- A. Plywood shall be 1/2" thick at vertical surfaces scheduled to be flashed and 3/4" thick at the abandoned roof hatch location on Roof Area "AA. All plywood shall be exterior grade of Group 1 or 2 species, Type CDX or better. All plywood shall have an APA stamp on it and shall meet the requirements of Product Standard PS 1-95 for Construction and Industrial Plywood.
- B. All plywood shall have a maximum moisture content of 15% by weight on a dry basis. Unless kiln dried after treatment, wolmanized plywood is not acceptable due to moisture content requirements herein.
- C. Nailers 10" wide and narrower that are indicated as plywood may be a single piece of dimensional lumber as specified in Paragraph 2.01 of this section. Those over 10" in width shall be plywood.

2.03 FASTENERS

- A. All fasteners and anchors shall be stainless steel unless otherwise noted.
 - 1. For attaching lumber to masonry: 3/8 in. dia. threaded rods set in a two-component adhesive into grouted CMU cells or solid masonry, 4 in. minimum embedment into backup material. Adhesive may be the following or approved equal:
 - a. AC100+gold by Powers Fasteners, Inc.
 - b. HIT-HY 70 injectable mortar by Hilti, with screen tube for support
 - 2. For attaching plywood to masonry: 3/8 in. dia. concrete/masonry screw, length as required to provide 2-1/2 in. minimum embedment into backup material. Fastener may be the following or approved equal:
 - a. Wedge-bolt+ by Powers Fasteners, Inc.
 - b. Kwik-Con 2 by Hilti
 - 3. For attaching plywood to concrete: 1/4 in. diameter, with countersunk (flat) head, length to provide manufacturer's standard embedment into concrete.
 - 4. For wood-to-wood: Hot dipped galvanized, annular ring nails, 11 ga or in gauges as detailed or required, with length to provide a minimum of 1-1/2 in. embedment into the final piece receiving the nail points, except full depth into plywood.
 - 5. For attaching plywood to wood blocking, wood blocking or plywood to steel decking, and all other wood-to-wood connections: No. 10 steel

screws with tapered Phillips head, length to provide 1-1/4 in. minimum embedment.

6. If required, any existing fastener for wood blocking and plywood that are found to be deteriorated shall be replaced with new fasteners of equal or better quality and capacity.

PART 3 - EXECUTION

3.01 GENERAL

- A. Construct all rough carpentry work called for on the drawings plumb, level, and true with tight, close fitting joints. Carpentry shall be securely attached and braced to surrounding construction, and executed in a first-class workmanship manner. Runs of blocking shall be built up plumb, straight and in-line with exterior masonry walls.
- B. Blocking shall be built to the same thickness as the insulation to the maximum extent possible, within 1/16" plus or minus. Blocking shall extend at least 2" beyond edge of metal flashing.
- C. At continuous blocking runs longer than two (2) feet, the minimum length of blocking shall be two (2) feet.
- D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 1. ANSI/SPRI/FM 4435/ES-1 – Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems and FM Global Loss Prevention Data Sheets 1-29 and 1-49.
 2. Countersink fasteners into wood only to depth for fastener heads to be flush.

3.02 PROTECTION

- A. The Contractor shall use extreme caution during wood blocking replacement operations. The facility is operational and contains personnel, furniture, fixtures and equipment.
 1. Contractor shall properly protect all areas from falling materials, debris, or dust due to his operations. Contractor shall be responsible for providing adequate personnel to protect, barricade, clean and protect these areas.
 2. Protect the building interior, contents, and occupants from all hazards associated with the Contractor's operations.

3. Equipment such as lighting, electrical conduits, junction boxes, ceiling tiles and associated attachment components may exist in the vicinity of or on the underside of the roof decking. Contractor shall take all necessary precautions so as not to cause any damages. Any damages that interrupt service and/or require repairs to the building furniture, fixtures or equipment shall be the responsibility of the Contractor at no additional cost to the Owner and shall be repaired immediately.
 4. During wood blocking replacement operations, the Contractor shall post one or more of his employees inside the facility to temporarily close the affected areas. The person in charge of the facility shall be notified by the Contractor prior to the commencement of this work. Proper barricades shall be provided by the Contractor to prevent normal access to or around these areas.
- B. Any damage to the interior of the building or its contents due to the Contractor's operations or to leaks during the Contractor's operations shall be corrected at the Contractor's expense to the satisfaction of the Owner and the Architect.

3.03 FASTENING

- A. All blocking and plywood shall be fastened to meet or exceed Factory Mutual's requirements and/or recommendations.
- B. Contractor to inspect and verify that the existing base layer of wood blocking is properly secured to the perimeter edge of the building. Contractor is required to secure any wood blocking that is scheduled to remain and any new wood blocking in accordance with Factory Mutual's requirements and/or recommendations (reference is made to FM Loss Prevention Data Bulletin 1-49).
1. When fastening wood blocking (base layer) to a masonry wall, a 1/2" anchor bolt shall be placed 48" on center at an 8" minimum depth (12" minimum depth when masonry wall is comprised of lightweight aggregate or cinder). Each anchor bolt shall be positioned (staggered if the wood nailer is wider than 6 inches) in a block core or air space and tightly filled with concrete (or approved substitute product) to the depth of the bolt. Cores or voids in the top course of concrete masonry units – fill the entire top course. At outside corners, the fastening density must be increased within the first 5 feet in each direction by positioning anchor bolts 24" on center.
 2. When fastening wood blocking (base layer) to steel decking, penetration of the fasteners should be to the top flutes only. Fasteners shall be galvanized steel metal screws (No. 10) and galvanized steel washers (minimum 5/8" outside diameter) under screw heads. Wood nailers shall be attached with 2 rows staggered, spacing of fasteners in each row shall not exceed 24 inches. The staggered fastening pattern shall be increased within 8 feet from outside corners (doubled, max. 12" on center

in each row). If the perimeter nailer is secured to a steel angle, 3/4" anchor bolts must be positioned at 48" on center, and at 8 foot corners the fastening shall be doubled (24" max.).

3. Fasteners used when securing additional wood nailers layers to the wood nailer base layer shall penetrate into the bottom nailer by 1-1/4" using a staggered fastening pattern in two rows at 12" on center. The staggered fastening pattern shall be increased within 8 feet from outside corners to 6" on center. Smaller pieces of blocking, such as penetrations, shall have a minimum of four fasteners per piece. A fastener shall be located no more than four inches from the end of each piece of blocking. Two fasteners are required at the ends of all blocking.
- C. Counterbore at all bolt heads, nuts, and washers as may be required to provide a flush surface for installation of roofing membrane materials.
- D. Plywood used at vertical flashing areas shall be securely fastened to the substrate at the top, middle and bottom with the approved fastener at 6" on center. When used in layers, each layer of plywood shall be secured equally, with fastener spacing as specified herein.

END OF SECTION

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SECTION 07 22 00

ROOF INSULATION

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. The General Conditions of the Contract for Construction and the General Requirements are hereby made part of this specification.
- B. Maintain a copy of all applicable drawings, specifications, shop drawings, and approved submittals at the site at all times during the Work.

1.02 SECTION INCLUDES

- A. The work of this Section consists of furnishing and installing all roofing insulation, and related items as indicated on the Drawing and specified herein, required to complete the roofing replacement and repair work.
- B. The roofing replacement insulation shall be as indicated in the schedule located on Drawings. Polyisocyanurate Rigid Board Roof Insulation (both tapered and flat stock) is specified. A high density polyisocyanurate insulation shall be installed over the polyisocyanurate insulation. The compressive strength of the polyisocyanurate rigid board roof insulation shall be 25 psi Typical. The compressive strength of the high density polyisocyanurate rigid board roof insulation shall be 110 psi Typical.
- C. Tapered insulation panels are to be installed as shown and detailed on drawings. Sumps are to be installed at all roof drains as detailed. The existing roofing system shall be removed at the roof drain sump areas down to the roof deck and tapered polyisocyanurate insulation shall be installed around the drain to provide a smooth transition from the roof surface to the drain.
- D. The Contractor shall install clapboard at the perimeter of all crickets. Clapboard shall be mechanically fastened.
- E. All materials shall be verified by Contractor to be proper for each intended use, and the entire work of this Section shall be done in such a manner that each installation will perform its intended purpose as applicable, in the finished work.
- F. The drawings indicate and show limits of construction for this project. The specifications specify material and work requirements for this project. Both are complementary to each other and both shall be followed to complete the work.
- G. Plans and dimensions under which the Work is to be performed are derived from a variety of sources. The existing conditions are provided for information only. Actual conditions may vary. Contractor is required to verify existing roofing system composition, conditions, and dimensions prior to submitting his bid. No

additional compensation or time extension will be made for dimensional errors or discoverable inaccuracies related to existing conditions in the contract documents.

1.03 QUALITY ASSURANCE

- A. All materials used as a component of the roofing system shall be supplied or approved in writing by the roofing system manufacturer and covered by the roof manufacturer's 20-year warranty. All materials shall be installed to serve their intended function.
- B. The roofing system manufacturer's technical representative (not a salesperson) shall certify in writing the materials and fastening specified are proper for their particular application. Submission of this letter shall be acceptance of the technical specification, details, and the specified guarantee.
- C. The roofing system manufacturer's technical representative (not a salesperson) shall visit the site at the initial application of his product and as often as required by the Contractor, Engineer, Owner, and Owner's Project Manager to ensure the specifications, details, requirements and recommendations are followed. At various intervals during the work, inspections shall be made by the technical representative to ascertain that the insulation board has been installed according to the specifications and details and will be accepted by the roofing system manufacturer and that the roofing system manufacturer will issue the specified warranty.
- D. All work shall be applied in strict accordance with the provisions of the technical specification and details. No deviations shall be permitted without written consent from the Engineer. Should a conflict between this specification (and the associated details) and the manufacturer's requirements arise, the most restrictive provision, as determined by the Engineer, shall govern.
- E. Fastener and Adhesive Pull Tests: Arrange with the fastener and adhesive manufacturer(s) to perform pull tests on site on the fasteners and adhesive proposed for use on this project. Perform the tests in representative sample areas of the roof deck prior to roofing installation (during the submittal phase) and again during the installation phase. The Contractor is required to make and repair all sample roof openings required to expose the roof deck and perform the pull tests. Prepare and submit test reports to the Engineer and Owner's Project Manager summarizing all test results, test data, test conditions, calculations, and roof plan showing the locations of each test. Perform a sufficient number of tests in a sufficient number of areas to meet the manufacturer's requirements.
 - 1. Fasteners: In accordance with ANSI/SPRI Fastener Pullout Standard, perform static tests and cyclic tests in each structural deck type for each of fastener specified for testing. The design pullout value shall be the lower of one-quarter of the average static pullout value or of the average cyclic load. Load each fastener in the cyclic test to the average static pullout value, and then load fastener to failure. Record test data including loads, location, depth of embedment, and fastener type. The

manufacturer to design fastener location and spacing shall use results of these tests. Testing shall be in accordance with ANSI/SPRI FX-1, 2006 Standard.

2. Adhesives: Perform static tests for the adhesive using the spacing specified and/or proposed, in accordance with ANSI/SPRI IA-1, 2010 Standard.

1.04 RELATED WORK

- A. Section 02 41 00 – Demolition
- B. Section 04 50 00 – Masonry Restoration
- C. Section 05 31 00 – Steel Deck Repairs
- D. Section 06 10 63 – Rough Carpentry
- E. Section 07 54 00 – Roofing & Flashing
- F. Section 22 00 01 – Plumbing – Roof Drains
- G. Section 23 00 00 – HVAC (Filed Sub-Bid)
- H. Section 23 00 01 – Temporary Mechanical Disconnects
- I. Section 26 00 00 – Electrical
- J. Section 26 00 01 – Temporary Electrical Disconnects

1.05 SUBMITTALS

- A. Submit the following under the provisions of Section 01 33 00.
 1. An approval letter from the roofing system manufacturer stating that the insulation, cover board, fasteners, specified for this project are acceptable (accepting the technical specification and details); stating that the specified guarantee will be issued; and stating that a technical representative will be on site as often as required by the Contractor, Engineer, Owner, and Owner's Project Manager and as stipulated in this specification.
 2. Manufacturer data sheet for insulation (flat and tapered), cover board, and fasteners.
 3. Manufacturer provided shop drawings for insulation attachment shall be submitted for review and approval. Insulation adhesive application rates shall be provided. The drawings shall indicate complete layout, fastening pattern, and application rates for all roof areas (including the field, perimeters, and corners).

Attachment of components to meet or exceed a Factory Mutual fastening rate and pattern (FM 1-90 in the field of the roof, FM 1-105 at roof perimeters, FM 1-150 at roof corners).
 4. Manufacturer provided shop drawing of tapered insulation panels layout shall be submitted for review and approval. The drawing shall indicate complete panel layout for all roof areas that require tapered insulation

panels, including locations and slope of crickets; locations and size of roof drain sumps with slope profile; and locations and slope of perimeter edge.

5. Manufacturer's Material Safety Data Sheets for all products specified in this Section.
6. Manufacturer's uplift resistance pull test results for insulation fasteners.

1.06 CODES

- A. Except as modified by the requirements of other governing codes and by this specification, overlay board and its installation shall conform to the provisions and recommendations of the following codes and standards:
 1. Insulation board shall have Factory Mutual Class I approval.
 2. Attachment of insulation board shall meet or exceed Factory Mutual's latest wind uplift requirements and recommendations for an adhered PVC roof membrane application over a steel and concrete roof decking, for a FM 1-90 wind uplift rating for the field of the roof, FM 1-105 wind uplift rating for the perimeters of the roof and FM 1-150 wind uplift rating for the corners of the roof.
 3. Insulation fasteners and distribution plates shall have Factory Mutual approval for the system specified.
 4. Insulation shall carry Underwriters Laboratory (Class A) approval for fire resistance.
 5. Local and applicable building codes.
 6. ASTM C 1289, – Standard specification for faced rigid cellular polyisocyanurate insulation board.
 7. LTTR – Long Term Thermal Resistance, using techniques from CAN/ULC S770 based on ASTM C1303.

1.07 TRANSPORTATION AND HANDLING

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to assure that 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.

1.08 STORAGE AND PROTECTION

- A. Contractor shall follow the recommended storage procedures of the manufacturer of the materials being used. No storage on or within the building will be allowed without written permission from the Owner. Any materials brought to the roof for daily operations or storage shall be evenly distributed on the roof to prevent concentrated loads and shall not overload the structure.
- B. All moisture sensitive materials shall be stored in weatherproof trailers or temporary protective shelters and shall be stored at least 4 inches above the ground on stable pallets or skids and shall at all times be completely covered and secured. Tarpaulins or a similar "breathable" material shall be used to cover materials. Rubber or plastic materials shall not be acceptable. Factory applied "shrink packs" or plastic wrappings shall not be acceptable. Careful control of humidity shall be performed to prevent greater than 10% moisture within composition insulations and overlay boards.
- C. Materials stored on the ground shall be thoroughly secured against moisture and wind. Materials and their coverings shall be tied and/or weighted to prevent uncovering or blowing of material by the wind. Contractor shall be responsible for damages caused by blowing and improperly stored material and equipment.
- D. Materials shall be handled with care and shall not be installed if they have been damaged in any way due to handling, storage or manufacturing defects. Contractor shall promptly mark and remove from the site any damaged or improperly stored materials when so requested by the Engineer.
- E. All materials are to be stored at the recommended temperature range as specified by the manufacturer. Contractor shall provide manufacturer's information to the Engineer concerning storage and handling of flammable or volatiles materials. The "shelf life" materials shall be provided with the date of manufacturer of all perishables. Materials that become congealed, thick, non-uniform or otherwise unsuitable for proper application shall be removed from the project site and replaced with new properly stored and tested materials.
- F. Provisions for placement of the Contractor's equipment must be planned by the Contractor and submitted to the Owner and the Engineer for approval.
- G. Provide off-site storage and protection when site does not permit on-site storage or protection.

1.09 CONTRACTOR'S USE OF PREMISES

- A. Contractor shall limit its use of the site for work and for storage to allow for:
 - 1. Owner occupancy and use of the building during construction.
 - 2. Public use of walks, parking lots, and driveways.

- B. Do not block exits at any time. Provide protected entranceways at each entrance when working in these areas.
- C. Coordinate work on the roof, use of the site, storage areas, and staging areas with the Owner. Limit use of the site and working hours to dates, times, and locations approved by the Owner.
- D. Cooperate with the Owner's scheduling requirements for working at an occupied building. Work under this Section shall not interfere with the operation of the building or building occupants at any time.
- E. The Contractor is responsible for protecting all materials and equipment stored on the site.
- F. Smoking is not permitted on the grounds.
- G. Dispose of all trash and debris in a legal manner off-site. Do not throw debris from roof, access equipment, or staging. Conduct debris to approved containers on the ground. Locate debris containers only in locations approved by the Owner in advance.

1.10 WEATHER AND TEMPERATURE REQUIREMENTS

- A. Work shall not commence or proceed, with the exception of the completion of necessary temporary measures to make the building weathertight, when the ambient air temperature is below 32°F unless otherwise specified.
- B. Work shall not commence or proceed, with the exception of the completion of necessary temporary measures to make the building weathertight, when precipitation of any kind, or winds in excess of 20 miles per hour are present or imminent or when, in the sole judgment of the Engineer or his authorized representatives, conditions are unfavorable or detrimental to the proper installation of the systems.
- C. Work shall not commence or proceed, with the exception of the completion of necessary temporary measure to make the building weathertight, when water, ice or frost is present on or within the materials or surfaces to which materials are to be applied.
- D. Work shall not commence or proceed with the exception of the completion of necessary temporary measures to make the building weathertight when the temperature is too hot to allow proper installation, or when existing or previously installed work is being damaged by the application, or when temperature conditions present a health or safety hazard to the workers on the site.

1.11 WARRANTY

- A. The roofing contractor shall supply the Owner with a two (2) year workmanship guarantee covering all areas in the Contract. In the event that any work performed by the Contractor or materials supplied by the Contractor are found defective or otherwise not in accordance with the Contract Documents within two

(2) years of acceptance of the work by the Owner, the roofing contractor shall remove and replace at no cost to the Owner

- B. Insulation, fasteners, adhesives, shall be included in the roof membrane manufacturer's 20-year labor and materials warranty. During this period, manufacturer shall make good at his own expense any faults or imperfections that may arise due to defects in the materials as well as from defects in the workmanship involved in their installation. Such repairs shall be made as promptly after observation as weather and site conditions permit.

PART 2 - PRODUCTS

2.01 INSULATION

- A. Approved polyisocyanurate insulation boards, both tapered and uniform thickness, as supplied by the roofing membrane manufacturer, shall be rigid, closed-cell HCFC FREE polyisocyanurate foam core insulation, integrally bonded to heavy non-asphaltic fiber-reinforced felt facers (top and bottom surface) in the foaming process. Insulation shall meet: UL Standard 790 (ASTM E 108) Classification; UL Standard 263 Fire Resistance Classification (ASTM E 119).

Insulation shall adhere to the following typical physical properties:

PROPERTY	TEST METHOD	VALUE
* Thermal Performance	ASTM C-518	As shown on drwgs.
Water Absorption % Volume	ASTM C 209 ASTM D 2842	<1% <3.5%
Dimensional Stability (Length & Width)	ASTM D 2126	Less than 2%
Compressive Strength	ASTM D 1621	20-psi min.
Foam Core Density	ASTM D 1622	2.0 pcf nominal
Moisture Air/vapor Transmission	ASTM E 96	<1.5 perm
Flame Spread	ASTM E-84	25 – 50

* The thermal performance shall be the Long Term Thermal Resistance (LTTR) value, determined in accordance with CAN/ULC S 770 test method.

- B. Cricket insulation panels are to be installed as indicated on the drawings and shall be sloped positively to the roof drains (refer to the roof area plan drawing for more information). The cricket insulation panels shall consist of tapered polyisocyanurate insulation sloped as indicated on Drawings.

- C. Clap board where specified shall be 6 in. wide and is to be installed at the perimeter of all crickets and all transitions.
- D. Tapered insulation panels (sumps) are to be installed at all roof drains as indicated on the drawings. Install tapered insulation around the drain to provide a smooth transition from the roof surface to the drain.

2.02 COVER BOARD

- A. Cover Board shall be rigid, roof insulation panel composed of a high density, closed cell polyisocyanurate foam core laminated to a premium performance, coated glass fiber mat facer specifically designed for use a cover board, meeting the requirements of ASTM C1289, Type II, Class 4, Grade 2. The cover board shall have a minimum compressive strength of 110 psi. Cover Board shall adhere to the following typical physical properties:

PROPERTY	TEST METHOD	VALUE
Water Absorption % Volume Max	ASTM C 209	<1% volume
Dimensional Stability	ASTM D 2126	<0.6% linear change
Compressive Strength	ASTM D 1621	110-psi minimum
Mold Resistance	ASTM D 3273	Pass
Moisture Air/vapor Transmission	ASTM E 96	<1.5 perm
Flame Spread	ASTM E-84	25 – 50

2.03 INSULATION FASTENERS

- A. Fasteners and distribution plates shall be designed to attach the polyisocyanurate insulation board to the roof decking. Contractor shall arrange for the insulation manufacturer to perform a proper amount of fastener uplift resistance tests for each proposed fastener; submittal of the results is required for approval prior to installation.

Fasteners and distribution plates shall be supplied by the roof membrane manufacturer or as required by the roof membrane manufacturer so as to obtain the specified wind uplift requirements and roof membrane manufacturer's 20-year warranty, and shall adhere to the following:

1. All fasteners shall meet all published requirements of corrosion resistance by roofing materials manufacturers. The fastener must be Factory Mutual approved and made in America. The fastener shall be coated with CR-10 corrosion resistant coating. When subjected to 30 Kesternich cycles (DIN 50018), the fastener must show less than 15% red dust and surpass Factory Mutual Research Approval Standard #4470.

Fasteners for use over steel and concrete roof decks shall be Heavy Duty Roofing Fastener type with a shank diameter of .190, a minimum diameter thread of .245, Head Diameter of .435, and a #3 Phillips Truss Head Style. The fastener must have 10 threads per inch and have a 30° spade point.

2. Fasteners shall include a corrosion resistant Factory Mutual approved low profile pressure plate, steel hot-dipped galvanized (AZ -55) plate fabricated of SAE 1010 steel (3 inch diameter).

2.04 INSULATION ADHESIVE

- A. Insulation adhesive shall be two-component polyurethane roof insulation adhesive designed to attach rigid board polyisocyanurate roof insulation boards to each other and to air/vapor barrier. Contractor shall arrange for the insulation manufacturer to perform a proper amount of insulation adhesive uplift resistance tests for the proposed insulation adhesive product; submittal of the results is required for approval prior to installation (reference paragraphs 1.03 E and 1.05 A).
- B. Insulation adhesive shall be supplied by the roof membrane manufacturer or as required by the roof membrane manufacturer so as to obtain the specified wind uplift requirements and roof membrane manufacturer's 20-year full systems warranty. Acceptable products and manufacturers are as follows: (1) OlyBond 500 Adhesive Fastener manufactured by OMG Roofing Products, Agawam, MA; (2) Weather-Tite One Step Foamable Adhesive manufactured by Millennium Adhesive Products, Inc., Chagrin Falls, OH; (3) Sarnacol LR-2001 manufactured by Sika Sarnafil, Inc., Canton, MA.

PART 3 – EXECUTION

3.01 PREPARATION

- A. Surface on which the system is to be applied shall be clean, smooth, dry, and free of fins, sharp edges, loose/foreign materials, oil and grease. Before beginning work, a technical representative of the insulation board manufacturer shall examine the surfaces in order to ensure that the substrate is acceptable. Prior to starting the work, the Contractor shall notify the Engineer that the substrate is ready for insulation attachment.
- B. Material with imperfections such as pinholes, cracks, handling damage, incorrect thickness (less than specified), etc. shall be rejected and removed immediately from job site.
- C. No work shall take place when moisture is present on the roof or in any of the materials. The Engineer may order the work to stop when, in his opinion, the weather conditions warrant him to do so. Contractor shall take such measures as the work can continue with minimum delay so the exposure of building and its contents is minimum.

- D. After the existing roof systems are removed, the existing materials to remain shall be dried out before installation of new roofing materials. After materials have been removed, the substrate shall be scraped clean of all remaining small pieces of insulation, lumps of concrete/grout, or gravel or other surface imperfections. After all scraping and cleaning is complete and after substrate is dry, Contractor shall inspect the surface to determine that it is smooth and uniform to receive the new insulation board. Contractor shall implement repairs to any deteriorated or damaged roof decking that is required prior to installation of the insulation board, and roofing membrane.
- E. No more insulation board shall be installed than can be completely covered with the finished roofing system on the same working day.
- F. All installed insulation board must be fully protected from precipitation and condensation damage at all times. Any wet material shall be marked, removed from the site and replaced prior to installation of new membrane.
- G. The materials shall be neatly cut to fit around roof penetrations and projections. Boards are to be laid in parallel courses with transverse joints staggered with joints in adjoining courses. Wherever possible, the stagger shall be half the panel dimension, but not less than 16" in any case. All joints shall be tight.
- H. Insulation boards shall be installed without gaps or voids and with smooth transitions and tightly fitting joint. No piece of insulation board shall be cut to fit less than two square feet unless size of opening dictates. The top surface of the insulation board shall be flush with the top surface of the wood blocking within a tolerance of + 0 in. and - 1/16 in. with respect to the blocking.
- I. Verify that all rooftop penetrations (drains, curbs, nailers, equipment supports, vents, etc.) and other roof accessories are secured properly and installed in conformance with the specifications and drawings.
- J. The Contractor shall use caution during reroofing operations. The facility is operational and contains personnel, furniture, fixtures and equipment. Mechanical equipment such as lighting, electrical conduits, junction boxes, etc. may exist in the vicinity of or on the underside of the roof decking. Contractor shall take all necessary precautions so as not to cause any damages. Any damages that interrupt service and/or require repairs to the building furniture, fixtures or equipment shall be the responsibility of the Contractor at no additional cost to the Owner and shall be repaired immediately.

3.02 INSTALLATION – MECHANICAL ATTACHMENT

- A. Install specified products using approved mechanical fasteners in accordance with the specifications, details, manufacturer's latest written requirements, and as required by governing codes and standards.
- B. Use fastener tools with a depth locator as recommended or supplied by the fastener manufacturer to ensure proper installation. Install the fastener using

manufacturer-approved screwshooter. Drive the fastener until a slight depression is seen around the plate. Proper length fasteners are critical and excessive lengths will not be allowed.

- C. Care must be taken not to overdrive the fastener and fracture the skin of the rigid board polyisocyanurate insulation board. Fastener must be tight enough so that the plate does not turn. Any overdriven fasteners and/or damaged thermal barrier board shall be the responsibility of the Contractor and shall be replaced immediately at no additional cost to the Owner.
- D. Mechanical attachment of rigid board polyisocyanurate roof insulation (base layer), shall meet or exceed Factory Mutual's latest wind uplift fastening rate and pattern for an adhered PVC roof membrane application over steel and concrete roof decking in accordance with the specified FM rating. Any additional attachment requirements that may be required by the roof membrane manufacturer, pertaining to the specified mph wind speed warranty, shall be adhered to.

3.03 INSTALLATION – ADHESIVE ATTACHMENT

- A. Install specified products using approved insulation adhesive in accordance with the specifications, details, manufacturer's latest written requirements, and as required by governing codes and standards.
- B. Tapered Insulation board shall be attached to the base layer of insulation board using approved insulation adhesive. Application rate and pattern shall be done in accordance with the approved shop drawing.
- C. Apply insulation adhesive directly to approved substrate using continuous ribbons of adhesive beads. Place insulation boards into position onto adhesive beads after allowing adhesive to rise 3/4" to 1". Insulation boards shall be stepped in and/or weighted for a proper timeframe to ensure the adhesive has adequately secured the components (roof insulation to roof insulation).

The Contractor shall provide for **technical representation by the insulation adhesive manufacturer** at all times when the adhesive is being applied for the first three (3) days of use and once every three (3) days thereafter to ensure that proper adhesion is obtained. Simulated uplift resistance field tests (in accordance with ANSI/SPRI IA-1, 2010 Standard) shall be performed by the insulation adhesive manufacturer representative on completed work areas to ensure that the insulation adhesive is being installed as specified. Uplift resistance field tests shall be done in locations as recommended by the manufacturer. The Contractor shall provide to the Engineer & Owner the insulation adhesive manufacturer's report documenting the results of the tests.

The Contractor is required to correct all roof areas that fail the uplift resistance test. Correction may include removal and replacement of the area or may include augmentation with mechanical fasteners.

- E. Insulation adhesive attachment of rigid board polyisocyanurate roof insulation (tapered), shall meet or exceed Factory Mutual's latest wind uplift fastening rate and pattern for an adhered PVC roof membrane application over steel and concrete roof decking in accordance with the specified FM rating. Any additional attachment requirements that may be required by the roof membrane manufacturer, pertaining to the specified mph wind speed warranty, shall be adhered to.

3.04 FIELD INSPECTION

- A. The Roofing Materials Manufacturer and the Insulation Materials Manufacturer shall provide observation/inspection services during the roof insulation installation. The technical representative shall provide field surveillance of the installation and shall monitor and report installation procedures, unacceptable conditions, etc. The insulation installation will be subject to observation and inspection by the Engineer, Owner, Roofing Material Manufacturer's Representative, and Insulation Material Manufacturer's Representative. All costs incurred by the Contractor due to Field Quality Control inspections shall be the sole responsibility of the Contractor and will not be considered grounds for or justification of an increase in the original contract price.
- B. The Engineer and the Owner's Project Manager will be on site periodically to observe the work progress and to monitor contract compliance. Any items observed not in compliance with the contract documents shall be identified and promptly corrected by the Contractor.
- C. Contractor is to provide any and all necessary protection to the entire roof area to maintain watertightness during the project duration, including existing roof areas not yet roofed. Any interior damages to the building or to the contents of the building (furniture, fixtures & equipment) that occur as a result of the Contractor's negligence shall become the Contractor's responsibility and he shall promptly repair and/or replace all damaged items to the satisfaction of the Engineer and Owner.

END OF SECTION

SECTION 07 54 00

ROOFING AND FLASHING

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. The General Conditions of the Contract for Construction and the General Requirements are hereby made part of this specification.
- B. Maintain a copy of all applicable drawings, specifications, shop drawings, and approved submittals at the site at all times during the Work.

1.02 SECTION INCLUDES

- A. The work of this Section consists of furnishing and installing all roofing and flashing system components as indicated on the Drawing and specified herein, required to complete the work.
 - 1. An adhered reinforced PVC roof membrane system is specified and detailed, complete with a manufacturer's 20-year labor and materials warranty. The overall polymer thickness of the PVC roof membrane field sheet shall be a minimum of 60-mils. The overall polymer thickness of the PVC roof membrane flashing sheet shall be a minimum of 60-mils. Attachment of components to meet or exceed a Factory Mutual fastening rate and pattern (FM 1-90 in the field of the roof, FM 1-105 at roof perimeters, FM 1-150 at roof corners).
 - 2. Any scrap PVC roof membrane associated with the new PVC roof membrane installation work is to be recycled by the PVC roof membrane manufacturer. Contractor is responsible for all costs associated with the proper removal, bagging, preparing, loading, and shipping of the PVC roof membrane to the PVC roof membrane manufacturer's designated recycling facility.
- B. All materials shall be verified by Contractor to be proper for each intended use, and the entire work of this Section shall be done in such a manner that each installation will perform its intended purpose as applicable, in the finished work.
- C. The drawings indicate and show limits of construction for this project. The specifications specify material and work requirements for this project. Both are complementary to each other and both shall be followed to complete the work.
- D. Plans and dimensions under which the Work is to be performed are derived from a variety of sources. The existing conditions are provided for information only. Actual conditions may vary. Contractor is required to verify existing roofing system composition, conditions, and dimensions prior to submitting his bid. No additional compensation or time extension will be made for dimensional errors or

discoverable inaccuracies related to existing conditions in the contract documents.

1.03 RELATED WORK

- A. Section 02 41 00 – Demolition
- B. Section 04 50 00 – Masonry Restoration
- C. Section 05 31 00 – Steel Deck Repairs
- D. Section 06 10 63 – Rough Carpentry
- E. Section 07 22 00 – Roof Insulation
- F. Section 22 00 01 – Plumbing – Roof Drains
- G. Section 23 00 00 – HVAC (Filed Sub-Bid)
- H. Section 23 00 01 – Temporary Mechanical Disconnects
- I. Section 26 00 00 – Electrical
- J. Section 26 00 01 – Temporary Electrical Disconnects

1.04 QUALITY ASSURANCE

- A. All materials used as a component of the roofing system shall be supplied or approved in writing by the roofing system manufacturer. All materials shall be installed to serve their intended function. All materials used in the reinforced PVC roof membrane system shall be manufactured and supplied by one system manufacturer.
- B. A licensed contractor approved and certified by the PVC roof membrane system manufacturer and employing personnel experienced and skilled in the application of the manufacturer's roofing system shall install the complete roofing and flashing system. The Roofing Contractor shall be experienced in the installation of warranted, PVC roof membrane systems. Minimum required experience involves at least 5-years experience installing PVC roof membrane systems and the successful installation of at least five (5) projects of similar scope, size and complexity, located in Massachusetts, where the Roofing Contractor has installed a PVC roof membrane system. All such references must be provided with the Contractor's submittals and shall include the following:
 - (1) Name and address of project indicating size and roofing membrane system type and manufacturer, for each of the five (5) referenced projects.
 - (2) Name and phone number of contact person (Owner and/or Designer), for each of the five (5) referenced projects.
 - (3) Written letter of "Certification" or "Approval" from the Roofing System Manufacturer showing that the Roofing Contractor has been "Certified" or "Approved" by the Roofing System Manufacturer for a minimum of five (5) years.
- C. All work shall be applied in strict accordance with the provisions of the technical specification and details. No deviations shall be permitted without written consent from the Engineer. Should a conflict between this specification (and the

associated details) and the manufacturer's requirements arise, the most restrictive provision, as determined by the Engineer, shall govern.

- D. At least one week prior to commencement of the construction work, a conference (preconstruction meeting) shall be held and attended by the Engineer, Contractor, Owner, Owner's Project Manager and a technical representative of the PVC roof membrane system manufacturer. The purpose of this conference is to review the specifications, details, application requirements, and schedule before construction operations begin.
- E. All materials used as a component of the roofing system shall be supplied or approved in writing by the roofing system manufacturer. All materials shall be installed to serve their intended function.
- F. No member of the roof shall be overstressed due to construction loads.
- G. Contractor is to provide any necessary protection to the installed work prior to acceptance by the Owner and Engineer. The Contractor at no additional cost to the Owner shall correct any damage incurred during this period.
- H. Contractor is to provide any and all necessary protection to the entire roof area to maintain watertightness during the project duration, including existing roof areas not yet roofed. Any interior damages that occur as a result of the Contractor's negligence shall become the Contractor's responsibility and he shall promptly repair and/or replace the damaged items.
- I. The roof membrane manufacturer's technical representative (not a salesperson) shall visit the site during the bidding period and certify in writing the materials specified are proper for their particular application. Submission of this letter shall be acceptance of the technical specification, details, and this guarantee.
- J. The Roofing System Manufacturer shall provide a qualified experienced inspector to inspect the work at appropriate intervals to ensure that the work is proceeding in accordance with the requirements of the Manufacturer. At a minimum the inspector shall visit the project site at least once a week during the construction period to perform a detailed inspection of the work. As often as requested by the Engineer, Owner, or Owner's Project Manager, the PVC roof membrane manufacturer's technical representative shall provide field surveillance of the installation. Any items observed not in compliance with the contract documents shall be identified and promptly corrected by the Contractor. The Contractor is responsible for all costs associated with the field surveillance work performed by the PVC roof membrane manufacturer's technical representative.
- K. The Engineer and the Owner's Project Manager will be on site periodically to observe the work progress and to monitor contract compliance. Any items observed not in compliance with the contract documents shall be identified and promptly corrected by the Contractor.

- L. Prior to the final project completion, inspections shall be made by representatives of the PVC roof membrane manufacturer's technical representative, Engineer and Owner's Project Manager in order to ascertain that the roofing system has been installed properly. A punch list will be developed by each and copies will be forwarded to the Contractor. Contractor shall immediately correct all punch list items. Deviations from the specifications and/or details must be corrected immediately. Warranty shall be issued upon final acceptance of the work.
- M. At the completion of the job, the Contractor and manufacturer shall each submit their guarantees to the Owner. Additionally, they shall submit an Inspection and Maintenance Schedule to the Owner.
- N. Prior to the commencement of work, the Contractor shall inspect all roof surfaces to ensure their compliance with the provisions of this specification and the manufacturer's published literature.
- O. All surfaces shall be smooth, dry, clean, free of fins or sharp edges, loose or foreign materials, oil or grease.
- P. Commencement of work shall be considered acceptance by the Contractor of the area to be roofed as a suitable and properly prepared substrate.
- Q. No work shall proceed when moisture is present on the roof or in the materials. The Engineer may stop work when, in his opinion, the job conditions warrant him to do so.
- R. All personnel concerned with the shop fabrication and field installation of sheet metal work must be qualified sheet metal journeymen who may be assisted by sheet metal apprentices qualifying for their journeyman status. The foreman of the crew must have at least five years experience in roofing sheet metal work.
- S. The Contractor shall conduct a quality control program that includes, but is not limited to, the following:
 - 1. Provide a copy of the Specifications, Drawings, and details on the site during the work of this Section.
 - 2. Inspect all materials to ensure conformity with Contract requirements, and that all materials are new and undamaged.
 - 3. Provide inspection and technical assistance by the membrane manufacturer on a regular basis. Provide written reports from the representative to the Engineer.
 - 4. Inspect all surface preparation prior to roofing application.

5. Inspect work in progress to ensure that work is being done in accordance with established procedures, manufacturer's instructions, and specific Engineer instructions and that no water leaks into the building.

1.05 SUBMITTALS

- A. Submit shop drawings and product data listed below under provisions of Section 01 33 00:
 1. An Approval Assembly Letter from the Roof Membrane Manufacturer that includes the following items:
 - a. Accepting the technical specification and details;
 - b. Stating that the specified 20-year warranty will be issued;
 - c. Stating that a technical representative (inspector) will be on site weekly at a minimum (provide inspector resume for review);
 - d. Listing the assembly products with application rates (for membrane adhesive and insulation attachment) indicating a FM 1-90 compliance rating (including perimeter and corner enhancements).
 - e. Stating that the product delivered meets or exceeds all of the physical property requirements and accelerated durability tests of ASTM D4434 (latest revision) Standard Specification for Poly Vinyl Chloride Sheet Roofing.
 - f. Stating that the product delivered meets or exceeds ENERGY STAR, LEED (Leadership in Energy and Environmental Design), and CRRC (Cool Roof Rating Council) requirements for reflectivity and emissivity.
 - g. A certificate of analysis, provided by the PVC roof membrane manufacturer that ensures that the product delivered meets the specified polymer thickness design criterion.
 2. Manufacturer's literature and data sheets on all specified products.
 3. Material Safety Data Sheets of all specified products.
 4. Shop drawings detailing special joint or termination conditions and conditions of interface with other materials. Shop Drawings – Details: Provide roofing and flashing details for all conditions and details encountered on this project including all transitions and terminations. Show layout, joining, profiles, terminations, and anchorages of wood blocking, sheet metal, and membrane flashing. Provide written confirmation that all the shop drawings have been approved by the manufacturer of the roofing system for this specific project.
 5. Construction schedule and work area plan indicating work sequence and duration of the roofing work in each area; indicate methods and duration of temporary waterproofing, PVC membrane, and flashing work. Provide adequate detail showing all staging and storage areas and any effect of

the work at each building access. Coordinate schedule and site access with the other trades.

6. Daily PVC Membrane Seam Samples: Submit the following after work has started: Daily cross-cut samples of membrane welded seams, at least one sample per day, labeled to show date and location of the sample.
 7. Maintenance Requirements and Recommendations: For roofing system to include in maintenance manuals.
 8. Manufacturer's Inspection Reports: Copy of roofing system manufacturer's inspection reports, punch list reports, and of completed roofing installation.
 9. Applicator's Quality Assurance: Submit list of a minimum of 5 completed projects of similar size and complexity to this Work. Include for each project: Project name, location, description of the work, and dates when project occurred; Owner; Contractor; Architect; PVC Roofing product.
- B. All details relating to the installation of the system shall be approved by the roof membrane manufacturer and installed in such a manner that the manufacturer will furnish the specified warranty for the installation. Engineer will retain right of final acceptance of details and installation.

1.06 MOCKUPS

- A. At least two weeks prior to the start of each type of flashing work, provide samples of flashing on the building where directed by the Engineer, as described below. Notify the Engineer at least seven days before construction of the sample so that the Engineer may have a representative present during the construction of the sample. Do not start work until the Engineer has approved the mockup.
 1. Construct mockups of each type of roofing work, including PVC-clad metal flashing details, typical roof system, and PVC membrane flashing details, for review and approval by the Engineer and Owner.
- B. Coordinate with related work to construct a complete mockup of each condition.
- C. In general, field mockups may become a permanent part of the work, after approval. The Contractor is responsible for reconstructing any mockups that are not approved along with any associated construction.

1.07 TRANSPORTATION AND HANDLING

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to assure that 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.

1.08 STORAGE AND PROTECTION

- A. Contractor shall follow the recommended storage procedures of the manufacturer of the materials being used. No storage on or within the building will be allowed without written permission from the Owner. Any materials brought to the roof for daily operations or storage shall be evenly distributed on the roof to prevent concentrated loads and shall not overload the structure.
- B. All moisture sensitive materials shall be stored in weatherproof trailers or temporary protective shelters and shall be stored at least 4 inches above the ground on stable pallets or skids and shall at all times be completely covered and secured. Tarpaulins or a similar "breathable" material shall be used to cover materials. Rubber or plastic materials shall not be acceptable. Factory applied "shrink packs" or plastic wrappings shall not be acceptable.
- C. Materials stored on the ground and on the roof shall be thoroughly secured against moisture and wind. Materials and their coverings shall be tied and/or weighted to prevent uncovering or blowing of material by the wind. Contractor shall be responsible for any and all damages caused by blowing and improperly stored material and equipment.
- D. Materials shall be handled with care and shall not be installed if they have been damaged in any way due to handling, storage or manufacturing defects. Contractor shall promptly mark and remove from the site any damaged or improperly stored materials.
- E. All materials are to be stored at the recommended temperature range as specified by the manufacturer. Contractor shall provide manufacturer's information to the Engineer concerning storage and handling of flammable or volatiles materials. The "shelf life" materials shall be provided with the date of manufacturer of all perishables. Materials that become congealed, thick, non-uniform or otherwise unsuitable for proper application shall be removed from the project site and replaced with new properly stored and tested materials.
- F. Provisions for placement of the Contractor's equipment must be planned by the Contractor and submitted to the Owner and the Engineer for approval.
- G. Provide off-site storage and protection when site does not permit on-site storage or protection.

1.09 WEATHER AND TEMPERATURE REQUIREMENTS

- A. Work shall not commence or proceed, with the exception of the completion of necessary temporary measures to make the building weathertight, when the ambient air temperature is below 32°F unless otherwise specified.

- B. Work shall not commence or proceed, with the exception of the completion of necessary temporary measures to make the building weathertight, when precipitation of any kind, or winds in excess of 20 miles per hour are present or imminent or when, in the sole judgment of the Engineer or his authorized representatives, conditions are unfavorable or detrimental to the proper installation of the systems.
- C. Work shall not commence or proceed, with the exception of the completion of necessary temporary measure to make the building weathertight, when water, ice or frost is present on or within the materials or surfaces to which materials are to be applied.
- D. Work shall not commence or proceed with the exception of the completion of necessary temporary measures to make the building weathertight when the temperature is too hot to allow proper installation, or when existing or previously installed work is being damaged by the application, or when temperature conditions present a health or safety hazard to the workers on the site.

1.10 WARRANTY

- A. **Roofing Contractor's Warranty:** The Roofing Contractor shall supply the Owner with a minimum two-year workmanship and leak-free warranty. In the event any work related to roofing, flashings, or metalwork is found to be defective, is not watertight, or otherwise not in accordance with the contract documents within two (2) years of final completion, the Roofing Contractor shall repair and/or remove and replace at no cost to the Owner. The Contractor's warranty obligation shall run directly to the Owner, and a copy shall be sent to the Manufacturer.
- B. **Manufacturer's Warranty:** The manufacturer shall provide a labor and materials warranty (no dollar limit) that guarantees all the roofing to be in a watertight condition for a period of twenty (20) years from the date of acceptance (final completion date). The warranty shall include coverage for windstorms up to 72 miles per hour. During these periods, manufacturer shall make good at his own expense any faults or imperfections that may arise due to defects in all components of the systems supplied by the PVC membrane manufacturer to include membrane, insulation, insulation adhesive, cover board, fasteners, edge metal, walkway pad and all related accessories as well as from defects in the workmanship involved in their installation. Such repairs shall be made as promptly after observation as weather and site conditions permit.

1.11 CODES AND REGULATORY REQUIREMENTS

- A. Except as modified by the requirements of other governing codes and by this specification, conform to the provisions and recommendations of the following codes and standards:

1. Conform to Massachusetts State Building Code, latest revision and any applicable local building code requirements.
 2. Underwriters Laboratories, Inc. (UL): Fire Hazard Classification.
 3. Factory Mutual Research Engineering Corporation (FM): FM Construction Bulletins 1-28, 1-29 and 1-49. Attachment of roofing system components to meet or exceed a Factory Mutual fastening rate and pattern (FM 1-90 in the field of the roof, FM 1-105 at roof perimeters, FM 1-150 at roof corners).
 4. Roofing and Waterproofing Manual published by the National Roofing Contractors Association (NRCA), 10255 W. Higgins Road, Suite 600, Rosemont, Ill. 60018-5607 (latest edition).
 5. Copper & Common Sense Sheet Copper Design Principles and Construction Techniques published by Revere Copper Products, Inc., One Revere Park, Rome, NY 13440-5661 (latest edition).
 6. Architectural Sheet Metal Manual published by the Sheet Metal and Air Conditioning Contractors' National Association, Inc. (SMACNA), 4201 Lafayette Center Drive, Chantilly, VA 20151-1209 (latest edition).
 7. ASTM B32 – Standard Specification for Solder Metal.
 8. ASTM B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 9. ASTM B370 – Standard Specification for Copper Sheet and Strip for Building Construction.
 10. Flashing: Provide PVC-clad metal flashings, PVC membrane flashings, manufacturer's specialty edge flashing details, and associated materials that comply with requirements of ANSI/SPRI ES-1 and the requirements and recommendations in FM Global 1-49 Property Loss Prevention Data Sheet for Perimeter Flashings, FM Global 1-29 Property Loss Prevention Data Sheet for Roof Deck Securement and Above Deck Roof Components, and Construction Details, as applicable.
- B. Material Safety Data Sheets of all specified products of this section shall be kept on site daily for project duration.

1.12 PROJECT PROGRESS SCHEDULE

- A. Contractor shall prepare and provide his Project Progress Schedule, prior to the preconstruction meeting, to the Engineer and Owner for review. The schedule shall show the complete sequence of construction by activity, with dates and times for beginning and completion of each element of construction. Provide

sub-schedules to define critical portions of the entire schedule. Coordinate content with Schedule of Values.

- B. The Project Progress Schedule will be reviewed at the preconstruction meeting and will be updated daily by the Contractor and presented to the Owner and Engineer daily. Contractor shall update the schedule daily, identifying changes since previous version. A review of the schedule will be conducted at each construction meeting, or more often as needed.

1.13 CONTRACTOR'S USE OF PREMISES

- A. Contractor shall limit its use of the site for work and for storage to allow for:
 - 1. Owner occupancy and use of the building during construction.
 - 2. Public use of walks, parking lots, and driveways.
- B. Do not block exits at any time. Provide protected entranceways at each entrance when working in these areas.
- C. Coordinate work on the roof, use of the site, storage areas, and staging areas with the Owner. Limit use of the site and working hours to dates, times, and locations approved by the Owner.
- D. Cooperate with the Owner's scheduling requirements for working at an occupied building. Work under this Section shall not interfere with the operation of the building or building occupants at any time.
- E. The Contractor is responsible for protecting all materials and equipment stored on the site.
- F. Smoking is not permitted on the grounds.
- G. Dispose of all trash and debris in a legal manner off-site. Do not throw debris from access equipment or staging. Conduct debris to approved containers on the ground. Locate debris containers only in locations approved by the Owner in advance.

1.14 PROJECT COORDINATION

- A. The Project Administrator shall be the Owner. The Contractor shall cooperate fully with the Administrator in all aspects of the roofing installation. The Contractor is responsible for, but not limited to, the following: allocation of demolition areas, demolition equipment, dumpsters, dump trucks, chutes, protection; hours of operation, traffic flow, roofing components installation, sheet metal components installation, sealants and caulking components installation, masonry components installation, roof drainage components installation.
- B. It is the responsibility of the Contractor to coordinate the work of this Section with all other work on the project.

- C. The Contractor shall make all necessary arrangements to limit travel on the existing and new roof system. Where it is necessary to travel on the existing roofing system the contractor shall provide all necessary temporary protection needed to protect the existing roofing system so as to ensure no leaks into the facility occur. Any damage to the existing roofing system caused by work of this contract shall be repaired at no cost to the owner.
- D. Contractor shall coordinate completion and clean up of work on a daily basis, including maintaining weather-tightness for project duration.
- E. Coordinate all work of this section with other trades. Perform all roofing and flashing work in a timely manner as not to delay other trades. The Contractor shall coordinate all work with the other trades, to prevent exposure of the building to inclement weather and leaks, at all times.

PART 2 - PRODUCTS

2.01 PVC ROOF MEMBRANE SYSTEM

- A. An adhered reinforced PVC roof membrane system is specified and detailed complete with a manufacturer's 20-year warranty. The overall polymer thickness of the PVC roof membrane field sheet shall be a minimum of 60-mils. The overall polymer thickness of the PVC roof membrane flashing sheet shall be a minimum of 60-mils.
- B. The reinforced PVC roof membrane system shall be a heat-weldable single-ply thermoplastic poly vinyl chloride sheet designed for new roof construction and re-roofing applications. An automatic hot-air welder furnished by the PVC roof membrane manufacturer shall be used for fusing the PVC roof membrane sheets into a monolithic layer resulting in a permanently fused joint as strong as the PVC roof membrane itself. No adhesives or solvents are to be used in the seaming process. No edge sealant is to be used in the seaming process.
- E. The reinforced PVC roof membrane shall meet or exceed all of the physical property requirements and accelerated durability tests of ASTM D4434 (latest revision) Standard Specification for Poly Vinyl Chloride Sheet Roofing.
- F. The reinforced PVC roof membrane shall be highly reflective and the color shall white, and shall meet or exceed ENERGY STAR, LEED (Leadership in Energy and Environmental Design), and CRRC (Cool Roof Rating Council) requirements for reflectivity and emissivity.
- G. The following PVC roof membrane manufacturers and associated reinforced PVC roof membrane products are acceptable for use on this project:
 - 1. Sika Sarnafil; G410 Energy Smart Roof Membrane
 - 2. Johns Manville; JM PVC UltraGard SR
 - 3. Carlisle SynTec; Sure-Flex Reinforced FRS PVC

2.02 FLASHINGS

- A. Vertical Flashing Membrane: A reinforced PVC roof membrane. The overall polymer thickness of the PVC roof membrane flashing sheet shall be a minimum of 60-mils.
- B. PVC-clad Metal Flashing: A 25-gauge, G90 galvanized steel sheet metal with a laminant of PVC membrane (20-mil non-reinforced), as supplied by the PVC roof membrane manufacturer. The dimensions of the metal flashing shall be as shown on the drawings. The metal flashing color for emergency overflow scupper, metal drip edge, and pitch pockets, shall be chosen by the Owner.
- C. Prefabricated Perimeter Edge System; The system has concealed fasteners with no penetrations on the horizontal roof surface and includes fasteners and splice plates. The perimeter edge system shall be made from two distinct parts. A rigid retainer base plate and a decorative snap-on fascia cover. The rigid retainer base plate is manufactured from 0.05 inch aluminum in 10 foot standard lengths and is provided with 9/32 inch slotted pre-punched holes for fastener spacing at 12 inches on center. The snap-on fascia cover is manufactured from .040" inch aluminum with a Fluoropolymer Kynar 500 finish configured as shown in drawings. Matching corners, end caps, blind nailers, fascia sumps, spillouts, etc. are to be provided as part of the system. The color of the metal shall be selected by the Owner.

The following prefabricated perimeter edge system products are acceptable for use on this project:

- 1. Sika Sarnafil; Edge Grip Fascia.
 - 2. Johns Manville; Presto-Tite Fascia.
 - 3. Carlisle SynTec; SecurEdge Fascia 300/30000.
- D. Brake metal shall be .040-inch aluminum with a Fluoropolymer Kynar 500 finish configured as shown in drawings. The metal flashing color for aluminum fascia extender metal, blind nailers, flat lock aluminum panel system, and emergency overflow scupper metal flashing shall be selected by the Owner. The metal flashing color for metal extender pieces, sleeper caps, and crimp on counterflashing shall be bone white.
 - E. Stainless steel for rain collar and hose clamp.
 - F. Miscellaneous Flashings:
 - 1. PVC T-joint patches shall be circular (minimum 4.5" diameter), 48-mil (minimum thickness) PVC membrane patch. Color shall be white.
 - 2. Prefabricated outside and inside flashing corners shall be 60-mil (minimum thickness) PVC membrane. Color shall be white.

3. Felt shall be a 9 oz. (minimum) non-woven polyester or polypropylene mat cushion layer that is necessary behind PVC flashing membrane when the flashing substrates are rough surfaced or incompatible with the flashing membrane.
4. Pitch Pocket shall be a molded PVC pitch pocket consisting of an interlocking, two-piece, injection molded flexible pitch pocket with a rigid PVC vertical wall and preformed deck flanges. Color shall be white.
5. Pourable sealer for use as the pitch pocket filler shall be a thermoplastic one-part pourable sealer; a one-part, moisture curing elastomeric polyether sealant providing rapid skin time forming a waterproofing surface in less than one hour. Color shall be white.

2.03 ATTACHMENT COMPONENTS

- A. Adhesive: PVC roof membrane adhesive designed for bonding PVC roof membranes to approved substrates, as supplied by the PVC roof membrane manufacturer.
 1. Water-Based/Latex-Based PVC roof membrane bonding adhesive shall be used to adhere the PVC roof membrane (horizontal application). Coverage rates will vary depending on type of substrate and climatic conditions. Contractor shall adhere to manufacturer's application rate requirements. Do not store at temperatures below 40°F or apply if temperatures have fallen below 40°F for a 24-hour period. Apply in conditions of 40°F and rising.
 2. VOC Compliant PVC roof membrane bonding adhesive (high strength solvent-based contact adhesive) shall be used to adhere the PVC roof membrane flashing sheet (vertical application). When the temperature requirements prohibit the use of the water-based/latex-based PVC roof membrane bonding adhesive, then the VOC Compliant PVC roof membrane bonding adhesive shall be used for horizontal applications. Coverage rates will vary depending on type of substrate and climatic conditions. Contractor shall adhere to manufacturer's application rate requirements.
- B. Termination Bar (Steel Roof Deck): An FM-approved, heavy-duty, 14 gauge, galvanized or stainless, roll-formed steel bar used to attach PVC roof membrane to the roof deck. The formed steel shall be pre-punched with holes every 1-inch on center to allow for various fastener spacing options.
- C. Termination Bar: An extruded aluminum, low-profile termination bar used to attach to walls and curbs at terminations, penetrations, and at incline changes of the substrate; produced from 6063-T5, 0.10 inch to 0.20 inch thick extruded copper, 1 inch wide width, with an integral caulk edge.

- D. PVC Cord: 5/32 in. diameter flexible thermoplastic extrusion that is welded to the top surface of the PVC membrane and against the side of the termination bar, used to hold the membrane in position.

2.04 FASTENERS

- A. For attaching sheet metal to masonry, use 3/16" diameter with mushroom head and carbon steel nail.
- B. For attaching sheet metal to wood, use 3/8" diameter head, 12 gauge annular ring of sufficient length to provide 1" embedment into the substrate or the membrane manufacturer's approved fastener.
- C. For attaching termination bar to masonry, use 3/16" x 2" zinc plated flat head screw type masonry fastener.
- D. All fasteners, anchors, nails, straps, bars, etc. shall be post-galvanized steel, aluminum or stainless steel. Mixing metal types and methods of contact shall be assembled in such a manner as to avoid galvanic corrosion. Fasteners for attachment of metal to masonry shall be expansion type fasteners with stainless steel pins. All concrete fasteners and anchors shall have a minimum embedment of 1.25 inch and shall be approved for such use by the fastener manufacturer. All miscellaneous wood fasteners and anchors used for flashings shall have a minimum embedment of 1 inch and shall be approved for such use by the fastener manufacturer.
- E. Heavy Duty Roofing Fastener: A roofing fastener with a shank diameter of .190, a minimum diameter thread of .245, Head Diameter of .435, and a #3 Phillips Truss Head Style. The fastener must have 10 threads per inch and have a 30° spade point. The fastener shall be of sufficient length to penetrate the steel roof decking by 3/4" (top flute) and the concrete roof decking by 1.0".

2.05 WALKPAD

- A. Walkpad: A polyester reinforced, hot-air weldable PVC membrane with textured surface (96-mil minimum thickness). Walkpads shall be a minimum of 36 inches wide. Color shall be green.

2.06 MISCELLANEOUS ACCESSORIES

- A. Aluminum Tape: A 2-inch wide pressure-sensitive aluminum tape used as a separation layer between small areas of asphalt contamination and the membrane and as a bond-breaker under the coverstrip at PVC-clad metal joints.
- B. Sealing Tape Strip: Compressible foam with pressure-sensitive adhesive on one side. Used with metal flashings as a preventive measure against air and wind blown moisture entry.

- C. Membrane Cleaner: A high quality solvent cleaner used for the general cleaning of the PVC roof membrane surface shall be utilized to properly clean the membrane as necessary. Membrane cleaner shall also be used daily to clean seam areas prior to hot-air welding.
- D. All fasteners, anchors, nails, straps, bars, shall be post-galvanized steel, aluminum or stainless steel. Mixing metal types and methods of contact shall be assembled in such a manner as to avoid galvanic corrosion. Fasteners for attachment of metal to masonry shall be expansion type fasteners with stainless steel pins. All concrete fasteners and anchors shall have a minimum embedment of 1.25 inch and shall be approved for such use by the fastener manufacturer. All miscellaneous wood fasteners and anchors used for flashings shall have a minimum embedment of 1 inch and shall be approved for such use by the fastener manufacturer.
- E. Metal separation membrane, where required, shall be self-adhesive, self-sealing, 40 mil minimum thickness, (bituthene) with minimum tensile strength of 250 psi.

2.07 SEALANTS

- A. Sealant use shall be in conformance with manufacturer's instructions. Sealant for terminations per details shall be as accepted by the roof membrane manufacturer based on chemical compatibility.
- B. Butyl sealants shall be those conforming with Federal Specification TT-S-001657.
- C. One part polysulfide sealants shall be those conforming with Federal Specification TT-S-00230C, Type II, Class A.
- D. One part polyurethane sealants shall be those conforming with Federal Specification TT-S-00230C, Type II, Class B.
- E. Silicone sealants shall be those conforming to Federal Specification TT-S-00230C, Type II, Class A.
- F. Butyl tape shall be of a type produced and recommended by a reputable manufacturer for architectural copper applications.
- G. Single Component Urethane (at capstones and stone elements): ASTM C 920, Type S, Grade NS, Class 100/50, Uses NT & O; single component, moisture curing, non-staining, non-bleeding. Color of sealant shall match color of adjacent materials, and as approved by the Owner.
- H. Backer rod shall be closed cell polyethylene foam backer rod of proper size to provide 25 % compression when installed. Backer rod shall be Ethafoam SB Brand sealant backer rod as manufactured by Dow Chemical or approved equal.

- I. Bond breaker tape shall be one-sided adhesive tape for use in joints with inadequate depth or configuration for use of backer rod. Bond breaker tape shall be 470 Tape as manufactured by 3M company or approved equal.
- J. All accessories for sealant materials shall be same manufacturer or approved by the manufacturer, and shall include the following: primer, solvents, cleaners, and masking materials.

2.08 PIPE SUPPORTS

- A. Pipe supports with strut used to support roof mounted electrical conduits and mechanical piping shall be manufactured by MIRO Industries, Inc. or approved equal products. The pipe support base shall be made of polycarbonate resin, and all metal parts including the strut system shall be made of hot-dip galvanized steel. Conduit and pipes shall be attached to the strut with typical pipe clamps or clips. The total weight per support shall not exceed the recommended weight limit. Pipe supports to be sized properly for each condition.

2.09 ROOF PENETRATION HOUSING

- A. Manufacturer's Representatives: Fiskio, Inc. which is located at: 370 Paramount Drive, Unit #1; Raynham, MA 02767; Toll Free Tel: 800-288-6816; Tel: 508-823-4044.
- B. RPH Model No. AL161010 – Designed for electrical outlet, telecommunication cables, refrigeration, solar line penetrations. Accommodates up to 1-5/8" OD pipes/conduit/telecommunication cables.
- C. Exist Seals (Series 5000, 6000, & 7000) – The contractor shall provide the proper amount of exit seals for each housing unit, to match the required sizes of penetrations.

2.10 SKYLIGHTS

- A. New skylight domes shall consist of aluminum extruded heliarc welded retainer frame with corrosion proof screws and high performance weather seals. (Reference Drawing R-1 for location). Corners to be fused to insure leak proof properties. Extrusion shall contain a condensation gutter and high-performance elastomeric gasket. Plastic skylights must be factory tested to support, without failure, a 40 PSF positive and a 20 PSF negative test pressure. Acrylic-sealed double domes shall be clear over white. Skylight assemblies shall comply with OSHA General Industry Standard 29 CFR 1910.23 for fall protection. Skylight domes and retainer rings shall be manufactured by Wasco Products, Inc., Commercial Division, Sanford, Maine, or approved equal product.
- B. Glazing shall be clear impact modified acrylic over clear impact modified acrylic.

2.11 SAFETY RAILINGS

A. Safety Railings

1. Acceptable Manufacturer: Garlock Safety Systems, which is located at: 2601 Niagara Ln.; Plymouth, MN 55447; Toll Free Tel: 877-791-4446; Tel: 763-694-2614; Email: [request info \(sales@garlockequip.com\)](mailto:sales@garlockequip.com); Web: www.railguard.net Or approved equal product.
2. Railing Sections:
 - a. Rails: 1-5/8 inch O.D. by 0.065 inch wall HREW tubing.
 - b. Length: 7 feet 6 inches.
 - c. Height: 42 inches.
 - d. Mid-rail: weld to posts at 21 inches below top rail.
 - e. Finish: Epoxy powder coated safety yellow.
3. Base Plates:
 - a. Material: cast iron class 20B. 90 lbs weight
 - b. Size: 1 foot 9-1/2 inches by 1 foot 9-1/2 inches.
 - c. Carrying handles: built in with a center carrying hook for base transporter.
 - d. Toeboard receptacles: four, built in.
 - e. Capacity: Up to four railing sections intersecting rails on the same base.
 - f. Spacing between railing uprights not exceed 3.25"
 - g. Holes: Holes for permanent mounting and round holes for pins securing base to rail.
 - h. Center of base must be open profile to reduce rocking on uneven surfaces.
 - i. Base plate must provide no less than 4 inches of leading edge substrate contact as concentrated load is applied to base.
 - j. Finish: Epoxy powder coated safety yellow.
 - k. Four adhesive pads with directional non-skid resistant ridge pattern and minimum 26 sq. inches of substrate contact each: shall be adhered to the bottom of base plate to resist slippage on hard surfaces.
4. Securing Pins:
 - a. Style: Double wire lock pin.
 - b. Lock: Lynch pin 3/8" diameter.
 - c. Finish: Zinc plated bake finish.
5. Speed Boards:
 - a. Material: 4 inches wide, zinc plated steel.
 - b. Attachment: Boards shall telescope to fit into toe board brackets on base plate and pinned to the base toe board brackets.

PART 3 – EXECUTION

3.01 PREPARATION

- A. On a daily basis the Contractor shall completely replace, with new roofing, all areas that the existing roofing has been removed from. All flashings shall be installed permanently and concurrently with the roof membrane in order to maintain a watertight condition as the work progresses. Temporary flashings are not allowed. Daily tie-ins are required.
- B. Surface on which the PVC roof membrane is to be applied shall be clean, smooth, dry, free of fins, sharp edges, loose and foreign materials, oil and grease. Before beginning work, a technical representative of the PVC roof membrane manufacturer shall examine the surfaces in order to ensure that the deck, insulation, curbs, nailers, blocking, and accessories are acceptable and properly secured. Material with imperfections such as pinholes, cracks, incorrect thickness (less than specified), etc. shall be rejected and removed immediately from job site.
- C. No work shall take place when moisture is present on the roof or in any of the materials. The Engineer may order the work to stop when, in his opinion, the weather conditions warrant him to do so. Contractor shall take such measures as the work can continue with minimum delay so the exposure of building and its contents is minimum.
- D. After the rigid board roof insulation attachment is complete and is accepted by the technical representative, and after the substrate is dry, Contractor shall inspect the surface to determine that it is smooth and uniform and ready to receive the PVC roof membrane. Prior to starting the membrane installation work Contractor shall notify the Engineer that the surface is ready for the membrane installation work to begin.
- E. Fumes from adhesive products shall not be allowed to enter into the building during installation. Appropriate measures must be taken by the Contractor, to assure that fumes are not drawn into the building through air intakes or through any other openings.

3.02 MEMBRANE APPLICATION GENERAL

- A. Insulation substrates, where applicable, shall have been installed in strict accordance with this specification and membrane roofing manufacturer's printed recommendation. Beginning of work constitutes acceptance of substrate.
- B. All components of the roofing system shall be installed the same day. This shall include all rigid board roof insulation, flashings, sheet metal, and related accessory work. New sections of work shall not be started until previous day's work is totally completed. Contractor shall take care to assure that all materials

and supplies necessary to finish the roofing system daily are available on the site prior to beginning the day's work.

- C. After surface preparation, roof deck repairs, wood blocking installation, plywood installation, and rigid board roof insulation installation work has been completed, Contractor shall install the PVC roof membrane system.
- D. PVC roof membrane is to be adhered and attached in accordance with this specification and the manufacturer's recommendations. Membrane overlaps shall be shingled with the flow of water.
- E. Do not restrict the flow of water on finished roofing areas and on existing (not yet re-roofed) areas. If a drain and related plumbing are not installed, temporary drainage must be provided.
- F. Hot Air Welding:
 - 1. Adjacent sheets shall be welded in accordance with membrane manufacturer's requirements and as stipulated in this specification. All side and end laps shall be hot-air welded. Lap area shall be a minimum of 3 inches wide when machine welding, and a minimum of 4 inches wide when hand welding. A minimum 1-1/2 inch continuous hot-air weld is required at all seams.
 - 2. Welding equipment shall be provided by or approved by the PVC roof membrane manufacturer. All mechanics intended to use the equipment shall have successfully completed a course of instruction provided by the PVC roof membrane manufacturer prior to hot-air welding.
 - 3. All surfaces to be hot-air welded shall be dry and clean according to the PVC roof membrane manufacturer requirements. No adhesives or contaminants shall be present within the lap areas.
 - 4. At all T-joint intersections, hot-air weld PVC T-joint patches to completely cover the T-joint intersection.
- G. Quality Control of Hot-Air Welded Seams:
 - 1. On a daily basis, the Contractor shall conduct on-site evaluation of all hot-air welded seams for continuity using a rounded screwdriver. On-site test cut samples of hot-air welded seams shall be made daily by the Contractor at locations as directed by the Engineer, Owner's Project Manager, or Manufacturer's representative. **One-inch wide cross-section test cut samples of hot-air welded seams shall be taken at least three times a day.** All deficient welds shall be immediately corrected. Each test cut shall be properly patched.

3.03 ADHERED MEMBRANE APPLICATION

- A. Over the properly installed and prepared substrate surface, the adhesive shall be applied using PVC roof membrane manufacturer approved nap rollers. The adhesive shall be applied at a rate per the PVC roof membrane manufacturer's requirements. The adhesive shall be applied in a smooth, even coating with no holidays, globs, puddles, or similar irregularities. Only an area that can be covered completely in the same day's operations shall be coated with adhesive.

NOTE: Drying time increases with cooler temperatures. Also, the Contractor is cautioned against work on days of high humidity because of extremely slow evaporation of the solvent. The Contractor shall verify application rates with the PVC roof membrane manufacturer's technical representative on a daily basis.

- B. The amount of membrane that can be coated with adhesive before rolling into substrate will be determined by ambient temperature, humidity, and manpower. Adjacent sheets shall be overlapped a minimum of 4 inches. Flashings shall extend 5 inches onto the roofing membrane. The bonded sheet shall be pressed firmly into place. Use a water-filled, foam-covered lawn roller to consistently and evenly press the membrane into the adhesive layer. The bonded sheet shall be rolled in both directions along the entire length of the sheet. A steel hand roller will be used to roll the membrane along side and end laps. The remaining non-bonded half of the sheet shall be folded back and the bonding procedure repeated.
- C. No bonding adhesive shall be applied in lap areas that are to be hot-air welded. A minimum 1-1/2 inch continuous hot-air weld is required at all seams.
- D. A termination bar shall be installed above the adhered roof membrane, 4 feet in from the edge along the entire perimeter of the roofs. Termination bar shall be fastened at 12" on center and a continuous PVC roof membrane cover strip shall be welded continuously over the bar.

3.04 FLASHING MEMBRANE APPLICATION

- A. All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed. If any moisture is allowed to enter under the new roofing due to incomplete flashings, the affected area shall be removed and replaced at the Contractor's expense. All flashings shall be adhered to compatible, dry, smooth, and solvent-resistant surfaces.
- B. Over the properly installed and prepared substrate surface, the solvent-based adhesive shall be applied using approved solvent-resistant rollers. The adhesive shall be applied at a rate per the PVC roof membrane manufacturer's requirements. The adhesive shall be applied in smooth, even coatings with no holidays, globs, puddles, or similar irregularities. Only an area that can be completely covered in the same day's operations shall be coated with adhesive. The surface with adhesive coating shall be allowed to dry completely prior to installing the membrane.

NOTE: Drying time increases with cooler temperatures. Also, the Contractor is cautioned against work on days of high humidity because of extremely slow evaporation of the solvent. The Contractor shall verify application rates with the PVC roof membrane manufacturer's technical representative on a daily basis.

- C. The amount of membrane that can be coated with adhesive before applying to substrate will be determined by ambient temperature, humidity, and manpower. Adjacent sheets shall be overlapped a minimum of 4 inches. Flashings shall extend 5 inches onto the roofing membrane. The bonded sheet shall be pressed firmly into place with a hand roller.
- D. No bonding adhesive shall be applied in lap areas that are to be hot-air welded. A minimum 1-1/2 inch continuous hot-air weld is required at all seams.
- E. Membrane flashings shall extend a minimum of 8 inches above the PVC roof membrane surface (review drawings for additional flashing height requirements). Membrane flashings shall be properly terminated, with an approved termination bar (mechanically attached along the top edge at 6 inches on center) and counterflashed with sheetmetal.
- F. Flashing membranes shall be adhered to substrates. All interior and exterior corners and miters shall be cut and hot-air welded into place. No bituminous elements shall be in contact with the membrane.
- G. Flashings shall be hot-air welded at their joints and at their connections with the roof membrane.
- H. All flashing membranes that exceed 30 inches in height shall receive additional securement. Contact Engineer for securement methods.

3.05 METAL FLASHING APPLICATION

- A. Workmanship for sheet metal shall be as follows:
 - 1. Surfaces to be covered with sheet metal shall be free from defects of every description and clean of dirt and other foreign matter before sheet metal work is started.
 - 2. Lines, arises and angles shall be sharp and true. Plane surfaces shall be free from waves and buckles. Joints and seams in plain surfaces shall be avoided as far as possible. Metal joints shall be watertight.
 - 3. Sheet metal work exposed to the weather shall be permanently watertight and weather tight, with suitable provisions made for free expansion and contraction without causing leaks. Metal shall be installed to provide adequate resistance to bending to allow for normal thermal expansion and contraction.

4. Exposed edges shall be doubled back 1/2 inch in such a manner as to conceal them and provide stiffness.
 5. No nails shall be exposed on the face of the finished work except as approved by the Engineer or except as directed herein.
- B. The Contractor agrees to guarantee all metal flashings permitted to be reused, the same as new construction under the Contract.
 - C. Install electrolytic insulation materials between dissimilar metals. Avoid to the greatest extent practical, using dissimilar metals in contact with each other.
 - D. All sheet metal work shall be cleaned at completion of installation. Grease and oil films, handling marks, contamination from steel wool, fitting and drilling debris shall be removed and the work scrubbed clean. All new exposed metal surfaces shall be free of dents, creases, waves, scratch marks, and solder or weld marks. Daily cleanup and removal from the site of all shavings, clippings, shearing, rivets, fasteners, and whatever other debris resulting from these operations are required.
 - E. Proceed with flashing work concurrently to PVC roof membrane installation to prevent water intrusion into the roof assembly and facility. Complete all metal work in conjunction with roofing and flashings so that a watertight condition exists daily. If any moisture is allowed to enter under the newly completed roofing due to incomplete flashings, the affected area shall be removed and replaced at the Contractor's expense.
 - F. Fasteners exposed to weather shall utilize neoprene washers between the fastener head and the metal flashing.
 - G. Counter flashings shall overlap base flashings at least 4 inches.
 - H. Airtight/Watertight and continuous existing edge metals are required behind metal fascias and edge metal. Existing fascias are to be fastened 6 inches on center into the wood nailer or masonry wall.
 - I. PVC-clad metal flashings shall be formed and installed per the specifications and details. PVC-clad metal flashings shall be fastened into solid wood nailers with two rows of post galvanized flat head annular ring nails, 4 inches on center staggered. Fasteners shall penetrate the nailer a minimum of 1-inch.
 - J. Install PVC-clad metal flashings with 1/4 inch gap between adjoining sections. The joint shall be covered with 2-inch wide aluminum tape. A 6-inch wide strip of PVC flashing membrane shall be hot air welded over the joint. Position the PVC flashing membrane and hot-air weld to the PVC-clad metal flashing with a minimum 1-1/2 inch continuous weld.

3.06 PERIMETER METAL

- A. The contractor shall install a sealing tape strip between the continuous cleat and wall as a preventive measure against air and wind blown moisture entry.
- B. Position the roof membrane over edge of roof and down outside face of wall covering wood nailer(s) completely. Allow 1/2 inch of excess membrane to extend down past the wood nailer. Hot-air weld all seams making sure there are no voids in welds.
- C. Apply a 3/8 inch (10 mm) continuous bead of manufacturer's approved sealant to the clean bottom of formed retainer. Install formed retainer from right to left as seen from rooftop. Overlap joints of straight run sections a minimum of 1 inch and corner sections a minimum of 5 inches. Field cut sections as necessary.
- D. Fasten formed retainer into side of nailer 12 inches on center. Use fasteners provided with snap-on fascia system; 1-1/2 inch hex head stainless steel fasteners with neoprene washers.
- E. Fasteners shall provide a minimum 240 lbs. pull-out resistance; suitable for the substrates to which being installed.
- F. Install concealed joint splice plates intersecting sections of snap-on fascia cover joints.
- G. Position snap-on fascia cover so that it's top engages the formed retainer top. Rotate downward engaging bottoms of snap-on fascia cover and formed retainer. Allow 1/4 inch gap between snap-on fascia sections for thermal expansion. Field cut where necessary.

3.07 INSTALLATION OF METAL EXTENDER PIECES AT CURBS

- A. The Contractor shall cut open and lift the corners of the existing exhaust fan and unit curbs counterflashing as required to allow for the installation of roofing and flashing.
- B. The Contractor shall install metal extender pieces at all exhaust fan and other curbs. Fasten metal extender pieces at 6" o.c. with approved grommetted fasteners.
- C. Metal extender pieces shall be lapped a minimum of 1-1/2" and shall have a face dimension of 4".
- D. The existing exhaust fan and unit curb cover shall be reinstalled.
- E. Secure exhaust and unit cover at 12" o.c. with an approved grommetted fastener (minimum of two on each side of the curb).

3.08 WALKPAD INSTALLATION

- A. Walkpads shall be used as a protection layer and shall be installed under all pressure treated wood sleepers, at all roof entrances, top and bottoms of all roof access ladders, completely around all serviceable rooftop units, and as shown/located on the drawings. Walkpads shall be installed in accordance with the PVC roof membrane manufacturer's requirements in order to obtain the specified warranty. The Walkpad shall be hot-air welded to the PVC roof membrane with a 1-1/2 inch continuous weld.

3.09 PVC FLASHING INSTALLATION – PENETRATIONS

- A. Clean the penetration to allow for a tight seal. The flashing seal must be made directly to a watertight penetration.
- B. Flash penetrations with the manufacturer's premolded pipe flashing boots wherever possible. Do not cut or patch premolded flashing to assist in their installation. Verify that the premolded flashings will provide the specified flashing height.
- C. Construct field-fabricated flashings where manufacturer's premolded pipe flashings are not available in the correct geometry or do not provide specified flashing height. Pitch pockets are not acceptable.
- D. Seal top edge of the pipe flashing with sealant and a stainless steel hose clamp.
- E. Flexible penetrations such as wires, flexible conduit, or plastic tubing must be routed through a rigid metal gooseneck that is fully soldered or welded watertight, and rigidly anchored to the deck or wall. Flash the gooseneck as described for pipe penetrations above.

3.10 DRAIN BOWL FLASHING

- A. Coordinate flashing of drain bowls with new drain, extension sleeve, clamping ring, and strainer installation (installation is described in Section 220001 Plumbing). Allow any repair mortar to cure and dry before flashing drains.
- B. Solidly coat drain bowl ring with sealant. Fasten the drain clamping ring, set in a solid bed of sealant, over the sealant/membrane assembly. Trim the PVC flush with the interior edge of the clamping ring taking care not to cut the membrane behind the clamping ring bolts. Lap the deck sheet onto the drain flashing sheet a minimum of 6 in. and heat-weld sheets together.
- C. Install strainer at all drains.

3.11 TIE-IN

- A. The Contractor shall install a watertight tie-in on a daily basis. When a break in the days work occurs, a watertight tie-in from the old/existing roof system to the

new roof system shall be installed by the Contractor. No voids/breaches should exist. The new PVC roof membrane shall be carried into the tie-in and the connection shall be made watertight. The tie-in shall be properly sealed so that water will not be allowed to travel under the new or existing roofing or enter into the facility. When work is resumed, the contaminated PVC roof membrane shall be cut out and discarded. All sealant, contaminated membrane, insulation fillers, etc. shall be removed from the work area and disposed of off site. None of these materials shall be used in the new work.

- B. If inclement weather occurs while the tie-in is in place, the Contractor shall provide the labor necessary to monitor the situation and maintain a watertight condition.
- C. If any water, debris or any other foreign material is allowed to enter the newly completed roofing, the affected area shall be removed and replaced at the Contractor's expense.
- D. Any interior damages that occur, as a result of a failure or breach of the tie-in, shall become the Contractor's responsibility and he shall promptly repair and/or replace all damaged items to the satisfaction of the Engineer and Owner.

3.12 SKYLIGHT INSTALLATION

- A. Materials for use shall be as supplied and/or recommended by system manufacturer. Materials shall be delivered in their original, unopened containers, clearly labeled with manufacturer's name, brand name, and such identifying numbers as are appropriate. Materials with imperfections shall be rejected and removed immediately from the site.
- B. An experienced Contractor familiar with the skylight manufacturer's systems and installation shall install the skylight.
- C. Surface on which the skylight system is to be installed shall be clean, smooth, dry, and free of fins, sharp edges, loose and foreign materials, oil and grease. Tops of curbs shall be properly flashed with PVC membrane to form watertight seal between skylight curb frame and curbing.
- D. No work shall take place when the weather prohibits safe and correct installation.
- E. Install the skylight assemblies and domes in accordance with the manufacturer's instructions, to form a watertight seal.

3.13 SAFETY RAILING INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Before installation, inspect all parts to insure no damaged parts are used.
- C. Railing must be secured to base with securing pins.

- F. Where there is a danger of falling materials onto someone below insert a steel Speed Board into the toeboard bracket on the base plate and secure with securing pins to base.
- G. Use a Railguard 200 outrigger at any interruption in continuous railing sections. Outrigger assembly consists of a 5 foot railing (1.52 m) with base plate pinned to railing and placed 90 degrees away from danger side of continuous railing.

3.14 SEALANT REPLACEMENT

- A. Existing sealant shall be removed in its entirety at all joints indicated. The level of preparation at sealant joint substrate areas shall be reviewed by both the technical representative of the sealant Manufacturer and the Engineer. Sealant pulls tests shall be performed at each specific type of substrate/sealant joint included in the project. Sealant pull tests shall be performed by the sealant Manufacturer in the presence of the Engineer. No sealant installation work shall commence until all joint preparation and sealant pull tests are approved by the Engineer. Please note that sealant primer may be required to obtain the required bond to pass the sealant pull tests.
- B. All joints to receive caulking or sealant shall be dry and free of loose particles, oil or grease, or other material that would prevent or interfere with full adhesion of the caulk or sealant.
- C. Do not apply caulking when the ambient air temperature or the temperature of surface to be caulked or sealed is below 50°F or above 100°F. Do not apply caulking or sealant during rain or snow.
- D. Mask off the edges of joints to prevent staining unless it can be demonstrated that the quality of workmanship is high enough so that this protection is not needed.
- D. Backer rod shall be installed at all joints and elsewhere as indicated on the drawings. Install backer rod carefully with approximately 30% compression avoiding tearing, twisting, or stretching. Splices shall be butted tightly. Install backer rod to provide a depth-to-width ratio for the sealant joint of 1:2.
- E. Bond Breaker Tape: Where backer rod is not practical, and where approved by the Engineer, install bond breaker tape to the back of the sealant joints neatly, such that sealant will adhere only to sides of the joint when installed.
- F. Force sealant tightly into the joint, forcing out all air pockets and filling the void completely. Nozzle size shall be of the proper size to the particular joint.
- G. Sealant shall be dry-tooled immediately after application to provide a smooth, uniform surface of the recommended profile.
- H. All surfaces stained, soiled or discolored during caulking or sealing shall be cleaned or restored.

- I. Smears and excess caulking and sealant shall be removed with a cleaning agent as recommended by the sealant manufacturer.

3.15 FIELD INSPECTION

- A. The PVC roof membrane manufacturer's technical representative shall provide field surveillance of the installation as necessary to ensure that the Contractor is performing the work in accordance with the contract documents. As often as requested by the Engineer, Owner, or Owner's Project Manager, the PVC roof membrane manufacturer's technical representative shall provide field surveillance of the installation. Any items observed not in compliance with the contract documents shall be identified and promptly corrected by the Contractor. The Contractor is responsible for all costs associated with the field surveillance work performed by the PVC roof membrane manufacturer's technical representative.
- B. The Engineer and the Owner's Project Manager will be on site periodically to observe the work progress and to monitor contract compliance. Any items observed not in compliance with the contract documents shall be identified and promptly corrected by the Contractor.
- C. Prior to the final project completion, inspections shall be made by representatives of the PVC roof membrane manufacturer's technical representative, Engineer, and Owner's Project Manager in order to ascertain that the roofing system has been installed properly. A punch list will be developed by each and copies will be forwarded to the Contractor. Contractor shall immediately correct all punch list items. Deviations from the specifications and/or details must be corrected immediately. Warranty shall be issued upon final acceptance of the work.
- D. Contractor is to provide any and all necessary protection to the entire roof area to maintain watertightness during the project duration, including existing roof areas not yet roofed. Any interior damages that occur as a result of the Contractor's negligence shall become the Contractor's responsibility and he shall promptly repair and/or replace all damaged items to the satisfaction of the Engineer and Owner.

3.16 PROTECTION OF WORK

- A. Contractor shall protect the project site including the building, its contents, all streets, walls, underground and overhead utilities. All areas shall be left in a watertight and weather tight condition in their entirety at all times. Contractor shall provide protective measures and materials to assure that each element will be without damage or deterioration throughout the entire construction period up to the date of final completion. Any defective elements shall be removed and replaced at the Contractor's expense and to the satisfaction of the Engineer and Owner. Remove protective coverings and materials at the appropriate time, but no later than final cleaning operations.

- B. No work shall take place during inclement weather. No work shall take place when moisture is present on the work area or in any of the materials. The Engineer may order the work stopped when, in his opinion, the weather conditions warrants him to do so. Contractor shall take such measures as necessary to dry out work surfaces so that the work can continue with minimum delay.
- C. Contractor shall cover and protect all walls, windows, projections, soffits, etc. where material is to be hoisted or removed from the roof deck. Contractor shall be responsible for all scrapes, stains, and damage to the walls and shall repair or replace any walls, windows, siding, etc., which are damaged by his operations, to the satisfaction of the Engineer and Owner. Any areas damaged shall be restored or cleaned, to the satisfaction of the Owner by the Contractor at no cost to the Owner.
- D. Whenever the possibility exists that debris or materials may fall causing a hazard to persons inside or outside the building, the Contractor shall post one or more of his employees to temporarily close these hazardous areas. The person in charge of the facility shall be notified prior to the commencement of work that may pose this type of hazard. Proper barricades shall be provided to prevent normal access to or around these areas.
- E. Contractor shall properly protect all areas where falling debris or dust is expected due to his operations. Contractor shall be responsible for providing adequate personnel to clean and protect these areas. Contractor shall include these costs in their bid.
- F. Protect the building interior, contents, Owner's employees and customers from all hazards associated with the Contractor's operations.
- G. Any damage to the interior of the building or its contents due to the Contractor's operations or to leaks during the Contractor's operations shall be corrected at the Contractor's expense to the satisfaction of the Owner and the Engineer.
- H. Any damage to the exterior of the building or any rooftop equipment due to the Contractor's operations shall be corrected at the Contractor's expense or to the satisfaction of the Owner and the Engineer.
- I. No member of the roof shall be overstressed due to construction loads and demolition operations. The Owner assumes no responsibility for the actual condition of the structure.
- J. Damage to any portion of the building which results in disruption of or inconvenience to the Owner or his employees shall be immediately repaired or replaced by the Contractor. If such restitution is not promptly made, the Owner shall have the necessary work performed by an outside agency at the Contractor's expense.

3.17 CLEANING

- A. The building and adjacent areas shall be left in a broom-clean condition at the end of each day. On completion of the work and after removal of all debris, the site shall be left in a clean condition satisfactory to the Owner and to the Engineer.
- B. At the completion of the Project, the Contractor shall restore or replace all property damaged by his Work and shall remove all spots, paint, smears, soil, concrete, mortar, sealant, adhesives, asphalt, writing, droppings, or other foreign materials, from all Work. Remove all temporary protection from all the Work. Final cleaning shall include as a minimum:
 - 1. Clean site; sweep paved areas, rake clean landscaped surfaces.
 - 2. Remove waste and surplus materials, rubbish, and construction facilities from the site.
 - 3. The Contractor shall clean all walls, windows or other building and grounds elements that have been affected by his work.
 - 4. Repair, patch and touch-up marred surfaces to specified finish to match adjacent surfaces.
 - 5. The Contractor shall clean the roof membrane to the satisfaction of the Owner and Engineer.
- C. Any scrap PVC roof membrane associated with the new PVC roof membrane installation work is to be recycled by the PVC roof membrane manufacturer. Contractor is responsible for all costs associated with the proper removal, bagging, preparing, loading, and shipping the PVC roof membrane to the PVC roof membrane manufacturer's designated facility.

3.18 COMPLETION OF WORK

- A. Prior to demobilization from the site, the completed project/work shall be reviewed by the Engineer, the PVC roof membrane manufacturers' technical representative, Owner's Project Manager, and the Contractor. All defects and items in non-compliance with the specifications, manufacturers' recommendations and the manufacturers' warranty requirements shall be itemized on a punch list. These items shall be corrected to the satisfaction of the Engineer, the PVC roof membrane manufacturers' technical representative, Owner's Project Manager, by the Contractor prior to demobilization.
- B. All warranties referenced in this specification shall have been submitted and accepted the Engineer and Owner. Fully executed warranty documentation shall be submitted to the Engineer and Owner as soon as possible for review and approval. At the completion of the job, the Contractor and manufacturer shall each submit their guarantees to the Owner. Additionally, they shall submit an Inspection and Maintenance Schedule to the Owner.

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SECTION 22 00 01

PLUMBING – ROOF DRAINS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. The General Conditions of the Contract for Construction and the General Requirements are hereby made part of this specification.
- B. Maintain a copy of all applicable drawings, specifications, shop drawings, and approved submittals at the site at all times during the Work.

1.02 SECTION INCLUDES

- A. The work of this Section consists of furnishing and installing all plumbing for roof drainage, plumbing vent extensions, and related items as indicated on the Drawings and specified herein, required to complete the work.
- B. Contractor shall replace the existing cast iron roof drain assemblies; to include new cast iron drain bowls, extensions, clamping rings, drain strainers, anchors, insulation, bolts, lead lining connections, and under deck clamps, as specified and detailed.

Contractor shall remove and replace an approximate 2LF to 4LF section of cast iron roof drain leader pipe, at a section where two pipes join (size to match existing; general location as shown on drawing). Note: the location is easily accessed by removing acoustical ceiling tiles.

Contractor shall install plumbing vent extensions as required to conform to the MSBC and as specified herein.

Contractor is responsible for providing all connections and alterations to accommodate the new work.

- C. Prior to the start of work, Contractor shall inspect and verify the proper functioning of all roof drains and shall identify those that are slow flowing or clogged. In an effort to ensure a free-flowing roof drainage system, Contractor shall snake free these drains at the **start of the project and again at the project's completion** for a minimum distance of 100 feet starting from the roof level.
- D. All roof drainage systems for the existing building shall not be made ineffective due to this work. Lines shall be run in a workmanlike manner, and as straight as possible.
- E. All materials shall be verified by Contractor to be proper for each intended use, and the entire work of this Section shall be done in such a manner that each installation will perform its intended purpose as applicable, in the finished work.

- F. Contractor shall properly protect all areas where falling debris or dust is expected due to his operations. Contractor shall be responsible for providing adequate personnel to clean and protect these areas. Provide protection at all times during construction to maintain watertightness. Contractor shall include these costs in the bids.
- G. Protect the building interior, contents, Owner's employees and tenants from all hazards associated with the Contractor's operations.
- H. Any damage to the interior of the building or its contents due to the Contractor's operations or to leaks during the Contractor's operations shall be corrected at the Contractor's expense to the satisfaction of the Owner and the Engineer.
- I. Any damage to the exterior of the building, roof membrane, or any roof top equipment due to the Contractor's operations shall be corrected at the Contractor's expense to the satisfaction of the Owner and the Engineer.
- J. The drawings indicate and show limits of construction for this project. The specifications specify material and work requirements for this project. Both are complementary to each other and both shall be followed to complete the work
- K. Plans and dimensions under which the Work is to be performed are derived from a variety of sources. The existing conditions are provided for information only. Actual conditions may vary. Contractor is required to verify existing roof drainage plumbing system and plumbing vent piping composition, conditions, and dimensions prior to submitting his bid. No additional compensation or time extension will be made for dimensional errors or discoverable inaccuracies related to existing conditions in the contract documents.

1.03 RELATED WORK

- A. Section 02 41 00 – Demolition
- B. Section 04 50 00 – Masonry Restoration
- C. Section 05 31 00 – Steel Deck Repairs
- D. Section 06 10 63 – Rough Carpentry
- E. Section 07 22 00 – Roof Insulation
- F. Section 07 54 00 – Roofing & Flashing
- G. Section 23 00 00 – HVAC (Filed Sub-Bid)
- H. Section 23 00 01 – Temporary Mechanical Disconnects
- I. Section 26 00 00 – Electrical
- J. Section 26 00 01 – Temporary Electrical Disconnects

1.04 SUBMITTALS

- A. Submit manufacturer's descriptive literature and data sheets listed below under provisions of Section 01 33 00:

1. Roof drain assembly including drain bowls, clamping ring assemblies, drain strainers, anchors, bolts, under deck clamps, leader pipes, hangers, lead and oakum, and insulation.
 - B. Submit Contractor Quality Assurance supporting documentation as stipulated in Paragraph 1.06 B.
 - C. Submit a schedule for the work in coordination with the roofing replacement work.
- 1.05 DELIVERY, HANDLING AND STORAGE
- A. Contractor shall comply with all recommendations of the pipe manufacturer and of applicable Technical Reports of the Cast Iron Soil Pipe Institute for handling and installation.
 - B. All work and materials shall be protected at all times. The Contractor shall make good all damage caused by his workmen either directly or indirectly. All pipe openings shall be closed with caps or plugs during installation. Equipment shall be tightly covered and protected against dirt, water, chemical or mechanical injury.
 - C. The Contractor shall do all carting, handling and hoisting for his materials and equipment in a safe and satisfactory manner. Any damage resulting there from shall be repaired or paid for by this Contractor to the satisfaction of the parties concerned, at no additional cost to the Owner.

1.06 QUALITY ASSURANCE

- A. All materials shall be installed to serve their intended function.
- B. All work shall be performed by a licensed plumber that regularly performs commercial roof drain replacement work. The work shall adhere to the local building codes, regulations, industry standards, and best practices of the trade. The Contractor shall have a minimum of five (5) years experience installing warranted commercial roof drainage systems. Minimum required experience involves the successful installation of at least ten (10) similar projects located in Massachusetts. Contractor shall provide the following supporting documentation:
 - (1) Name and address of project indicating project name, project date, and number of drains replaced, for each of the ten (10) referenced projects.
 - (2) Name and phone number of contact person (Owner, Designer, and Roofing Contractor), for each of the ten (10) referenced projects.
 - (3) Written evidence of plumbing contracting license.
- C. All work shall be applied in strict accordance with the provisions of the technical specification and details. No deviations shall be permitted without written consent from the Engineer. Should a conflict between this specification (and the associated

details) and the manufacturer's requirements arise, the most restrictive provision, as determined by the Engineer, shall govern.

1.07 COORDINATION

- A. Coordinate all work of this section with other trades. Perform all plumbing work in a timely manner as not to delay other trades. The Plumbing Contractor shall coordinate all work with the roofing and waterproofing trades, to prevent exposure of the building to inclement weather and leaks, at all times.

1.08 CONTRACTOR'S USE OF PREMISES

- A. Contractor shall limit its use of the site for work and for storage to allow for:
 - 1. Owner occupancy and use of the building during construction.
 - 2. Public use of walks, parking lots, and driveways.
- B. Do not block exits at any time. Provide protected entranceways at each entrance when working in these areas.
- C. Coordinate work on the roof, use of the site, storage areas, and staging areas with the Owner. Limit use of the site and working hours to dates, times, and locations approved by the Owner.
- D. Cooperate with the Owner's scheduling requirements for working at an occupied building. Work under this Section shall not interfere with the operation of the building or building occupants at any time.
- E. The Contractor is responsible for protecting all materials and equipment stored on the site.
- F. Smoking is not permitted on the grounds.
- G. Dispose of all trash and debris in a legal manner off-site. Do not throw debris from access equipment or staging. Conduct debris to approved containers on the ground. Locate debris containers only in locations approved by the Owner in advance.

1.09 WARRANTY

- A. Plumbing Contractor's Warranty: The Plumbing Contractor shall supply the Owner with a minimum two-year workmanship and leak-free warranty. In the event any work related to plumbing is found to be defective, is not watertight, or otherwise not in accordance with the contract documents within two (2) years of final completion, the Plumbing Contractor shall repair and/or remove and replace at no cost to the Owner. The Contractor's warranty obligation shall run directly to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All materials shall be selected so as to conform to all applicable local state and federal codes.
- B. **Roof Drains:** Roof Drains as manufactured by Zurn Industries, Inc., J.R. Smith Mfg. Co., Inc., Josam Co., Inc. Roof drain to be sized so as to match existing diameters; Roof Drain shall be Dura-Coated cast iron body with combination membrane flashing clamp/gravel guard and low silhouette vandal proof cast iron dome. Provide all necessary accessories, including, but not limited to the following: under deck clamps (two piece clamp made of Dura-Coated cast iron that secures drain to deck), adjustable extension assembly, static extension, roof sump receiver, and bronze mesh screen over dome to prevent debris from entering drain.
- C. **Drain piping:** Cast iron soil pipe of Service weight cast iron with no hub joints or bell and spigot joints or as required to comply with current applicable local, state and federal codes. All pipes shall be supplied in the longest lengths possible so as to minimize pipe joints. Use Dielectric connections or other approved means when connecting pipes of dissimilar material.
- D. **Pipe joint:** at roof drain bowl to leader pipe connection shall be sealed with lead and oakum.
- E. **Insulation:** Furnish and install the following type pipe covering and insulation as manufactured by Owens Corning, Knauf, Certaineed, or approved equal product. Fiberglass insulation ("K" value of 0.23 at 75° , non-combustible) with fire retardant jacket on all pipings. Laps sealed with Insul-Coustic IC-102 or approved equal. Thickness to be 1". Fittings, flanges and valves to be insulated with either Zeston pre-molded PVC insulation fittings or with molded or mitered fiberglass finished with glass cloth and Insul-Coustic IC-102 or approved equal. All insulation shall have a composite fire hazard rating as tested by ASTM E-E4, NFPA 255, or UL273, not to exceed 25 flame spread and 50 smoke developed. All accessories shall have same component ratings.
- F. **Stainless Steel Coupling:** shall be used to extend the height of existing vent pipe penetrations that do not extend a minimum of 18" of the finished roof. Couplings shall conform to ASTM C1540, CSA B 602, & FM 1680 Class 1. Couplings shall consist of a Type 304 stainless steel shield, clamp assembly and a high quality elastomeric gasket conforming to ASTM C 564. Transition couplings conform to ASTM C 1460. Stainless steel couplings shall be SD 4000 stainless steel coupling manufactured by Anaco, or an approved equal product.

PART 3 - EXECUTION

3.01 CLEANING AND TESTING

- A. Contractor shall snake clear and clean all referenced drains at **the start of the project and again at the project's completion** for a minimum distance of 100 feet starting from the roof level.
- B. Upon completion of work all parts of installation shall be thoroughly cleaned of all foreign material including roofing products, grease, metal cuttings, dirt, etc.
- C. All roof drains and piping shall be water tested in, accordance with applicable plumbing code, to verify proper operation and adequately sealed joints and flashing. All testing work shall be performed in the presence of the Engineer or Owner's representative. Leaks developing subsequent to these tests shall not be repaired by mastic or other temporary means. All leaks shall be repaired by removal of the valve, fitting, joints or other sections that are leaking and reinstalling new material.

The contractor will be required to test 10% of the roof drains at the facility by performing a flood test. The contractor shall plug the drain and flood an approximate 100 square foot area with water for a period of 24 hours minimum. The plug shall then be removed and a visual inspection at the underside of the roof drain for signs of leakage. The contractor shall be responsible for the removal and replacement of any PVC roofing that is found to be wet.

3.02 DRAIN INSTALLATION

- A. Install new drain bowl and new drain leader connection in all drains prior to roof replacement. Install new roof drains in accordance with manufacturer's recommendations ensuring flange is flush with the existing deck, in a receiver pan if necessary and that all lead and oakum seal connections are proper to create a positive watertight connection with the new drain leader pipe including:
 - 1. Flash in flange up to and around vertical drain body bosses.
 - 2. Install clamping ring over raised bosses and tighten clamping ring against flashing until secure. Refer to Section 07 54 00 – PVC Roofing & Flashing for membrane and flashing termination requirements.
 - 3. Install strainer basket onto clamping ring and lock into place.
- B. Insulation: Insulation shall be installed in a workmanlike manner by workman regularly engaged in this type of work. Insulate all new drains. Insulate all existing drain piping to the point where it enters the ceiling level below. Insulation to be installed after all surfaces are clean and dry. Insulation on pipe fittings, and pipe joints shall not be insulated before the piping is tested and approved. A complete moisture and vapor seal shall be provided over insulation on cold surfaces where vapor barrier jackets, facings, or coatings are required. Anchors, hangers, and other projections shall be insulated and vapor sealed to prevent condensation. All

openings, punctures, and staples shall be sealed with vapor barrier compound. Jackets and facings shall be securely and neatly applied to the insulation. Jackets and facings shall be drawn tight and all joints shall have laps or butt strips of material identical with jackets or facings, secured with factory or field applied adhesives or with staples. Jackets on pipe insulation shall have not less than 1-1/2" lap joints at longitudinal joints and not less than 3" wide butt strips at end joints. Insulate all horizontal storm drainage piping.

3.03 EXTENSION OF VENT PIPE PENETRATIONS

- A. The plumbing contractor shall conduct a survey of the existing vent pipes on the roof to determine which vent pipes must be extended. This survey will be coordinated the roofing contractor and the tapered insulation plan. Vent pipe penetrations must extend a minimum of 18" above the finished roof system.
- B. Vent pipes that are being extended shall be cleaned of all foreign material including roofing products, grease, metal cuttings, dirt, etc. The plumbing contractor shall verify that the vent pipe is not broken, cracked, or has any sharp corners that will damage the stainless steel coupling. The contractor will cut any pipe that exhibits these conditions prior to the installation of the new coupling.
- C. The plumbing contractor shall slide the stainless steel coupling down over the existing vent pipe penetration. Install new cast iron pipe into the stainless steel coupling. The stainless steel sealing clamps shall be torqued to 80-inch pounds.
- D. The roofing contractor shall flash the vent pipe penetration in accordance with the PVC flashing details.

END OF SECTION

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SECTION 23 00 00

**HEATING, VENTILATING, AIR CONDITIONING AND COOLING
(Filed Sub-Bid Required)**

PART 1 - GENERAL

1.01 FILED SUB-BID

- A. HVAC is stipulated as a Filed Sub-Bid under Part D, Item 2, of the FORM FOR GENERAL BID.
- B. All sub-bids shall be submitted on the FORM FOR SUB-BID furnished by the Awarding Authority as required by Section 44G of Chapter 149 of the General Laws, as amended.
- C. Sub-bids must be filed with the Awarding Authority in a sealed envelope on the date stipulated in the Invitation To Bid.
- D. In any case in which the sub-bidder intends to perform with persons of his own staff, the class of work listed above, he must nevertheless list his own name therefore under Paragraph E of the FORM FOR SUB-BID.
- E. **The Filed Sub-Bid work is being bid as Alternate No. 1 Bid; the work includes HVAC work as specified and detailed as follows:**
 - (1) **Specification Section 23 00 00 HVAC and Drawings H-1, H-2, H-3 & H-4.**
 - (2) **Specification Section 26 00 00 ELECTRICAL and Drawings E-1, E-2 & E-3.**
- F. The General Conditions of the Contract for Construction and the General Requirements are hereby made part of this specification.
- G. Maintain a copy of all applicable drawings, specifications, shop drawings, and approved submittals at the site at all times during the Work.

1.02 DEFINITIONS

- A. Owner – City of Salem
- B. Awarding Authority – City of Salem
- C. Architect – Russo Barr Associates
- D. Engineer – BLW Engineers, Inc.
- E. The Roofing Contractor shall be considered the General Contractor and General Bidder.

- F. The HVAC Contractor shall be considered to be the HVAC Subcontractor.
- G. The Electrical Contractor shall be considered the Electrical Subcontractor.
- H. "Provide" shall mean furnish and install.
- I. "Disconnect" shall mean to electrically disconnect and otherwise make the equipment safe for removal and disposal by others. The Electrical Contractor shall remove conduit and wiring serving disconnected equipment, unless otherwise noted.
- J. "Remove" shall mean to "disconnect", remove and dispose of the equipment indicated.
- K. "Relocate" shall mean to "disconnect" for relocation of the existing equipment.
- L. "Remain" shall mean the existing equipment is to remain in place, in operating condition.

1.03 RELATED DOCUMENTS

- A. Include GENERAL CONDITIONS, SUPPLEMENTARY GENERAL CONDITIONS and applicable parts of Division 01 as part of this Section.
- B. Examine all Project Specifications and Drawings for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. When open-flame or spark producing tools such as blower torches, welding equipment, etc., are required in the process of executing the work, the General Contractor shall be notified not less than 24 hours in advance of the time that the work is to begin and the location where the work is to be performed. Provide, where necessary, fire protective covering and maintain a constant non-working fire watch where work is being performed and until completed.
- E. The following definitions apply to the Drawings and Specifications
 - 1. Furnish: The term "furnish" is used to mean "supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations."
 - 2. Install: The term "install" is used to describe operations at project site including actual "unloading, unpacking, rigging in place, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations."

3. Provide: The term “provide” means to “furnish and install, complete and ready for intended use.”
4. Installer: An “installer” is the contractor or an entity engaged by the contractor, either as an employee, subcontractor, or sub-subcontractor for a performance of a particular construction activity, including installation, erection, application and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

1.04 DESCRIPTION OF WORK

- F. 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. Rooftop Units
 2. Roof Exhaust Fans
 3. Galvanized Sheet Metal Duct Systems, each type
 4. Insulation, each type
 5. Testing and Balancing of Air
 6. Vibration Isolation
 7. Provide a complete system of automatic temperature controls, as shown on the Drawings and called for in this Specification.
 8. Systems shall be complete, including all appurtenances for fully workable systems.
 9. Cutting and Patching
 10. Firestopping
 11. Seismic Provisions
- B. Provide any other component or related system (whether or not listed) which is part of the overall design and basic equipment and deemed necessary for its completion, thoroughness and readiness for operation in perfect condition.
- C. Furnish, set up and maintain all derricks, hoisting machinery, scaffolds, staging and planking as required for the work.
- D. Supply the service of an experienced and competent supervisor who shall be in charge of the HVAC Subcontractor's work at the site.

- E. The HVAC Subcontractor shall be held responsible for subletting any work shown or specified herein, but not classified as HVAC work in order to avoid any jurisdictional disputes and work stoppage arising there from.
- F. All electrical apparatus and controls furnished as a part of the HVAC work shall conform to applicable requirements under DIVISION 26 - ELECTRICAL
- G. All work shall be coordinated with the Construction Schedule.
- H. Power wiring is specified in Section 26 00 00 - Electrical, and will be provided by the Electrical Subcontractor.
- I. Installation of systems and equipment provided under this section shall be done in strict accordance with Massachusetts Department of Public Safety Codes, Massachusetts Department of Environmental Protection, Massachusetts State Building Code and local regulations having jurisdiction.
- J. All pressure vessels shall conform to ASME and Massachusetts codes and regulations.
- K. All work, where applicable, shall conform to NFPA codes and all material shall be U.L. approved.
- L. All electrical apparatus furnished under this section shall be approved by the U.L. and shall be so labeled or listed where such is applicable. Where custom-built equipment is specified and the U.L. label or listing is not applicable to the completed product, all components used in the construction of such equipment shall be labeled or listed by U.L. where such is applicable to the component.
- M. Give notices, file plans, obtain permits and licenses, pay fees and obtain necessary approvals from authorities having jurisdiction. Deliver certificates of inspection to Engineer. No work shall be covered before examination and approval by Engineer, inspectors, and authorities having jurisdiction. Replace imperfect or condemned work conforming to requirements, satisfactory to Engineer, and without extra cost to the Owner. If work is covered before due inspection and approval, the installing contractors shall pay costs of uncovering and reinstalling the covering, whether it meets contract requirements or not.
- N. During the progress of the heating, ventilating and air conditioning work, clean up and remove all oil, grease and other debris caused by this work. At completion, the Contractor shall clean all equipment, piping and duct systems and leave all work in perfect operating condition.
- O. The structure and its appurtenances, clearances and the related services, such as plumbing, heating, ventilation and electric service have been planned to be legal, adequate and suitable for the installation of equipment specified under this section. The Owner will not assume any increase in cost caused by differing requirements peculiar to a particular make or type of equipment, and any incidental cost shall be borne by the HVAC Sub-Contractor. He shall be

responsible for the proper location of his required sleeves, chases, inserts, etc., and see that they are set in the forms before the concrete is poured. He shall be responsible for his work and equipment furnished and installed by him until the completion and final acceptance of this contract, and he shall replace any work which may be damaged, lost or stolen, without additional cost to the Owner.

1.02 PROTECTION OF MATERIALS, WORK, AND GROUNDS

- A. Materials, fixtures and equipment shall be properly protected and all pipe and duct openings shall be temporarily closed so as to prevent obstruction and damage.
- B. Protect and preserve all materials, supplies and equipment of every description and all work performed. Protect all existing equipment and property of any kind from damage during the operations. Damage shall be repaired or replaced promptly by the Contractor at his expense.

1.03 DRAWINGS

- A. It is the intention of the Specifications and Drawings to call for finished work, tested and ready for 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 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 Engineer before being installed. The 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 Engineer before proceeding with the installation. The 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. Size of ducts and 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 such a manner as to avoid being unsightly.
- D. All measurements shall be taken at the building by the Contractor, prior to purchasing and installing the equipment and piping.

1.04 SHOP DRAWINGS

- A. Provide five (5) sets of shop drawings for the following in accordance with Division 01:
1. Roof Top Unit
 2. Roof Exhaust Fans
 3. Supports
 4. Insulation, each type
 5. Automatic Temperature Controls components complete with wiring Diagrams
 6. Sequence of Controls
 7. Sheetmetal Standards
 8. Sheetmetal Shop Drawings
 9. Vibration Isolation

1.05 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. Submit in accordance with Division 01 for all equipment provided in this section. Operation and maintenance data complete with at least the following information.
- B. Table of Contents:
1. Introduction:
 - a. Explanation of manual and its use
 - b. Description of all systems
 - c. Description of automatic temperature control systems
 2. Plant Operation:
 - a. Operating instructions for all HVAC apparatus.
 3. Maintenance
 - a. Maintenance and lubricating chart: Furnish three sets of charts indicating equipment tag number, location of equipment, equipment service, greasing and lubricating requirements, lubricants and intervals of lubrication.
 - b. Recommended list of spare parts: Furnish two 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, including 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.

4. Manufacturer's literature (include model and serial numbers of equipment):
 - a. Rooftop Unit
 - b. Roof Exhaust Fans
 - c. Automatic Temperature Controls

1.06 UNDERWRITERS' LABEL AND LISTING

- A. All electrical apparatus furnished under this Section shall be approved by the UL and shall be labeled or listed where such is applicable. Where custom-built equipment is specified and the UL label or listing is not applicable to the completed product, all components used in the construction of such equipment shall be labeled or listed by UL where such is applicable to the component.

1.07 CUTTING AND PATCHING

- A. All cutting and patching one (1) square foot and less in area necessary for the proper installation of work to be performed under this Section and subsections shall be performed by the HVAC Sub-Contractor. All cutting and patching associated with demolition work and greater than one (1) square foot in area for the installation of work under this section shall be by the General Contractor.
- B. All work shall be fully coordinated with all phases of construction, in order to minimize the requirements for cutting and patching.
- C. The contractor shall see that all such chases, openings, and sleeves are located accurately and are of the proper size and shape and shall consult with the Engineer in reference to this work. In so doing, he shall 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 Engineer.
- D. Carefully fit around, close up, repair, patch, and point around the work specified herein to the entire satisfaction of the Engineer.
- E. Fill and patch all openings or holes left in the existing structures by the removal of existing equipment by himself, his subcontractors or other field subcontractors.
- F. All of this work shall be carefully done by workmen competent to do such work and with the proper and smallest tools applicable.
- G. Any cost caused by defective or ill-timed work shall be the contractor's responsibility therefore.

- H. The fire resistance rating of floors, walls, and ceilings shall be maintained. UL listed firestopping shall be installed in accordance with manufacturer's written instructions.

1.08 GUARANTEE

- A. Guarantee that all work installed will be free from any and all defects in workmanship and/or materials and that all apparatus will develop capacities and characteristics specified.
- B. If, during a period of one year from the date of final completion and acceptance of the work, any such defects in workmanship, material or performance appear, the HVAC Sub-Contractor will, without cost to the Owner, remedy such defects within a reasonable time to be specified in notice from the Architect.
- C. Correct all damage to insulation, paint or building caused by defects in his work, equipment, and its operation. Guarantee shall include startup, shutdown, maintenance, and 24-hour service during the guarantee period.
- D. Any apparatus that requires excessive service during the warranty period will be considered defective and shall be replaced.

1.09 ELECTRICAL

- A. All electrical apparatus and controls furnished as a part of this Section shall conform to applicable requirements under DIVISION 26 - ELECTRICAL.
- B. All motors furnished under this Section shall be NEMA premium efficiency furnished by the manufacturer of the equipment served and shall be mounted and aligned so as to run free and true. Each motor shall be built to conform to the latest applicable NEMA, ANSI and IEEE standards for the type and duty of service it is to perform. All rebates from local utility shall be submitted to the Owner.
- C. Each motor shall be designed to operate on 60 Hz, and each shall be expressly wound for the voltage specified. Each motor shall operate satisfactorily at rated load and frequency with a voltage variation no greater than plus or minus 10 percent of voltage specified. Dual voltage 208/220 motors will not be accepted.
- D. All motors shall be provided with adequate starting and protective equipment and each shall have a terminal box of adequate size to accommodate the required conduit and wires.
- E. Motor controllers shall be equipped with all poles, auxiliary contacts and other devices necessary to permit the interlocking and control sequences required. Controller operating coils shall be generally designed for 120 volt operation, and 3 phase motors shall be provided with thermal overload protection in all phases.

- F. Furnish all magnetic starters for each and every motor furnished under this section of the specification, except where otherwise indicated. The Electrical Sub-Contractor shall install and wire the starter. The Contractor shall provide disconnects for all HVAC equipment. The Electric Sub-Contractor shall install and wire all disconnects. All starters for motors over 10 HP shall be solid state with reduced inrush design. The maximum allowable inrush shall be 2.5 times running load amperage. All starters for fractional HP motors shall be provided with manufacturer's standard motor starter.
- G. Furnish and install all low voltage and/or line voltage control wiring for the boiler/burner units, chillers, cooling towers, pumps, and fans. All wiring shall be performed by a licensed electrician.

1.10 VERIFYING CONDITIONS

- A. Before commencing any work under this section, verify all governing dimensions and examine all adjoining work on which this work is in any way associated or connected. Failure to visit the jobsite will in no way relieve the Contractor from installing the work according to the intent of these specifications and at no additional cost to the Owner.
- B. Each bidder shall visit the site and inspect conditions affecting the proposed work. Failure to do so and misinterpretation of the Plans and Specifications resulting there from shall be entirely the responsibility of the bidder.
- C. Each bidder shall make note of the existing conditions affecting hauling, rigging, transportation, installation, etc., in connection with his work and shall make all provisions for transportation of all materials and equipment.
- D. Where field conditions require, the Contractor shall arrange for equipment to be shipped to the job, dismantled and assembled in place.
- E. Remove walls, window assemblies/glass and floor structures where necessary to install and remove equipment as shown. The Contractor shall reinstall such displaced structures to their original condition.

1.11 PAINTING

- A. All finish field painting shall be provided by general contractor.

1.12 STANDARDS

- A. The latest published issue of the standards, recommendations, or requirements of the following listed societies, associations, or institutes in effect at the date of Contract are part of this Specification. These shall be considered as minimum requirements; specific requirements of this specification and/or associated drawings shall have precedence. In case of conflict between published requirements, the Owner's representative shall determine which is to be followed.

1. AMCA Air Moving and Conditioning Association
2. ANSI American National Standards Institute
3. ASHRAE American Society for Heating, Refrigerating, and Air Conditioning Engineers
4. ASME American Society of Mechanical Engineers
5. ASTM American Society for Testing and Materials
6. FIA Factory Insurance Association
7. IEEE Institute of Electrical and Electronic Engineers
8. MCAA Mechanical Contractors Association of America
9. NEMA National Electrical s Association
10. NFPA National Fire Protection Association
11. SMACNA Sheet Metal and Air Conditioning Contractors' National Association
12. UL Underwriters' Laboratories, Inc.
13. OSHA Occupational Safety and Health Act
14. NEC National Electric Code

1.13 COOPERATION AND COORDINATION WITH OTHER TRADES

- A. The work shall be so performed that the progress of the entire building construction including all other trades shall not be delayed nor interfered with. Materials and apparatus shall be installed as fast as conditions of the building will permit and must be installed promptly when and as desired.
- B. 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 Architect for decision to prevent delay in installation of work. All work and materials placed in violation of this clause shall be readjusted to the Architect's satisfaction, at no expense to the Owner.
- C. 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 will interfere with work of other sections, assist in working out space conditions to make satisfactory adjustment. Prepare and submit for approval 3/8 inch scale or larger working drawings and sections, clearly showing how this 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.

- D. Keep fully informed as to the shape, size and position of all openings required for all apparatus and give information in advance to build openings into the work. Furnish and set in place all sleeves, pockets, supports and incidentals.
- E. All distribution systems which require pitch or slope such as storm and sanitary 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, lights and apparatus and install work to avoid interferences.
- F. This Subcontractor shall, with the approval of the Architect and without extra charge, make reasonable modifications in his work as required by normal structural interferences, or by interference with work of other trades, or for proper execution of the work.
- G. This Subcontractor shall protect all materials and work of other trades from damage that may be caused by his work and shall make good any damages so caused.
- H. This contractor shall submit Requests for Information (RFI's) regarding the work of this section in accordance with the provisions of Division 01.

1.14 SCAFFOLDS AND STAGING

- A. General: Filed Subcontractors shall obtain required permits for, and provide scaffolds, staging, and other similar raised platforms, required to access their Work.
 - 1. Scaffolding and staging required for use by this Filed Subcontractor pursuant to requirements of Section 01 50 00 - Temporary Facilities and Controls shall be furnished, erected, maintained in a safe condition, and dismantled when no longer required, by this Filed Sub-Trade requiring such scaffolding.
 - 2. Each Filed Subcontractor is responsible to provide, maintain and remove at dismantling, all tarpaulins and similar protective measures necessary to cover scaffolding for inclement weather conditions other than those required to be provided, maintained and removed by the General Contractor pursuant to MGL (Refer to Section 01 50 00 - Temporary Facilities and Controls and as additionally required for dust control).
 - 3. Furnishing portable ladders and mobile platforms of all required heights, which may be necessary to perform the work of this trade, are the responsibility this Filed Subcontractor.

1.15 HOISTING MACHINERY AND EQUIPMENT

- A. All hoisting equipment, rigging equipment, crane services and lift machinery required for the work by this Filed Subcontractor shall be furnished, installed, operated and maintained in safe conditions by this Filed Subcontractor, as referenced under Section 01 50 00 - Temporary Facilities and Controls.

1.16 SEISMIC RESTRAINT REQUIREMENTS

- A. 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.
- B. For each respective set of anchor bolts provide calculations to verify adequacy to meet combined seismic-induced sheer and tension forces.
- C. For each weldment between structure and item subject to seismic force, provide calculations to verify adequacy.
- D. Calculations shall be stamped by a professional engineer who is registered in the Commonwealth of Massachusetts and has specific experience in seismic calculations.
- E. Restraints shall maintain the restrained item in a captive position without short circuiting the vibration isolation.
- F. Provide seismic restraints for all piping, ductwork and equipment in accordance with the requirements of the Massachusetts State Building Code, 780 CMR, 8th Edition, and referenced requirements of BOCA and NFPA.

1.17 FINAL ACCEPTANCE

- A. Final acceptance of Ownership of the HVAC system installed within this scope of work shall be contingent on passing a satisfactory system pressure test, mechanical performance test and cooling and heating function test to determine that the system will perform according to the contract requirements. The above tests shall be witnessed by the Engineer and the Owner at his option and acceptance will only be granted in writing by the Owner after receipt of certification from the Engineer that the design criteria have been met.

PART 2 - PRODUCTS

2.01 ROOFTOP UNIT, RTU-3

- A. Manufacturers:

1. York
2. Trane
3. Daikin
4. Or Approved Equal

B. DX Cooling

1. Unit: High Capacity DX Cooling Makeup Air Units utilizing R410-A Refrigerant.
2. Furnish and install model JDMA for treatment of up to 100% constant outside air per plans and specifications. Unit shall be completely factory assembled, tested, internally wired, fully charged with Refrigerant R410A, and shipped as one piece. Unit shall consist of foam insulated weather-tight casing with optional field installed outdoor intake hood, compressors, air-cooled condenser coils, condenser fans, evaporator coils, supply fan, motors and drives, and unit controls. Packaged Cooling and Heating Units shall carry an ETL listing.
3. DX systems shall be designed to provide 10% to 100% incremental capacity control for treatment of up to 100% outside air with up to 80 degree F (27 degree C) dewpoint entering the unit. Unit shall have hermetic compressors with a scroll design with internal pressure relief and motor temperature winding protection. Compressor shall be equipped with reversal rotation protection. Refrigeration protection shall include low and high pressure switches, refrigerant circuit frost protection, liquid line filters/dryers and service gage ports. The unit shall have a factory installed refrigerant charges to provide unit performance as shown in the schedule. Low pressure switch shall operate at 35 psi or lower pressure. The auto reset low pressure switch shall not reset until the pressure rises about 50 psi. The manual reset high pressure switch shall operate above 600 psi with 15 psi. The unit will not reset without a user manually pushing the reset button and the refrigerant line pressure is below 400 psi. Refrigeration control shall include thermal expansion valves, external equalizers and distributors for each compressor circuit.
 - a. The refrigerant system shall have a non user adjustable 5 minute minimum ON and minimum OFF timer circuit protection. The refrigerant circuit shall have an anti-cycle timer in addition to the minimum ON/OFF timer that prevents the compressor(s) from cycle on the minimum timer circuit.
 - b. The refrigerant system shall include evaporator coil. The copper tube-aluminum plate fin evaporator coil shall be 4 rows with 14 fins per inch to meet leaving air performance as shown on the unit schedule. The multi-circuit evaporator coils shall be interlaced configuration. The entire coil face area shall be active with a

single circuit or multiple circuit activation such that the entire coil face shall provide air cooling and dehumidification in part load operation. Split coil face design not acceptable because it does not allow full active face area for dehumidification in the part load operation. The evaporator coils shall be protected from frosting by a low temperature cutout. The factory installed froststat on each circuit shall interrupt power to the associated compressor when the temperature drops below 35F. The frost stat shall not deactivate until the circuit temperature rises to 50F. The coils shall be leak tested at the factory to ensure pressure integrity. The unit shall include air cooled condenser coils sized to provide the unit performance as shown in the mechanical schedule. The condenser coil shall be light weight 5/16 copper tubing with aluminum fins. The condenser shall be compact 2 row coil design with low refrigerant volume. The condenser coils shall NOT be aluminum micro-channel type design.

- c. The condensate drain pan shall be rust proof or high corrosion resistant 316 stainless steel. The drain outlet shall be attached to a double sloped drain pan with a minimum 1/8 inch per foot (10 mm per meter) slope. The drain pan shall collect potential condensate from all evaporator/condenser coils and distributor area in the air stream to prevent blow-off condensate reaching unprotected bottom unit surfaces. The unit shall have field supplied and installed P trap, in accordance with all local and area codes and Best Practices.
- d. The unit shall be supplied with high efficiency electronically commutated motors (ECM) for the condenser fans. The motors shall be rated for the necessary condenser coil airflows. The motors shall have an efficiency 89% or higher. The condenser fans shall be accessible for servicing. The condenser fan system shall be dynamically balanced at the factory and installed with vibration dampening to reduce ambient noise. The motor shall accept a 0-10v control signal and modulate based upon a command from the unit's control systems. The motor shall provide the following diagnostics and safety features: Lockrotor/jam fault, over/under current protection, over temperature protection and under/over voltage protection.
- e. Factory installed hot gas bypass options shall be available on all fixed capacity refrigerant stages in addition to multiple steps of capacity modulation to supplement discharge air control. The hot gas bypass valve shall have a range of 95 -115 psi with a factory setting of 105. (SST 33.7F) The valve shall be rated to handle 30% of the associated compressor capacity. The HGBP circuit shall be equipped to prevent reverse flow through the valve.
- f. The unit shall have a factory installed removable condenser coil hail guard providing protection from large debris and hail that can cause significant damage to the condenser coils. The hail guard shall not obstruct condenser airflow or add significant condenser

- fan static pressure. The hail guard shall prevent half-inch diameter debris from hitting the condenser coil.
- g. The condenser coils shall be copper tube and aluminum fin design. The coils shall be light weight and low refrigerant volume with the use of 5/16 copper tubing. The condenser coils shall NOT be aluminum micro-channel type design.
 - h. The evaporator coil(s) shall be copper tube and aluminum fin design. The evaporator coils shall be interlaced, 4 row design maximizing latent performance as shown on the unit's mechanical schedule.
 - i. Coils shall have coating to prevent premature deterioration caused by salt or other environmental chemicals. The coat shall provide an ASTM B117-97 salt spray of 6048 hours. The coat shall provide dip & baked onto the coil insure even coating with no reducing of thermal performance. Spray on coat is not acceptable. The coat shall pass ASTM G21 mold growth standard. The following coils shall be coated:
 - 1) All DX Evaporator Coil(s)
 - 2) All DX Condenser Coil(s)
 - 3) Reheat Coil(s)
 - j. Unit compressors shall have sound blankets. The sound blankets shall reduce ambient noise as demonstrated by sound performance sheets provided by manufacturer. Sound blankets shall come factory installed. Blankets shall be rated for outdoor use.
4. Unit shall include DX based reheat. The method of reheat shall comply with ASHRAE 90.1 requirements. Unit shall include a dedicated compressor and refrigeration circuit using full condenser reheat or total heat of rejection to the supply airstream. The reheat coil position shall include a minimum separation of 10 inches (102 mm) from the cooling coil to eliminate re-evaporation of cooling coil condensate. The circuit shall be capable of delivering a nominal 13°F to 17°F temperature rise from the main evaporator temperature without the need for modulating the capacity for all entering outside air conditions. The reheat system shall modulate to maintain the user adjustable unit leaving air temperature setpoint while also maintaining a constant evaporator temperature setpoint. The reheat coil shall operate down to 50°F ambient temperature without the need of low ambient kit. The reheat coil shall provide greater than 7 COP efficiency at 65°F db/64°F wb entering air temperature. Manufacturer shall show unit performance at above condition. The refrigerant circuits shall include thermal expansion valves with external equalizers. Service gage ports and refrigerant line filter dryers are factory installed as standard. Pre-cooling coils shall be two row depth with 6 fin per inch to minimize air pressure drop.

C. Gas Heating

1. The system shall be provided with gas heat with the capacity shown the mechanical schedule. Gas heating system shall be factory install consisting of heat exchanger, venter fan, spark ignition system, control valves and all necessary safeties to provide a fully operational heating system ready for operation from the factory. The heat exchanger shall be constructed of 409 stainless steel for make-up air applications. The heat exchanger shall properly drain condensate or other water during the heating and cooling season. The system shall modulate both the gas and combustion air to maintain temperature setpoint(s) and thermal efficiency. The heat exchanger shall be capable of 100 degree (F) temperature rise for 100% outside air treatment. The heating system shall be certified to ANSI Standard Z83.8/CSA 2.6. The heat exchanger shall be 4 pass serpentine, non-welded, constructed of 409 stainless steel. Safety Features shall consist but not limited to:
 - a. Automatic discharge air limit control.
 - b. Air proving pressure switch.
 - c. Color coded wiring and matching terminal blocks.
 - d. Circuit breaker protected transformers
2. The gas heating shall utilize natural gas.
3. Heating system shall have a minimum thermal efficiency of 91%. The thermal efficiency shall not fall below 90% through the modulated operational range. The Heat exchanger shall have condensate drain to remove and/or prevent water build up in the unit. The condensate shall not exceed 4 pH level. The condensate shall be piped to the appropriate building system for removal.
4. Provide 10:1 power vented modulation. The dual gas heat sections shall have a modulating gas valve for first section and a single stage gas value for the second section with spark ignition controls for both sections. The gas value shall modulate and stage to provide 10 to 100% capacity control. (10:1) The gas control shall consist of ignition boards, 2 speed venters, flame sensors, igniters, gas valves and associated safeties. The spark ignition boards shall have LED status & diagnostic. The unit shall lock out heating system banks for the following failures: venter pressure switch failure, ignition lockout, excessive limit switch losses and excessive flame sense losses. The gas control system shall be designed to maintain constant gas efficiency in all throughout the modulated range. The dual heat exchanger shall modulate/stage as follows:
 - a. 10% – 50% Capacity = Bank 1 ON and modulating from 20-100%, Bank 2 OFF
 - b. 50% - 100% Capacity = Bank 1 ON and modulating from 20-100%, Bank 2 100% Capacity

5. The unit shall be equipped factory supplied, field install flue extension kit. The exhaust shall expel gas while prevent rain, condensate or other water from damaging the gas heat exchanger.
6. The unit's gas manifold shall include high and low pressure switches. The auto-reset low pressure switch shall be rated for 50% of the maximum manifold pressure. The manual reset high pressure shall be rated for 125 of the maximum manifold pressure.
7. Manufacturer to provide condensate neutralizer. The neutralizer shall be field installed. It shall not require external power nor added chemicals. The neutralizer shall raise the leaving water pH from 4 to near neutral conditions of 7.0 pH 1.0. System shall be field rechargeable.
8. Manufacturer to provide condensate pump. The pump shall be field installed with a dedicated 115V amp service.

D. Cabinet

1. Unit shall have Foam panel construction for all exterior surfaces and base. The foam insulation shall meet ASTM E-84 with a flame spread of 20 and smoke density of 300. No foam panel acceptable if unit construction exceeds R12 value, no exposed installation air stream and exceed flame safety characteristic of foam paneling. Outer casing shall be fabricated from G90 galvanized steel substrate with 60 gloss painted finish coat. Finish shall be rated for > 1000 salt spray hours. The cabinet design shall prevent condensation forming on the outside of the unit casing in operation via a dedicated thermal break from all internal components to the external surface. Fully gasketed, hinged doors of foam construction shall provide access to filters, dampers, evaporator coils section, supply fan section. Provide hinged single wall construction doors for the heater section and control section. On hinged doors frequently used for service (i.e. filter and coil access) The unit control panel section shall be laid out to provide separation of high and low voltage components per UL standards. High voltage contactors & distribution shall be touch safe. The control panels shall be hinged for easy access to the unit controls. For ease of service, all electrical components will be clearly identified with 1/2 inch (13 mm) diameter self-adhesive labels to match the unit specific wiring diagram. The low voltage and unit controller access electrical panel shall be physically isolated from the high voltage section. The open door to the control section reveals the wiring diagrams, DDC programming instructions and all manuals and literature protected and permanently attached to the cover. Control transformers will incorporate integral, resettable circuit breaker protection.

E. Supply Fan

1. The unit's supply fan shall be direct drive with an ABB variable frequency drive allowing peak fan efficiency and system RPM. The fan system shall be made of galvanized steel. The impeller shall have RAL 5002 coating, directional arrows marketing. The fan sled shall allow up to 176°F (80°C) for the impeller and the motor shall allow ambient temperatures -4°F to 104°F (-20°C to 40°C). The impeller and motor shall be designed for continuous operation. The fan system shall utilize Zie Ziehl-Abegg patented rotating diffusor which reduces noise and helps increase overall system efficiency. The 7 blade, welded construction impeller shall be dynamically balanced at the factory with hub; admissible vibration level less than 2,8 mm/s (0.11 in/s) in conformity with ANSI/AMCA 204.
2. The supply fan sled shall have slide out design for easy inspection and replacement.
3. The fan sled shall also allow inspection of the gas or electric heat exchangers.
4. The fan sled shall have rubber dampers to isolate and minimize vibration.
5. The fan sled shall include Inlet cone with measuring device for airflow measurement. The packaged unit shall allow fan inlet differential pressure readings inside the control panel to measure supply fan CFM with an accuracy of +/-5%. The unit controller shall allow fan speed settings for occupied and unoccupied modes. The unit controller shall also allow fan speed settings for heating and cooling modes. The unit shall meet the schedule performance. The unit control system shall have test and balance function to allow permanent setting of the airflow(s) as shown in the mechanical schedule.
6. The ABB frequency drive shall be factory installed with line reactor, ECM Filter and all necessary wiring per UL standard. The drive shall have built in menu drive display with test, start-up, maintenance and diagnostic assistant. The drive shall be factory programmed for 30 second soft start. The drive shall have the following protection and alarms: single phase, overvoltage trip limit, under voltage trip limit, over temperature, microprocessor fault, motor stall protection, motor over temperature.
 - a. The supply fan shall be adjustable constant volume control. **Sequence:** Whenever the supply fan is ON, the VFD will shall drive to the user defined % based upon the unit display or Network provided value. The control system shall limit the adjustable drive speed between a minimum of 25% and a maximum of 100%.

F. Intake & Section

1. Unit shall outdoor air hood design for 100% airflow to allow uniform coil velocity and filter loading. The motorized damper shall be spring return

for closure during unit shutdown or power interruption. Outdoor air inlet hood shall include 1 inch (25 mm) permanent filters and screen. Hood filter and screen shall meet MERV 4 rating. (Dust mites, pollen, and water spray) Hood airflow shall not exceed 300 fpm intake velocity to prevent snow and rain entrainment. Units designed for 100% outside air intake only shall include an integrated transition section (without return air opening) designed specifically for 100% outside air introduction

2. Units shall have fully integrated factory installed 100% motorized outdoor air damper.
3. Units shall be available with fully integrated factory installed 100% motorized outdoor damper and return damper.
4. Units shall be available with fully integrated factory installed 100% motorized outdoor damper, return with gravity exhaust damper.
5. Units shall be available with fully integrated factory installed 100% motorized outdoor damper, return and exhaust air to exhaust fan with gravity relief damper.
6. Units shall be available with fully integrated factory installed 100% motorized outdoor damper, return and exhaust air to factory installed energy recovery section
7. Units shall be available with 100% opening with no factory installed dampers.
8. Damper Construction: The control damper shall be low leak with blade and jamb seals. The damper leakage shall not exceed 10 cfm per square foot at 4" sp. The damper shall be constructed of 16 gage galvanized steel with reinforcement to insure structural integrity. Blade edge seals shall be PVC coated polyester fabric suitable for -25°F to +180°F (-32°C to +83°C) mechanically locked into the blade edge. Jamb seals shall be flexible stainless steel metal, compression type to prevent leakage between end of the blade and the damper frame. Bearings shall be corrosion resistant, molded synthetic sleeve type turning in an extruded hole in the damper frame. Linkage shall be concealed out of airstream, within the damper frame to reduce pressure drop and noise and lessen the need for maintenance.
9. The damper(s) shall be control from an external 0-10V input signal. Sensors/Signal: User supplied 0-10 volt , 2 wire signal. Independent power source. Sequence: The control system accepts a 0-10 volt signal that will position the damper from 0-100% open between the user set maximum and minimum settings.
10. The damper(s) shall have User Adjustable Two Position Control. Sensors/Signal: None, controlled by the unit's control system.

Sequence: Whenever the unit supply fan is ON in the occupied mode, the dampers will be open to outside air from 0-100% based upon the user setting.. If the supply fan is ON in the unoccupied mode, the dampers will open to outside air to a second user define setting. When the supply fan is OFF, the dampers will be closed 100% to the outside air.2 Position damper control

11. The damper(s) shall be controlled Building Static Pressure.
Sensors/Signal: Unit mounted pressure sensor; sensing range -0.5" w.c. thru 0.5" w.c.; 24 Vac, 0-10V signal; ± 1% FS accuracy; 1/4" barb connections. Requires field installed 1/4" pneumatic tubing to the sensing zone. Sequence: Whenever the supply fan is called to run in the occupied mode, the dampers modulate to maintain the user selected building static pressure setpoint. The dampers are limited to 25%-100% open position. When the supply fan is OFF or in the unoccupied mode, the dampers are closed to the outside air.
12. The damper(s) shall have 4 Position damper control Option GF4: Sensors/Signal: Quantity 2, user supplied, dry contact closures. (4 wires) Sequence: Whenever the supply fan is ON in the occupied mode, the dampers will open to a user defined % of outside air based upon 2 dry contact closure inputs. When the supply fan is OFF, the dampers will be closed to outside air.

State	External Switch Position		Damper % Open to Outside (default values)
Position 1	Open	Open	20
Position 2	Close	Open	40
Position 3	Open	Close	60
Position 4	Close	Closer	80

13. The unit shall have factory installed 4" MERV 8 filters before the evaporator coils. The filters shall be accessible through a hinged door. None hinge door access is not acceptable. The filters shall be pleated V configuration with an average arrestance of 95%; MERV Rating 8 per ASHRAE 52.2-99. The filters shall be manufactured from recycled synthetic material with moisture & microbial growth resistant properties. The filter shall have less than 0.36" w.c. pressure drop at 500 fpm air velocity. The filter area shall be sized to handle the rated airflow as shown on the mechanical schedule.

G. Full Perimeter Curbs:

1. Manufacturer shall furnish a 36" Tall Curb, with Horizontal (front) Discharge, capable of up to 10,000 cfm. Shall be a full perimeter curb with integral horizontal supply air and optional return air ductwork and

duct connections. The horizontal airflow curb shall be designed for either roof or slab installation. 36" Tall Curb, Horiz (front) Discharge, up to 10,000 cfm. A full perimeter curb with integral horizontal supply air and optional return air ductwork and duct connections is also available. The horizontal airflow curb is designed for either roof or slab installation. 36" Tall Curb, Horiz (front) Discharge, MAPS2, up to 10,000 cfm.

- H. Make-up Air Control System. The unit shall operate to maintain one of the following discharge air temperature setpoints during all weather conditions.
1. Space Cooling Required: 55F DAT (Range 50 – 100F)
 2. Space Heating Required: 90F DAT (Range 50 – 100F)
 3. Space cooling required during winter operation. 55F DAT (Range 50 – 100F)
 4. Neutral Air - Dehumidified: 70F DAT @ 52-55 Dewpoint (Range 50 – 100F)
 5. Neutral Air - Heating: 70F DAT (Range 50 – 100F)
 6. The unit shall operate based upon a 7-day programmable time schedule, contact closure or a BMS command to operate in either occupied or unoccupied mode. In the occupied mode the unit supply fan shall run continuous based upon one of the following controls: Constant volume (summer/winter), duct static pressure, or building static pressure. See fan sequence for further details. In the unoccupied mode the fan shall run intermittently to maintain a space temperature setpoint. (84F cooling/ 64F heating).
 7. The optional unit supplied exhaust fan shall run whenever the supply fan is on, otherwise it is OFF. The exhaust fan shall operate based upon one of the following: Constant volume, building static pressure, supply fan tracking. See fan sequence for further details. In the unoccupied mode the exhaust shall be OFF.
 8. The intake dampers shall operate based upon one of the following: 100% outside, external input from user supplied 0-10v, 2-position, 4 position or building static pressure. In the unoccupied period the outside air damper shall be 100% closed while the return air damper shall be 100% open. For units only having one damper, the damper shall be 100% open whenever the supply fan is running.
 9. The mechanical heating and cooling shall operate to maintain the discharge air temperature setpoint. The energy recovery wheel shall be operational in the occupied mode and OFF in the unoccupied mode.
 10. The control system shall incorporate all the necessary safeties.

11. The alarm functionality shall include low temperature, compressor failure, sensor failure, smoke alarm, power failure, heating failure and supply fan failure. The failures mounted display. The unit will have test and diagnostics routines for services and start- up.
 12. The control system shall be able to provide neutral air and space temperature control per the sequence of operation shown.
 13. The unit shall be supplied with factory installed disconnect. The line voltage connections to the unit shall be made through a flush-mounted, nema 4X switch with lock-out feature. The disconnect shall be rated for the unit MCA/MOP as shown on the schedule. The unit shall carry a rating plate showing necessary data and all approval.
- I. Provide the following options:
1. A weatherproof convenience outlet shall be provided. The outlet shall be field powered utilizing an independent circuit from the main unit power. The circuit shall be 20 amp circuit with breaker and installed per local and state building codes.
 2. Unit shall have factory installed phase lost protection
 3. The unit shall have a factory install remote start/stop dry contacts. The contacts when are OPEN will command the unit shall be in the OFF state. When the contacts are CLOSE, the unit shall be in the ON state following its normal sequence of operation.
 4. BACnet interface for inclusion into existing Johnson Metasys Building Management System.

2.02 ROOFTOP UNIT, RTU-7

A. Manufacturers:

1. Reznor
2. Moline
3. Trane
4. Or Approved Equal

B. General

1. Unit shall be supplied to meet this specification without substitution except by engineer's approval. Reznor brand product identified below is basis of design.

2. Provide packaged, roof-mounted heating and make up air units as Reznor equipment. These units shall be the RPBL series designed for 80% thermal efficiency with power-vented gas furnaces, arranged for roof mounting.
- C. Approvals & Certifications
1. Units to be supplied from factory certified by AGA and US standards of ANSI.
- D. Cabinet Construction
1. Unit cabinet to be supplied with single wall construction with factory installed 1 1/2 Lb. density insulation.
 2. Unit to be supplied with weatherized Galvalume steel cabinet with interlocking joint construction as per Reznor (U.S. Patent No. 5,373,673) or equal and a full curb cap base assembly for mounting on a roof curb or supports. Lifting points for unit and any modules shall be factory installed on each corner of the curb cap rail.
- E. Supply Blower
1. Fan/drive shall be selected for range 1051-1100 RPM
 2. To have motor equipped with rubber in shear vibration isolation base.
 3. Manufacturer to provide said unit with factory-installed Adjustable V-Belt Drive Blower.
- F. Combustion Air and Venting
1. The unit shall have a factory-installed power venter device with a centrifugal wheel and direct drive motor to draw combustion air through an inlet in the cabinet.
- G. Supply Motor
1. Unit shall be supplied from factory with EPACT compliant (7-1/2 horsepower) Totally Enclosed Fan Cooled blower motor.
- H. Electrical Specifications & Control Systems
1. Unit to be configured with Left side control location (facing airstream).
 2. Unit Shall be configured for 208 Volt, Three Phase, 60 cycle supply voltage.
 3. Unit Shall be supplied with a Motor starter, IEC open, for single-speed motors.

4. Manufacturer shall provide for field installation, a 60 amp, 240 volt, raintight, non-fusible disconnect switch. Switch shall be UL listed.

I. Filtering

1. Manufacturer shall furnish unit with a filter rack and 2 inch disposable pleated filters. Said filters shall have an average arrestance at least 90% when tested in accordance with ASHRAE 52-76.

J. Air Intake Options

1. Unit to be furnished with factory supplied 100% outside air screened inlet hood with moisture eliminator louvers.

K. Fuel & Burner Type

1. Unit to be supplied for operation with natural gas as fuel source.
2. Unit to be supplied with steel die-formed atmospheric burners to be constructed with 409 E-3 stainless steel ribbon inserts. Burners should be designed with a die-formed flared venturi inlet port. Units shall be provided with 409 E-3 stainless steel burner body construction.
3. Unit to be supplied with steel die-formed "ribbon" style atmospheric burners to be constructed with 409 E-3 stainless steel ribbon inserts. Burners should be designed with a die-formed flared inlet port.

L. Gas Train, Controls & Ignition

1. Gas controls for said furnace shall be designed for makeup air heating application. Furnace shall be provided with an electronic modulating gas regulator which provides for firing rates between 25% and 100%. Said modulating regulator shall be controlled by duct sensor thermistor and remote temperature selector. Said temperature selector shall be shipped separate so as to be mounted in a convenient location by the customer, to control discharge air within a range of 55 to 90 degrees Fahrenheit. The modulating regulator shall regulate gas discharge pressure when discharge air temperature drops below a setpoint, if low fire cannot satisfy the duct sensor setting, gas pressure shall be increased, increasing input. Setpoint shall be adjustable at the remote temperature selector, within a range from 55 to 90 degrees (F). A main redundant safety shut-off valve shall include a servo regulator which maintains constant gas pressure to the modulating regulator under wide variations in gas supply pressure. Said valve shall also include the safety pilot valve, and the manual shutoff valve. Manufacturer shall furnish a field-installed DPST wall switch for On-Off Control of unit.

M. Heat Exchanger

1. Heat exchanger shall be manufactured from die-formed halves of 409 (E-3) Stainless Steel.
2. Heat exchanger shall be multiple cells of aerodynamic clamshell style like Reznor Thermocore design. Cells shall be of two-piece, seam welded construction joined by weld to top and bottom panels.
3. Note: Manufacturer's Limited Warranty for heat exchangers applies. Refer to written limited warranty for terms.

N. Installation & Mounting

1. Manufacturer shall furnish a field assembled Roof Curb of factory pre-assembled sections. Said curb shall be 16 inches tall, constructed of 16 gauge aluminized steel, 2" x 6" wood nailers, and 3 pound fiberglass insulation. Said roof curb shall provide base for blower cabinet and furnace section with horizontal discharge.

O. Code Requirements

1. The unit shall be installed in accordance with the standards of the National Fire Protection Association or the National Fuel Gas Code for gas-fired duct furnaces, and these standards should be followed carefully. Authorities having jurisdiction should be consulted before installations are made to verify local codes and installation procedures. The unit shall be installed in accordance with the National Fuel Gas Code ANSI Z223.1. In Canada, the installation of these appliances is to be in accordance with CAN/C.G.A.-B149.1 and B149.2, Installation Code for Gas Burning Appliances and Equipment, and local codes.

P. Electrical Supply And Connections

1. All electrical wiring and connections including electrical grounding should be made in accordance with the National Electric Code ANSI/NFPA No. 70 or, in Canada, the Canadian Electrical Code, Part I-CSA. Standard C22.1. Check any local ordinance or power company requirements that apply. A separate line voltage supply should be run directly from the main panel to a fused disconnect switch, at the unit, and then making connection to leads in the unit junction box. All external wiring must be made within approved conduit and have a minimum temperature rise rating of 60 degrees C. The unit must be electrically grounded in accordance with the National Electrical Code, ANSI/NFPA No. 70 or CSA Standard C22.1 when installed, if an external electrical source is utilized.

Q. Gas Piping And Pressure

1. All piping must be in accordance with requirements outlined in the National Fuel Gas Code ANSIZ223.1 or CAN/C.G.A.-B149 (.1 or .2).

Install a ground joint union and manual shut-off valve upstream of unit control system.

- R. Controls: Provide BACnet interface for inclusion into existing Johnson Metasys Building Automation System.

2.03 SHEET METAL WORK

- A. Furnish all sheet metal work and accessories specified herein.
- B. References to "Duct Manual" herein refer to the latest edition of the HVAC Duct Construction Standards as published by the Sheet Metal and Air Conditioning Contractor National Association, Inc.
- C. All ducts shall be of galvanized steel construction. Ducts shall be properly stiffened to prevent drumming when the fans are in operation.
- D. All galvanized duct thicknesses shall be in accordance with the Duct manual.
- E. Seal all low pressure duct joints (Class B) with sealant as manufactured by Minnesota Mining Company, Foster, General Electric, or approved equal. Excess sealant must be removed immediately to provide a neat appearance.
- F. All low pressure ducts shall be fabricated for 2 inches water gauge pressure.
- G. All ducts shall be constructed in accordance with Table 1 and Figure 1-5 through 1-13 of the Duct Manual.
- H. Duct joints shall be constructed in accordance with Fig. 1-4 of the Duct Manual.
- I. Duct seams shall be constructed in accordance with Fig. 1-5 of the Duct Manual.
- J. Duct reinforcement shall be per Table 1-18, Figures 1-9, 1-10 and 1-11 of the Duct Manual.
- K. Fittings and special installations shall be constructed in accordance with Figure 2-1 through 2-10 of the Duct Manual.
- L. Flexible connections shall be 4" wide connections, in accordance with Fig. 2-19 of the Duct Manual, constructed of Ventglass heavy glass fabric double coated with neoprene and shall be as manufactured by Vent Fabrics, Inc. Flexible connections shall meet the requirements of the National Board of Fire Underwriters. Exterior flexible connection shall be weathertight.
- M. Hangers and supporting systems shall be in accordance with Figure 4-1 through 4-8 and Tables 4-1 through 4-3 of the Duct Manual.

2.04 SPECIALTIES

- A. Air vent valves on all main piping systems shall be ¼ inch manual gate valves Powell Fig. 507, Lunkenheimer, Crane, or approved equal.
- B. Vent valves on coils shall be Bell & Gossett No. 4V, Taco, Armstrong or approved equal.

2.05 PIPE AND FITTINGS

- A. Rooftop unit condensate drain piping shall be schedule 40 PVC.

2.06 VIBRATION ISOLATION

- A. General
 - 1. All vibration isolators shall be the product of a single approved manufacturer.
 - 2. Model numbers hereinafter specified are from Mason Industries. Other equivalent units by Consolidated Kinetics, Vibration Mountings and Controls or approved equal are acceptable.

2.07 INSULATION

- A. Insulate the interior ductwork with 2" thick, 3/4 lb. density fiberglass (R-5 minimum) duct insulation, ASTM C533, maximum service temperature 450 °F, with factory applied flame retardant PSK facing (UL labeled).
- B. Exterior Ductwork: Ductwork to be installed outdoors shall be insulated with minimum R-8, 2" thick, 1.5 lb. Density polyolefin foam insulation. Joints to be sealed per manufacture's recommendation. Insulation shall then be wrapped with rubberized asphalt / 10 mil polyethylene film membrane and completely weathertight.
- C. Fiberglass Insulation
 - 1. Fiberglass shall meet ASTM C 335 for thermal efficiency.
- D. Ends of insulation shall be sealed with material as recommended by the manufacturer.
- E. A complete moisture and vapor seal shall be provided wherever insulation terminates against metal hangers, anchors and other projections through insulation on cold surfaces.
- F. Fire Hazard Rating: Insulation materials, coatings and other accessories shall individually have a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed. Ratings shall be determined by U.L. "Test Method for Fire Hazard Classification of Building Materials", No. 823 or NFPA No. 225 or ASTM E84.

2.08 VIBRATION ISOLATION

- A. General
 - 1. All vibration isolators shall be the product of a single approved manufacturer.
 - 2. Model numbers hereinafter specified are from Mason Industries. Other equivalent units by Consolidated Kinetics, Vibration Mountings and Controls or approved equal are acceptable.
- B. Vibration isolators shall be provided for all mechanical equipment hung in ceiling and shall be selected in accordance with the weight distribution of the equipment to be served so as to produce a uniform deflection. Deflections shall be as hereinbefore specified.
- C. Submittals shall include all spring deflections, spring diameters, scale drawings, attachment details, and rated capacity indicating adequacy for each piece of equipment served.

2.09 DUCT LINER

- A. Furnish and install flexible duct liner insulation in the following locations:
 - 1. Rooftop Units – All new ductwork connectors.
- B. Duct liner shall be flexible, fabricated from glass fibers bonded with thermosetting resin. Airstream surface to be protected with an acrylic surface coating that does not support microbial growth as per ASTM G21 and G22.
- C. Duct liner to be 1" thick, 1-1/2" lb. per cu.ft. density.
- D. "K" ("ksi") Value: ASTM C 518, 0.25 at 75°F.
- E. Noise Reduction Coefficient: NRC = .70 or higher based on Type "A" mounting, tested in accordance to ASTM C 423.
- F. Maximum Velocity: 5,000 ft/min.
- G. Adhesive: Meeting ASTM C 916.
- H. Fasteners: Manufactured duct liner galvanized steel pins, welded or mechanically fastened.
- I. Installation to be in strict accordance with manufacturer's recommendations.

2.10 ROOF EXHAUST FANS

- A. Manufacturers: Greenheck, Penn, Cook, or approved equal.

- B. Certification: per AMCA for sound and capacity.
- C. Roof Fan - Roof-mounted Centrifugal
1. Fan housing: heavy gauge spun aluminum roll beaded.
 2. Fan wheel: all aluminum, centrifugal with backwardly inclined blades and tapered inlet shroud, statically and dynamically balanced.
 3. Inlet cone: aluminum.
 4. Motor and drive compartment: weathertight, separate from the exhaust airstream, with ventilation air supplied by an air passage not connected with the exhaust air stream.
 5. Motor: heavy duty, permanently lubricated, sealed ball bearing type.
 6. Drive: sized for 165% of motor horsepower, cast iron, keyed to the fan and motor shafts, variable pitch.
 7. Fan shaft: aluminum, turned, ground and polished.
 8. Belt: oil resistant, nonstatic, nonsparking with minimum life expectancy of 24,000 hours.
 9. Bearings: flanged, permanently lubricated, permanently sealed, ball type with minimum average life of 200,000 hours.
 10. Drive assembly and wheel: aluminum or nonferrous, removable as a complete unit with disassembly of external fan housing, mounted on rubber vibration isolators.
 11. Provide each fan with the following:
 - a. Gravity backdraft damper
 - b. Bird screen
 - c. Disconnect switch
 - d. Variable pitch motor pulley (for belt drive units)
 - e. Prefabricated roof curb
- D. Utility Fans
1. General:
 - a. Base fan performance at standard conditions (density 0.075 Lb/ft³)
 - b. Performance capabilities up to 30,000 cubic feet per minute (cfm) and static pressure to 5 inches of water gauge
 - c. Fans are available in sixteen sizes with nominal wheel diameters ranging from 11 inches through 36 inches (206 - 236 unit sizes)

- d. Fan type in AMCA Arrangement 10 with a single width and single inlet housing
 - e. AMCA class I blower on sizes 210 and larger
 - f. Each fan shall bear a permanently affixed manufacture's engraved metal nameplate containing the model number and individual serial number
2. Wheel:
- a. Non-overloading, backward inclined centrifugal wheel
 - b. Constructed of steel (except size 206-210 is aluminum)
 - c. Statically and dynamically balanced in accordance to AMCA Standard 204-05
 - d. The wheel cone and fan inlet will be matched and shall have precise running tolerances for maximum performance and operating efficiency
 - e. Single thickness blades are securely riveted or welded to a heavy gauge back plate and wheel cone.
3. Motors:
- a. Motor enclosures: [Open driproof] [Explosion resistant enclosure]
 - b. Motors are permanently lubricated, heavy duty ball bearing type to match with the fan load and pre-wired to the specific voltage and phase
4. Shafts and Bearings:
- a. Fan shaft shall be ground and polished solid steel with an anti-corrosive coating
 - b. Permanently sealed bearings or pillow block ball bearings
 - c. Bearing shall be selected for a minimum L10 life in excess of 100,000 hours (equivalent to L50 average life of 500,000 hours), at maximum cataloged operating speed
5. Housing:
- a. Discharge position specified on equipment schedule
 - b. Constructed of steel and coated with permatector
 - c. Shall be easily rotated in the field to any of the eight standard discharge positions
 - d. Housing and bearing supports shall be constructed of welded steel members to prevent vibration and to rigidly support the shaft and bearing assembly balancing up to a minimum of 10 horsepower
6. Housing Supports and Drive Frame:

- a. Housing supports are constructed of structural steel with formed flanges
 - b. Drive frame is welded steel which supports the shaft and bearings and reinforcement for the housing
 - c. Pivoting motor plate with adjusting screws to make belt tensioning operations
 - d. Prepunched mounting holes for installation
 - e. Drive frame is coated with Permator
7. Disconnect Switches:
- a. NEMA rated: [7 and 9]
 - b. Positive electrical shut-off
 - c. Wired from fan motor to junction box
8. Drive Assembly:
- a. Belts, pulleys, and keys oversized for a minimum of 150 percent of driven horsepower
 - b. Belts: Static free and oil resistant
 - c. Pulleys: Cast type, keyed, and securely attached to wheel and motor shafts
 - d. Motor pulleys are adjustable for final system balancing
 - e. Readily accessible for maintenance
9. Options/Accessories: Provide each fan with the following:
- a. Access Door:
 - 1) Type: Hinged
 - 2) Provides access for inspection and cleaning of wheel
 - b. Belt Guards:
 - 1) Three-sided fabricated steel belt guard covers drive and motor
 - c. Dampers:
 - 1) Types: Gravity
 - 2) Galvanized frames with prepunched mounting holes
 - 3) Backdraft dampers are not suitable for downblast or bottom angular downblast discharge positions.
 - 4) Balanced for minimal resistance to flow
 - d. Drain Connection:
 - 1) Threaded connection
 - 2) Provided to drain moisture from the bottom of the fan housing; fan supplied without drain plug, unless specified

- e. Finishes:
 - 1) Types: Hi-Pro Polyester
- f. Heat Slinger and Shaft Seal:
 - 1) Heat slinger is an aluminum cooling disc
 - 2) Disc dissipates heat along the fan shaft
 - 3) Shaft seal is aluminum rub ring
- g. Inlet and Outlet Guards:
 - 1) Constructed of expanded metal mounted in a steel frame to provide protection for non-ducted installations
- h. Inlet Vane Dampers:
 - 1) Zinc plated steel blade axles, stainless steel washer and bearings.
 - 2) Suitable for temperatures up to 200 Fahrenheit
 - 3) External Inlet Vane Dampers not available in unit size 210 and smaller
- i. Isolation:
 - 1) Type: Direct Mount
 - 2) Sized to match the weight of each fan
- j. Temperature Ratings:
 - 1) Type of Ratings: Standard operating temperature
- k. Weatherhood:
 - 1) Completely cover motor and drive compartments
 - 2) Vented to provide sufficient motor cooling
 - 3) Required to meet UL 705 and 762 ratings

2.11 AUTOMATIC TEMPERATURE CONTROL

- A. Manufacturers:
 - 1. Johnson Controls Company
 - 2. Tridium Niagara
 - 3. Siemens
 - 4. Or equal.

- B. Furnish and install all control components system of automatic controls and also to integrate the existing Johnson Metasys control system including software, dynamic graphics, etc. into the existing platform. This direct digital system of automatic temperature control shall be complete in all respects including all labor, materials, equipment and services necessary and shall be installed by personnel employed by the ATC Sub-Contractor.
1. Direct Digital automatic temperature and energy monitoring and control (DDC) system using field programmable micro-processor based units (Stand Alone Digital Controllers or SDC's, Application Specific Controllers or ASC's) with communications to existing Building Management System.
 2. Central access to all point data shall be web-based access Windows environment. This operator interface shall allow multiple concurrent windows depicting point data, graphics, or trend data from any existing or new EMCS points.
 3. All control equipment to be fully proportioning, and the latest state of the art in manufacture and design.
 4. The control systems to be installed by competent control mechanics and electricians under the supervision of the manufacturer of the control equipment. All control equipment to be the product of one (1) manufacturer and all ATC components to be capable of interfacing with the HVAC equipment. The factory trained control contractor must maintain adequate staff and offer standard services to fully support the Owner in the timely maintenance, repair, and operation of the control system. Contractors who do not maintain such staff and offer services or who must develop same for this project are not acceptable. Bids from franchised dealers as well as wholesale, distributor or representative type ATC contractors, or others whose principal business is not the manufacture, installation and service of temperature control systems will not be acceptable.
 5. The Automatic Temperature Control (ATC) Contractor shall be the same contractor as the HVAC Maintenance Contractor for this project; sub-contracting Automatic Temperature Control work will not be allowed. Contractor shall have a large support, technical and engineering staff on call 24 hours a day with a minimum of 20 technicians and 5 support engineers. This staff shall be based within 50 miles of the City. The ATC Contractor must support all hardware and software regardless of age. The ATC Contractor shall be "forward-backward" supportive. The software shall be extremely user friendly. Changes in programming must be made without having to rewrite the programming. Local branch/company/division must offer onsite and offsite computer operations training.
- C. Scope:

1. The control system provided to consist of all microprocessors, personnel computer, software, graphics, database entry, and all other necessary control components, along with a complete system, interlocking and communication wiring/cabling to fill the intent of the specification and provide for a complete and operable system. Provide damper operators for equipment such as mixing dampers, where such operators are not supplied by the equipment manufacturers.
 2. Alarms, where applicable, and all interlocking wiring required to be provided by the ATC contractor.
 3. The ATC contractor to review and study all HVAC, Electrical and HVAC drawings and entire specification to familiarize himself with the equipment and system operation and to verify the quantities and types of dampers, operators, alarms, etc., he has to provide.
 4. All interlocking wiring and installation of all required control devices associated with roof top units, exhaust fans, pumps, DX cooling, boilers, VAV boxes, unit heaters (each type), etc., to be provided by the ATC contractor. Close coordination to be exercised between the ATC contractor and the HVAC contractor and equipment manufacturers so that installation will be provided in a manner to result in fully operable systems, as intended in these specifications.
 5. The ATC contractor shall provide all power wiring, conduit, etc. for all his components requiring such. Provide power wiring from breakers in electric panels to ATC panels. All wiring to be done in strict conformance with Division 26.
 6. The ATC contractor shall provide communication wiring from new controller to building indirect connection (assume 300 lineal feet length of run) for web access through IP address provided by the School (final punchdown of communication cable to building shall be by IT or by the school personnel).
 7. Provide CO₂ sensors to control the rate of ventilation air introduced into the spaces via the sequences outlined on the drawings.
 8. The Automatic Temperature Control contractor shall be available during the balancing and adjusting period to set damper positions in accordance with the Balancing contractor's settings as indicated on the schedule sheets.
- D. Incidental Work By Others:
1. The following incidental work to be furnished by the designated contractor under the supervision of the ATC contractor:

- a. The HVAC contractor to coordinate required work with ATC and, without limiting the generality thereof, the work he is to perform for ATC to include the following:
 - 1) Provide, on magnetic starters furnished, all necessary auxiliary contacts, with buttons and switches in required configurations.
 - 2) Install all automatic dampers and install duct smoke detectors to control air handling unit shutdown, where applicable.
 - 3) Provide necessary blank-off plate (safing) required to install dampers that are smaller than duct size.
 - 4) Assemble multiple section dampers with required interconnecting linkages and extend required number of shafts through duct for external mounting of damper motors.
 - 5) Provide access doors or other approved means of access through ceiling and walls for service to control equipment.
 - 6) The Automatic Control Sub-Contractor shall provide an additional 10% of total space sensors, carbon dioxide sensors, pressure sensors, damper motors of each size and current sensors to the owner at the end of the project as replacement stock at no additional cost to the project.

- b. The Electrical Contractor to:
 - 1) Provide all power wiring (110 VAC or greater) to motors. Provide "spare" breakers in electric panels to be used as a power source by ATC contractor for ATC panels.
 - 2) Provide power sources for use of the ATC contractor where shown on the electrical plans for ATC compliance with Paragraph E below. In general, this will be used for powering terminal controllers and actuators.

E. Electric Wiring:

1. All electric wiring, wiring connections and all interlocking required for the installation of the temperature control system, as herein specified, to be provided by the ATC contractor, unless specifically shown on the Electrical drawings or called for in the Electrical Specifications, Division 26. Power to valves and actuators to be by the ATC contractor, except as specifically noted in the Electrical drawings and specifications.
2. All wiring and wiring methods to comply with the requirements of the Electrical Section of the specifications.
3. Provide, on magnetic starters, all necessary auxiliary contacts, with buttons and switches in required configurations.

F. Submittal Brochure:

1. In addition to the requirements of Division 01, the following to be submitted for Approval:
 - a. Control drawings with detailed piping and wiring diagrams, including bill of material and a written sequence of operation for each system controlled by the ATC contractor. Diagrams to include individual wiring and tubing marking designation, interlock details and wiring details of interfaces to other manufacturers system.
 - b. A symbols key and an overall LAN Architecture Diagram.
 - c. Panel layouts and nameplate lists for all local and central panels.
 - d. Valve and damper schedules showing size, configuration, capacity and location of all equipment.
 - e. Data sheets for all control system components.
 - f. Control strategies (software flow charts) must be included within the second ATC shop drawing submittal. The listing of each strategy must be in English and demonstrate the desired ATC sequence of operation. Submittal must be complete with proposed schedules, listing of setpoints and end device point listing and addresses.
 - g. Auto-Cad R-2004 compatible as-built drawings (DVD disks).
 - h. Upon project completion, submit operation and maintenance manuals, consisting of the following:
 - 1) Index sheet, listing contents in alphabetical order
 - 2) Manufacturer's equipment parts list of all functional components of the system, Auto-CAD disk of system schematics, including wiring diagrams
 - 3) Description of sequence of operations
 - 4) As-Built interconnection wiring diagrams
 - 5) Operator's Manual
 - 6) Trunk cable schematic showing remote electronic panel locations, and all trunk data
 - 7) List of connected data points, including panels to which they are connected and input device (ionization detector, thermostat, etc.)
 - 8) Conduit routing diagrams

G. Guarantee:

1. In addition to the guarantee requirements of the Contract and General Conditions, the Contractor shall obtain in the name of the Owner the standard manufacturer's guarantee of all materials furnished under this Section where such guarantees are offered in the manufacturer's published product data. These guarantees are in addition to, and not in lieu of, other liabilities which the Contractor may have by law or other provisions of the Contract Documents.

2. Upon completion of the installation, the ATC contractor shall submit to the Owner an agreement to provide the necessary programmed maintenance, to keep the various control systems in proper working condition, for a period of one (1) year commencing at final project acceptance. Additionally, this contractor to submit to the owner its standard agreement to support the system operation. This service must include operators support, application support, remote diagnostic support (via remote, on-line telephone support services) as well as database management support. This service shall be available 365 days per year, 24 hours a day.
3. The programmed maintenance agreement shall fully describe the maintenance work to be performed and shall advise as to the cost of this work prior to awarding of Contract.

H. Instruction and Adjustment:

1. Upon completion of the project, the ATC contractor to:
 - a. Fine-tune and "debug" all software control loops, routines, programs and sequences of control associated with the control system supplied.
 - b. Completely adjust and make ready for use, all transmitters, relays, damper operators, valves, etc., provided under this Section. This contractor shall furnish copies of complete, detailed, calibrating checkout and commissionary documentation for each controller.
 - 1) Documentation to list each procedure and shall be signed by the control specialist performing the service.
 - c. The ATC contractor shall provide an on-site training program for the Owner's staff in the operation and use of the control system. Training to include three (3) segments, as follows:
 - 1) Include 8 hours (e.g. one (2) eight (4) hour day) of classroom and hands-on training. This segment to instruct Owner's personnel in the system configuration, component characteristics, control strategy on each controlled system and all requirements for daily operation and use of the system. This segment to give the Owner's representative a working proficiency in day-to-day operational requirements (i.e., system monitoring, alarm acknowledgment, HVAC system troubleshooting techniques, setpoint and time schedule adjustments, manual override, etc.).
 - 2) All training to take place at the site and at times mutually agreed to between the ATC contractor and the Owner. The ATC contractor to provide to the Owner's designated representative, at least three (3) weeks before each

segment, a course syllabus outline and schedule. The ATC contractor to provide all training material, reference material and training aids, as required, all as part of his Contract cost.

- 3) Provide a "User's Guide" for each room in the building for teachers and administration personnel for the operation of HVAC system in that room.

I. Communication:

1. Control products, communication media, connectors, repeaters, hubs, and routers shall comprise a BACnet internetwork. Controller and operator interface communication shall conform to ASHRAE/ANSI Standard 135-2001, BACnet.
2. Each controller shall have a communication port for temporary connection to a laptop computer or other operator interface. Connection shall support memory downloads and other commissioning and troubleshooting operations.
3. Internetwork operator interface and value passing shall be transparent to internetwork architecture.
 - a. An operator interface connected to a controller shall allow the operator to interface with each internetwork controller as if directly connected. Controller information such as data, status, and control algorithms shall be viewable and editable from each internetwork controller.
 - b. Inputs, outputs, and control variables used to integrate control strategies across multiple controllers shall be readable by each controller on the internetwork. Program and test all cross-controller links required to execute control strategies. An authorized operator shall be able to edit cross-controller links by typing a standard object address or by using a point-and-click interface.
4. Controllers with real-time clocks shall use the BACnet Time Synchronization service. System shall automatically synchronize system clocks daily from an operator-designated controller via the internetwork. If applicable, system shall automatically adjust for daylight saving and standard time.
5. System shall be expandable to at least twice the required input and output objects with additional controllers, associated devices, and wiring. Expansion shall not require operator interface hardware additions or software revisions.

PART 3 - EXECUTION

3.01 GENERAL

- A. Install all items specified under PART 2 - PRODUCTS, according to the applicable manufacturer's recommendations and shop drawings, the details shown on the drawings and as specified under this section. Provide all required hangers and supports.
- B. 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 B31.1 for Pressure Piping and certified by the American Welding Society, ASME or an approved independent testing laboratory; and each such welder shall present his certificate attesting his qualifications to the Engineer's representative whenever requested to do so on the job.
- C. 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 be accurately matched 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.
- D. All necessary precautions shall be taken to prevent fire or damage occurring as the result of welding operations.

3.02 DEMOLITION

- A. The existing facility will be occupied during demolition work. Building will be unoccupied per schedule.
- B. Where sections of a system are to be removed and the system serves other areas of the building that are outside the immediate scope of the work, perform the following:
 - 1. Coordinate the temporary shutdown of the system with the Owner's representative.
 - 2. Install supports in the remaining active sections of the system as required by the removal of nearby supports associated with the demolition.
 - 3. Isolate the system.
 - 4. Cap the remaining system section, leaving the remainder of the system active.
- C. Provide temporary shoring or bracing during the demolition work to prevent movement, settlement, or collapse of the system or adjacent systems due to the work.

- D. Promptly repair any damage caused to adjacent facilities or areas that are designated to remain at no additional cost to the Owner.
- E. Materials/Equipment:
 - 1. Coordinate with all Contractors and Subcontractors to provide disconnection prior to equipment removal.
 - 2. Remove material/equipment by unfastening at the supports or attachments. Then remove the attachments from the building, leaving no component of the original installation.
 - 3. The Owner shall have the option to choose to take possession of the equipment or not. If the Owner chooses not to take possession of the equipment, remove and drop equipment/materials to floor for removal/disposal by the General Contractor.
 - 4. Exercise care with equipment that is to be relocated or turned over to the Owner. Examine the equipment before removal in the presence of the Owner's representative to determine its condition. Make a record of any marks, etc. by a photograph or videotape acknowledged by the Owner's representative.
 - 5. Install relocated equipment to ensure no damage.
 - 6. Equipment to be turned over to the Owner: Deliver to an on-site location designated by the Owner, and obtain acknowledgment of receipt in good condition the following equipment.
- F. Remove existing equipment and appurtenances as indicated on demolition plans and as required to install the new systems.

3.03 INSULATION

- A. All of the insulation work shall be done by contractors regularly engaged in this type of work in a neat and workmanlike manner. All insulation shall be completely sealed with no glass fibers exposed to the air.

3.04 EQUIPMENT

- A. Equipment shall be installed complete with all required hangers and supports in accordance with the manufacturer's recommendations.
- B. All equipment provided under this Section shall be installed in strict accordance with manufacturer's written installation instructions.
- C. Furnish and install all steel structural support members for proper hanging and support of equipment. Provide vibration isolation on all hangers.

- D. The HVAC Contractor shall label all equipment. Subcontractors will provide owner with excel spreadsheets of all items to be labeled, owner will assign numbers, assign names, print out labels and provide subcontractors with labels. Subcontractor will then affix the labels to the equipment. Brass tags are eliminated. As-builts and manuals will reference owner provided numbers and names.

3.05 SHEET METAL WORK

- A. All of the sheet metal work shall be done by contractors regularly engaged in this type of work.
- B. Neatly erect all sheet metal work as shown on plans or as may be required to carry out the intent of these plans and specifications.
- C. All necessary allowances and provisions must be made by this subcontractor in the case of beams, posts, pipes, iron work or other obstructions in the construction of the building or the work of other trades whether or not the same is shown on plans.
- D. All ducts are to be rigid and are to be strongly and carefully supported with suitable braces or angles to keep them true to shape and to prevent buckling.
- E. All joints are to be made tight and all interior surfaces are to be made smooth.
- F. Protect all work under this section from injury during the progress of erection and until final acceptance by the Architect.
- G. All metal work in dead or furred down spaces is to be erected in time to occasion no delay in the work of other trades on the building.
- H. Supply collars to diffusers shall be installed inside the neck of the diffusers. Dampers on all registers and diffusers shall be installed in the open position.
- I. Joints in all ductwork throughout shall be sealed, Class-B. All ductwork shall be taped and sealed.
- J. During the progress of the work and after the completion of the same, this Subcontractor shall remove from the premises all dirt, debris, rubbish, waste materials, etc., cause by him in the performance of this work, together with all his tools and appliances.

3.06 AUTOMATIC TEMPERATURE CONTROLS

- A. System shall be complete with all control wiring, switches, relays, transformers, and other accessories.
- B. The Control System herein specified shall be free from defects in workmanship and material under normal use and service. After completion of the installation, regulate and adjust all thermostats, control valves, control motors, and other

equipment provided and/or wired under this contract. If within twelve (12) months from the date of completion, any of the system herein described is proved to be defective in workmanship or materials, it will be replaced or repaired free of charge.

- C. Provide any service incidental to the proper performance of the Control System under guarantees outlined above for the period of one year. Normal maintenance of the system or adjustments of components is not to be considered part of the guarantee.

3.07 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.

3.08 VIBRATION ABSORPTION

- A. All equipment and piping shall operate without objectionable or unusual noise or vibration, as judged by the Engineer.
- B. Rotating equipment shall be fitted with such vibration-absorbing facilities as will be required to limit the transmission of vibration to the building and to the attached piping and breaching. The facilities shall be generally designed to limit this transmission to a maximum of 2%, but a greater amount will be allowed if it does not prove objectionable. The facilities shall also be designed to limit equipment floor loadings to 500 lb/sq. ft. or less. If, in order to accomplish this, the equipment requires the job installation of isolation mountings, inertia blocks, special hangers or other arrangements, these shall be carefully and specifically selected for each piece of equipment.
- C. Motor driven equipment shall have the motor, equipment and drive mounted on a common base. Hollow bed plates shall be grouted with a rich cement mortar.
- D. Submit shop drawing data for approval by the Engineer showing the make, type, and size of isolation mountings, flexible pipe connectors, and other facilities to be provided, including any concrete inertia blocks that may be required. The data shall clearly indicate that the isolating arrangements can and will limit the transmission of vibration as specified.

3.09 MISCELLANEOUS IRON AND STEEL

- A. Provide steel supports and hangers required to support fans, tanks, air handling units, pipe, ductwork, and other equipment or materials. Submit details of steel supports and method of fabrication for approval.
- B. 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 strongly constructed.

- C. 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.
- D. Members shall be generally welded, except that bolting may be used for field assembly where welding would be impractical. Welders shall be skilled.
- E. 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.

3.10 BALANCING, ADJUSTING, OPERATING, AND INSTRUCTIONS

- A. The HVAC contractor shall engage the services of an independent firm to perform testing, adjusting and balancing of the HVAC systems. The HVAC subcontractor shall submit to the owner at least qualified firms for the owner's review and acceptance.
- B. Engage a balancing company to adjust, balance, and operate the heating, ventilating and air-conditioning system and thoroughly instruct the Owner's personnel in all phases of care and operation of the systems. The Balancing Company shall be certified by Associated Air Balance Council or by the National Environmental Balancing Bureau.
- C. Before the air systems are tested and balanced, ducts and equipment shall be thoroughly cleaned by the contractor so that no dirt, dust, or other foreign matter will be deposited in or carried through the systems. For this purpose, cheesecloth shall be placed over each opening for entraining such particles during the cleaning operation.
- D. The units shall not be operated without filters in place. All filters shall be replaced by the Contractor after rooftop units have been cleaned and ready for system balancing.
- E. The Contractor as a part of this contract shall provide all materials, labor, and service of all subcontractors for fulfillment of air and water balancing of all systems. The Balancing Company shall inform Contractor of all requirements ahead of time.
- F. All equipment shall be operated and adjusted and all air systems shall be adjusted and balanced, readings taken and recorded on an approved form submitted to the Engineer for approval, readjusted and rebalanced in accordance with the Engineer's review comments and resubmitted.
- G. Air Systems

1. Systems shall be adjusted and balanced so that air quantities at outlets are as indicated on the drawings and so that the distribution from supply outlets is free from drafts and uniform over the face of each outlet.
 2. Adjustments shall be made by the Balancing Company to volume dampers at air outlets to produce the least pressure drop consistent with volume requirements.
 3. After completion of balancing and adjusting, settings of dampers, shall be permanently marked by the Balancing Company so that they can be restored if disturbed at any time.
 4. Direct reading velocity meters may be used by the Balancing Company for comparative adjustment of individual outlets, but air quantities in ducts have velocity of 1,000 feet per minute or greater, shall be measured by means of pitot tubes and inclined gauge manometers. Instrument test opening enclosures as specified shall be provided as required.
 5. Adjustment of the temperature controls shall be coordinated by the person in charge of the balancing and adjusting and shall be performed coincidental therewith. In conjunction with the Automatic Temperature Control System, simulate a complete cycle of operation for each system.
 6. After completion of the testing, balancing and adjusting of the air systems, six copies of a report showing the following information shall be submitted to the Engineer for review and approval.
 7. After each complete system has been balanced and adjusted, the total cfm at fan discharge, static pressure at fan outlet, total static pressure for apparatus, fan speed, motor amperage for each phase and voltage shall be listed.
- H. The Balancing Company shall provide all instruments and accessories required to perform the tests.
- I. Upon completion of the systems, during the first stages of the first cooling season, the Balancing Company shall operate the systems until temperatures in all areas are uniform. The period of time shall be no less than a five-day, forty-hour period. During these times, the Balancing Company shall keep at least two men on the job continuously, together with a man from the temperature control Sub-Subcontractor for the purpose of testing and balancing systems.
- J. The Contractor shall obtain from the manufacturer of each piece of equipment, five (5) copies of lubrication, operating and maintenance data sheets and control system drawings. He shall prepare five (5) complete sets of written coordinating operating and maintenance instructions into complete operating and maintenance manuals.

END OF SECTION

SECTION 23 00 01

TEMPORARY MECHANICAL DISCONNECTS

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. The General Conditions of the Contract for Construction and the General Requirements are hereby made part of this specification.
- B. Maintain a copy of all applicable drawings, specifications, shop drawings, and approved submittals at the site at all times during the Work.

1.02 SECTION INCLUDES

- A. The work of this Section consists of conducting all temporary mechanical disconnects and/or modifications of any building equipment required to complete the work. The work of this Section includes performing all necessary and required modifications to the existing rooftop mechanical units inclusive of all associated piping, wiring, and ductwork. The Contractor is responsible for all disconnection, reinstallation, and rooftop mechanical unit modification work that may be required. Various rooftop mechanical unit modification work may be required so as to increase the flashing height and/or allow for proper roofing installation. Contractor shall notify the user of the facility and the Owner a minimum of 48 hours in advance of any rooftop mechanical unit modification work.
- B. The Contractor is responsible to ensure the rooftop mechanical units remain operational as required by the user of the facility and Owner. Any damages that occur to the existing rooftop mechanical units as a result of the Contractor's operations shall be immediately corrected by the contractor at no additional expense.
- C. All materials shall be verified by Contractor to be proper for each intended use, and the entire work of this Section shall be done in such a manner that each installation will perform its intended purpose as applicable, in the finished work.
- D. The drawings indicate and show limits of construction for this project. The specifications specify material and work requirements for this project. Both are complementary to each other and both shall be followed to complete the work.
- E. Plans and dimensions under which the Work is to be performed are derived from a variety of sources. The existing conditions are provided for information only. Actual conditions may vary. Contractor is required to verify existing roof top mechanical units system composition, conditions, and dimensions prior to submitting his bid. No additional compensation or time extension will be made

for dimensional errors or discoverable inaccuracies related to existing conditions in the contract documents.

1.03 RELATED WORK

- A. Section 02 41 00 – Demolition
- B. Section 04 50 00 – Masonry Restoration
- C. Section 05 31 00 – Steel Deck Repairs
- D. Section 06 10 63 – Rough Carpentry
- E. Section 07 22 00 – Roof Insulation
- F. Section 07 54 00 – Roofing & Flashing
- G. Section 22 00 01 – Plumbing – Roof Drains
- H. Section 23 00 00 – HVAC (Filed Sub-Bid)
- I. Section 26 00 00 – Electrical
- J. Section 26 00 01 – Temporary Electrical Disconnects

1.04 QUALITY ASSURANCE

- A. All work shall be performed by a licensed mechanical contractor that regularly performs commercial rooftop unit repair or replacement work. The work shall adhere to the local building codes, regulations, industry standards, and best practices of the trade. The Contractor shall have a minimum of five (5) years experience installing and/or repairing warranted commercial rooftop unit systems. Minimum required experience involves at least ten (10) similar successful projects located in Massachusetts. Contractor shall provide the following supporting documentation:
 - (1) Name and address of project indicating project name and project date for each of the ten (10) referenced projects.
 - (2) Name and phone number of contact person (Owner, Designer, and General Contractor), for each of the ten (10) referenced projects.
 - (3) Written evidence of mechanical contractor license.
- B. The Contractor shall disconnect mechanical equipment when performing roofing work as needed to install roofing, to obtain flashing heights, and to control fumes.
- C. Each unit shall be fully operational immediately after reinstallation. Shutdown time for each unit shall be limited to an eight-hour period unless otherwise agreed in writing by the Owner.
- D. Prior to commencing any disconnects, the Owner shall be given 48 hours notice.

1.05 TESTING

- A. Prior to commencing roofing removal and replacement work, the Contractor shall verify that all rooftop mechanical units are in working order. The Contractor shall

provide a written report to the Owner and Engineer documenting that all rooftop mechanical units are in working order. The written report (initial report) shall note if any rooftop mechanical units are not operational, and shall note any and all deficiencies in operation including unusual noises, vibrations, odors, leaks, etc.

- B. Upon completion of the work (roofing installation work and any rooftop mechanical unit modification work), the Contractor shall verify in writing to the Owner and Engineer that all rooftop mechanical units are in working order.
- C. Any deficiencies, which were not noted in the initial report, shall be corrected by the Contractor at his expense.

1.06 COORDINATION

- A. Coordinate all work of this section with other trades. Perform all temporary mechanical disconnect work in a timely manner as not to delay other trades. The Contractor shall coordinate all work with the roofing and waterproofing trades, to prevent exposure of the building to inclement weather and leaks, at all times.

1.07 CONTRACTOR'S USE OF PREMISES

- A. Contractor shall limit its use of the site for work and for storage to allow for:
 - 1. Owner occupancy and use of the building during construction.
 - 2. Public use of walks, parking lots, and driveways.
- B. Do not block exits at any time. Provide protected entranceways at each entrance when working in these areas.
- C. Coordinate work on the roof, use of the site, storage areas, and staging areas with the Owner. Limit use of the site and working hours to dates, times, and locations approved by the Owner.
- D. Cooperate with the Owner's scheduling requirements for working at an occupied building. Work under this Section shall not interfere with the operation of the building or building occupants at any time.
- E. The Contractor is responsible for protecting all materials and equipment stored on the site.
- F. Smoking is not permitted on the grounds.
- G. Dispose of all trash and debris in a legal manner off-site. Do not throw debris from access equipment or staging. Conduct debris to approved containers on the ground. Locate debris containers only in locations approved by the Owner in advance.

1.08 WARRANTY

- A. Contractor's Warranty: The Contractor shall supply the Owner with a minimum two-year workmanship warranty for the work of this section

1.09 SUBMITTALS

- A. Submit manufacturer's descriptive literature and data sheets for any specified and/or required products listed in this specification section, under the provisions of Section 01 33 00.
- B. Submit Contractor Quality Assurance supporting documentation as stipulated in Paragraph 1.04 A.

PART 2 - PRODUCTS

2.01 REPLACEMENT PARTS

- A. Any replacement parts or additional materials needed due to rooftop mechanical unit modifications, and/or changes in curb or sleeper heights shall be as recommended by the manufacturer of the mechanical unit or as required by governing codes.

PART 3 - EXECUTION

3.01 GENERAL

- A. Perform all work to meet the requirements of the Massachusetts Building Code.
- B. After disconnection, move units a sufficient distance to permit the installation of any necessary and/or required modifications, new roofing, and new flashing materials.
- C. Units shall be moved onto existing roofing to the maximum extent possible. Provide plywood bases to rest disconnected units on.
- D. Provide plywood traffic ways for moving units. If mechanical contrivances of wheeled "A" frame-type hoists are used, plywood shall be placed under the equipment for its full route of movement. Plywood shall be minimum of 5/8" thick.
- E. Under no circumstances shall any rooftop mechanical units be stored on completed sections of the new roof or any adjoining roofs not included in this contract.
- F. Reinstall rooftop mechanical units and verify units are functioning properly (Refer to paragraph 1.05 Testing).

END OF SECTION

**SECTION 26 00 00
ELECTRICAL**

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. The General Conditions of the Contract for Construction and the General Requirements are hereby made part of this specification.
- B. Maintain a copy of all applicable drawings, specifications, shop drawings, and approved submittals at the site at all times during the Work.
- C. **The Filed Sub-Bid work is being bid as Alternate No. 1 Bid; the work includes HVAC work as specified and detailed as follows:**
 - (1) Specification Section 23 00 00 HVAC and Drawings H-1, H-2, H-3 & H-4.**
 - (2) Specification Section 26 00 00 ELECTRICAL and Drawings E-1, E-2 & E-3.**

1.02 DEFINITIONS

- A. Owner – City of Salem
- B. Awarding Authority – City of Salem
- C. Architect – Russo Barr Associates
- D. Engineer – BLW Engineers, Inc.
- E. The Roofing Contractor shall be considered the General Contractor and General Bidder.
- F. The HVAC Contractor shall be considered to be the HVAC Subcontractor.
- G. The Electrical Contractor shall be considered the Electrical Subcontractor.
- H. “Provide” shall mean furnish and install.
- I. “Disconnect” shall mean to electrically disconnect and otherwise make the equipment safe for removal and disposal by others. The Electrical Contractor shall remove conduit and wiring serving disconnected equipment, unless otherwise noted.
- J. “Remove” shall mean to “disconnect”, remove and dispose of the equipment indicated.

- K. "Relocate" shall mean to "disconnect" for relocation of the existing equipment.
- L. "Remain" shall mean the existing equipment is to remain in place, in operating condition.

1.02 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals necessary to provide complete electrical system as shown on the Drawings and as specified herein. The major items of work shall generally consist of:
 - 1. Electrical Demolition: Demolition/removal of HVAC RTU's and associated existing branch circuitry. Disconnection of exhaust fan wiring, to prepare for fan removal by the HVAC contractor. Electrical subcontractor shall reconnect existing branch wiring to newly installed exhaust fans.
 - 2. New Electrical Work shall include roof top equipment conduits, new branch circuitry, new disconnects and new circuit breakers (in existing panelboards). The work shall generally consist of providing:
 - a. Raceways, Fittings and Supports
 - b. Wire and Cable
 - c. Disconnect Switches
 - d. Feeder Circuit Wiring and Connections for new equipment and mechanical units.
 - e. Grounding
 - f. Electrical Identification (name plates and labeling)
 - g. All Fees and Permits
 - h. Testing
 - i. Circuit breakers for existing panelboard.
- B. Furnish all labor and materials to perform demolition work as shown on the Drawings and as specified hereinafter.
- C. During final inspection, the electrical contractor shall be available to the mechanical and electrical engineers to open all electrical/control panels for inspectional purposes.

1.03 RELATED WORK PROVIDED BY THE HVAC CONTRACTOR

- A. Control Wiring
- B. Disconnect switches for exhaust fans and Roof Top Units shall be furnished by HVAC, installed and wired by the Electrical Contractor.

1.04 CODES, ORDINANCES, AND PERMITS

- A. Installation of systems and equipment provided under this section shall be done in strict accordance with Massachusetts Department of Public Safety Codes, Massachusetts Department of Environmental Protection, Massachusetts State Building Code, the Massachusetts Electrical Code, the National Electrical Code (most recent editions) and the City of Salem Codes and Regulations having jurisdiction.
- B. All electrical apparatus furnished under this section shall be approved by the UL and shall be so labeled or listed where such is applicable. Where custom-built equipment is specified and the UL label or listing is not applicable to the completed product, all components used in the construction of such equipment shall be labeled or listed by UL where such is applicable to the component.
- C. Give notices, file plans, pay for and obtain permits and licenses, pay fees and obtain necessary approvals from authorities having jurisdiction. Deliver certificates of inspection and approval to the Engineer. Authorities having jurisdiction include, but are not necessarily limited to:
 - 1. City of Salem Wiring Inspector (Inspectional Services Department)
- D. No work shall be covered before examination and approval by Engineer, inspectors, and authorities having jurisdiction. Replace imperfect or condemned work conforming to requirements, satisfactory to Engineer, and without extra cost to the Owner. If work is covered before due inspection and approval, the installing contractors shall pay costs of uncovering and reinstalling the covering, whether it meets contract requirements or not.
- E. In the event local inspectors or codes require a change in the material, design, or involve additional labor, all such changes shall be submitted to the Engineer for approval before proceeding with the work. Comply with all local codes and inspections.

1.05 RECORD DRAWINGS

- A. Refer to Section 01 70 00, Project Closeout, of the Specifications for record drawings and procedures to be provided under this section.

1.06 CLEANING

- A. During the progress of the electrical work, the Electrical Subcontractor shall clean up and remove all scrap, demolition material, and other debris caused by the Contractor. At completion, the Electrical Subcontractor shall clean all electrical equipment, wiring and raceway systems and leave all work in perfect operating condition.

1.07 COORDINATION AND RESPONSIBILITY

- A. The structure and its appurtenances, clearances and the related services, such as plumbing, heating, ventilation and electric service have been planned to be legal, adequate and suitable for the installation of equipment specified under this section. The Owner will not assume any increase in cost caused by differing requirements peculiar to a particular make or type of equipment, and any incidental cost shall be borne by the Electrical Subcontractor. He shall be responsible for the proper location of his required sleeves, chases, inserts, etc., He shall be responsible for his work and equipment furnished and installed by him until the completion and final acceptance of this contract, and he shall replace any work which may be damaged, lost or stolen, without additional cost to the Owner.

1.08 PROTECTION OF MATERIALS, WORK, AND GROUNDS

- A. Materials, fixtures and equipment shall be properly protected and all raceway openings shall be temporarily closed so as to prevent obstruction and damage.
- B. Protect and preserve all materials, supplies and equipment of every description and all work performed. Protect all existing equipment and property of any kind from damage during the operations. Damage shall be repaired or replaced promptly by the Electrical Subcontractor at his expense.

1.09 DRAWINGS

- A. It is the intention of the Specifications and Drawings to call for finished work, tested and ready for 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 Electrical Subcontractor 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 Engineer before being installed. The Electrical 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 Engineer before proceeding with the installation. The Electrical 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. Size of 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 such a manner as to avoid being unsightly.

- D. All measurements shall be taken at the building by the Electrical Contractor, prior to purchasing and installing the equipment and raceways.

1.10 APPROVAL OF MANUFACTURERS AND SHOP DRAWINGS

- A. Submit five (5) copies of the following in accordance with Section 01 33 00.
 - 1. Disconnects and Safety Switches
 - 2. Wire and Cable
 - 3. Conduit and Raceways
 - 4. Circuit Breakers
- B. Individual information shall be submitted for each type of equipment. Where multiple products of various sizes, capacities or ratings are indicated on the same page of a submittal, the Electrical Contractor shall clearly identify which items are being submitted. Unmarked submittals will be returned without action. Additional requirements for shop drawings may be contained under individual items.

1.11 UNDERWRITERS' LABEL AND LISTING

- A. All electrical apparatus furnished under this Section shall be approved by the UL and shall be labeled or listed where such is applicable. Where custom-built equipment is specified and the UL label or listing is not applicable to the completed product, all components used in the construction of such equipment shall be labeled or listed by UL where such is applicable to the component.

1.12 CUTTING AND PATCHING

- A. All cutting and patching necessary for the proper installation of work to be performed under this Section shall be performed by the General Contractor.
- B. All work shall be fully coordinated with all phases of construction, in order to minimize the requirements for cutting and patching.
- C. All of this work shall be done by careful workmen competent to do such work and with the proper and smallest tools applicable.
- D. Any cost caused by defective or ill-timed work shall be borne by the contractor responsible.

1.13 GUARANTEE

- A. The Electrical Contractor shall guarantee, in writing, all work and all materials provided under this Section in accordance with the provisions of the printed form of Contract and the General Conditions.

1.14 ELECTRICAL

- A. All furnished electrical apparatus and controls shall conform to applicable requirements under DIVISION 26 00 00 - ELECTRICAL.
- B. The HVAC Contractor shall furnish and install all low voltage and/or line voltage control wiring for the hvac units unless indicated otherwise.

1.15 VERIFYING EXISTING CONDITIONS

- A. Before commencing any work under this section, verify all governing dimensions and examine all adjoining work on which this work is in any way associated or connected. Failure to visit the jobsite will in no way relieve the Electrical Contractor from installing the work according to the intent of these specifications and at no additional cost to the Owner.
- B. Each bidder shall visit the site and inspect conditions affecting the proposed work. Failure to do so and misinterpretation of the Plans and Specifications shall be entirely the responsibility of the bidder, and will not be a basis for claim for extra compensation.
- C. Each bidder shall make note of the existing conditions affecting hauling, rigging transportation, installation, etc., in connection for his work and shall make all provisions for transportation such of all materials and equipment.
- D. Where field conditions require, the Electrical Contractor shall arrange for equipment to be shipped to the job, dismantled and assembled in place.

1.16 PAINTING

- A. All finish field painting shall be provided by the General Contractor.

1.17 REFERENCE STANDARDS

- A. The latest published issue of the standards, recommendations, or requirements of the following listed societies, associations, or institutes in effect at the date of Contract are part of this Specification. These shall be considered as minimum requirements; specific requirements of this specification and/or associated drawings shall have precedence. In case of conflict between published requirements, the Engineer and/or Owner's representative shall determine which is to be followed.
- B. Electrical equipment, installation and workmanship shall conform to the latest editions of the applicable codes and standards of the following organizations.

1. Institute of Electrical and Electronic Engineers (IEEE)
2. American National Standards Institute (ANSI)
3. Massachusetts and National Electrical Code (MEC/NEC)
4. Underwriters' Laboratories (UL)
5. National Bureau of Standards (NBS)
 - a. H33-Safety Rules-Electrical Utilization Equipment.
 - b. H51-Safety Rules-Installation and Maintenance of Electric Supply and Communication Lines.
6. National Electrical Manufacturers Association (NEMA)
7. American Society for Testing and Materials (ASTM)
8. Insulated Power Cable Engineers Association (IPCEA)
9. Occupational Safety and Health Act (OSHA)

1.18 COOPERATION WITH OTHER TRADES

- A. The work shall be so performed that the progress of the entire building construction, including all other trades, shall not be delayed or interfered with. Materials and apparatus shall be installed as fast as conditions of the building will permit and must be installed promptly when and as desired.
- B. 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 Engineer for decision to prevent delay in installation of work. All work and materials placed in violation of this clause shall be readjusted to the Engineer's satisfaction, at no expense to the Owner.
- C. 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 will interfere with work of other sections, assist in working out space conditions to make satisfactory adjustment. If so directed by the Engineer, prepare and submit for approval 1/8" scale or larger working drawings and sections, clearly showing how this 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.

1.19 WORKING CONDITIONS AND SAFETY

- A. Whereas the building may be occupied during the construction period, it is of utmost importance for occupant's safety and that the building functions be

maintained. The Electrical Contractor shall not disrupt the normal operations of the building and shall be required to cease work during occupied hours if, in the opinion of the Owner's Representative or the Engineer, the work creates a disruption. The Electrical Contractor will then be required to perform such disruptive work during unoccupied business hours. No work shall commence until the site has been properly prepared.

1.20 MATERIAL AND WORKMANSHIP

- A. All material provided shall be new and approved for the intended service.
- B. Defective equipment or equipment damaged in the course of installation or testing shall be replaced by the Electrical Contractor at no cost to the Owner.
- C. All work shall be executed in the best and most thorough manner known to each trade. Employ careful, competent, experienced journeymen, and insofar as possible, keep the same foreman and workmen from the beginning to the completion of the job.

1.21 PRODUCT HANDLING AND STORAGE

- A. Arrange for, and provide, a storage space or area at the job site for all electrical equipment and materials to be installed or reinstalled in the project. The exact location of portable storage vans at the job site or protected storage areas within the building construction, conditions permitting, shall be arranged with the Engineer.
- B. All electrical equipment and materials, upon receipt at the job site shall be thoroughly inspected as to their type and condition and the quantity received.
- C. After inspection, all electrical equipment and materials shall be moved to the storage area designated.

1.22 OUTAGES

- A. The Electrical Contractor shall coordinate all power outages with Owner's Representative.
- B. Outages confined to the roof top equipment shall be coordinated with the general contractor.

1.23 HOISTING, SCAFFOLDING, STAGING AND PLANKING

- A. Provide, set up and maintain all required derricks, hoisting, machinery, scaffolding, staging and planting for the work of this section.
- B. Scaffolding is to have solid backs and floors to prevent dropping materials to the floors or ground.

PART 2 - MATERIALS

2.01 RACEWAYS AND FITTINGS

A. General:

1. All wiring shall be installed in conduit or wireways, unless otherwise indicated. All conduits shall be minimum 3/4" commercial trade size, unless otherwise specified or indicated on the drawings. Metallic conduit fittings shall be made of steel or malleable iron only. Die-cast zinc-alloy fittings and fitting made of inferior materials, such as "pot metal", shall not be used.

B. Rigid Steel Conduit:

1. Rigid Steel, Galvanized
 - a. Full weight galvanized steel conforming with UL 6 and ANSI C80.1.
2. Terminations
 - a. Double locknuttred with insulated throat bushings in dry locations.
 - b. Insulated, gasketed hub connectors in damp/wet locations.
3. Fittings and Conduit Bodies
 - a. Fittings and conduit bodies: ANSI/NEMA FB 1; threaded type, material to match conduit.

C. Electrical Metallic Tubing (EMT)

1. Zinc coated steel conforming to industry standards, NEMA TL2, by Republic Steel, Allied Tube or approved equal.

D. Liquid-Tight Flexible Metal Conduit

1. Flexible galvanized steel tubing over which is extruded a liquid-tight jacket of polyvinyl chloride (PVC) 1-1/4" size and smaller shall be provided with a continuous copper bonding conductor.
2. Connectors shall be steel or malleable iron with insulated throats.

E. Wireways

1. Wireways, auxiliary gutters, and associated fittings shall comply with UL 870.
2. Wireways shall be of the screw-cover type, and of sizes indicated or as required by NEC.

3. Wireways shall be of raintight construction in wet locations.
4. Finish shall be paint, manufacturer's standard.

2.02 OUTLET BOXES

- A. Outlet boxes for exposed conduit work shall be cast aluminum alloy with cast aluminum alloy covers.
- B. Switch boxes, receptacle boxes and other outlet boxes shall be standard 4" square with plaster rings or gang covers as required.
- C. Outlet boxes for various systems and components shall be as required by manufacturer.
- D. Provide screw-joint outlet boxes, with gasketed weatherproof covers in locations, where exposed to moisture, or next to water or steam connections, and where indicated as weatherproof on Drawings.
- E. Provide only enough conduit openings to accommodate conduits at individual location. Each box shall be large enough to accommodate number and sizes of conduits, wires and splices to meet NEC requirements, but shall be at least size shown or specified. Necessary volume shall be obtained by using boxes of proper dimensions.

2.03 WIRING DEVICE PLATES

- A. Provide 0.040" brushed stainless steel device plates by Arrow-Hart, Bryant, Hubbell or approved equal. One-piece type device plates shall be provided for all outlets and fittings. Plates on unfinished walls and on fittings shall be of zinc-coated sheet steel, cast-metal, or impact resistant plastic having rounded or beveled edges. Plates on finished walls shall be of steel with baked enamel finish. Screws shall be of metal with countersunk heads, in a color to match the finish of the plate.
- B. Device plates for shut off switches and manual motor starters shall have engraved nameplates in 1/4" letters.
- C. Device plates shall be manufacturer of wiring devices.

2.04 DEVICE, PULL AND JUNCTION BOXES

- A. The Electrical Contractor shall provide junction boxes, pull boxes, terminal boxes and fittings as indicated on drawings, specified herein or wherever necessary to facilitate pulling or splicing of wires and cables of all electrical systems, and/or required by code.
- B. Junction or pull boxes not over 100 cubic inches in size shall be standard outlet boxes, except as noted otherwise. Junction and pull boxes over 100 cubic inches in size shall be constructed of code gauge sheet steel with screw covers and

gaskets and shall be fabricated from approved detailed working drawings. Finish shall be paint over zinc chromate primer.

- C. Outlet boxes in unfinished areas shall be cast metal with threaded conduit hubs.
- D. Outlet boxes for receptacles shall be of galvanized steel at least 2" deep and of sufficient size to accommodate devices at outlet location. All boxes shall have mounting lugs or ears for covers and knockouts for raceway termination.

2.05 WIRE AND CABLE

- A. Wire and cable of sizes, quantities and types shown on drawings, schedules or specified herein shall be provided by the Electrical Contractor. All wire and cable shall be installed in raceways, unless otherwise indicated.
- B. Wire and cable work shall be in strict accordance with requirements of National Electrical Code and its latest revisions, both with respect to material and workmanship, except where insulation thickness and covering are required by these Specifications in excess of Code requirements.
- C. Minimum size wiring, unless otherwise indicated, for power branch circuit shall be #12 AWG.
- D. Branch circuit power, and control wiring, except as otherwise noted, shall have type THWN-THHN, 600 volts insulation. Unless otherwise noted, feeder wiring and branch circuit wiring sizes #6 AWG AND LARGER shall be Type XHHW, #8 AWG and smaller type shall be THWN-THHN.
- E. Wires and cables shall be single conductor. Conductors of sizes #8 AWG and larger shall be stranded; wires smaller than #8 AWG shall be solid. Conductors shall be soft drawn copper and have a conductivity of not less than 98 percent of ASTM standards for annealed copper. Aluminum conductors will not be accepted.
- F. Sizes 12 and 10 AWG wire and cable shall be factory color-coded with a separate color for each phase of each system voltage used consistently throughout power systems. Size 8 AWG and larger shall be completely colored with vinyl tape wherever accessible. Colors shall be in accordance with those listed in Section 3 of this specification.
- G. Grounding conductors and equipment grounds unless bare, shall have a GREEN covering or shall be completely marked with green tape at boxes, conduit bodies or where otherwise accessible.
- H. Cables ties and straps shall be self-clinching types of one piece molded construction. Bodies shall be of nylon and clinching clips shall be spring bronze. Ties and straps shall be Thomas & Betts Company, Types TY-25 and TY-35 or approved equal.

2.06 WIRE PULLING EQUIPMENT

- A. Provide polyethylene ropes for pulling wire.

2.07 DISCONNECT SWITCHES (Furnished by HVAC)

- A. All safety switches shall be NEMA type "HD", heavy duty and shall meet or exceed NEMA Standard KS-1 for type HD switches, and meet or exceed Federal Specification W-S-865C for HD switches.
- B. Enclosed disconnect switches shall have the following features:
 - 1. Quick-make, Quick-break Switch Mechanism
 - 2. Padlockable Door and Handle
 - 3. Positive Type Interlocked Door
 - 4. 250 volt AC Rating
 - 5. Visible On-off Indication
 - 6. NEMA I Surface Enclosure in Dry Locations
 - 7. CO/ALR Cable Lugs
 - 8. Horsepower Rated (note that HP rating of switch must be equal to or greater than HP rating of motor or equivalent equipment loads.

2.08 FUSES

- A. Provide current-limiting, high-interrupting-capacity fuses for equipment provided under this and other Sections.
- B. Fuses 600 Amp and smaller that serve motors, shall be dual-element current limiting Class RKL or approved equal.
- C. Submit specific fuse locations, types, manufacturers and ratings.
- D. Switch sizes and fuse ratings shown on Drawings and specified represent general approximate values for each motor hp delineated. Coordinate fuse values with motor switch sizes. Obtain recommended fuse rating data from the fuse manufacturer. In case of discrepancy between Contract Documents and manufacturer's recommendations, manufacturer's recommendations, shall govern work. Revise switch sizes to accommodate recommended fuse values and revise assembled equipment as necessary. Furnish necessary change information to equipment manufacturers. Submit changes in switch sizes to Architect for approval. Certify that motor circuits have adequate short circuit protection with fuses provided.

2.09 GROUNDING

- A. Cables shall be of solid or stranded copper size as specified on the drawings. Cables shall be bare when installed in soil or in open air, and shall be insulated with 600 volt green jackets in all runs installed in conduit.
- B. The grounding conductor bonding jumper shall be attached to the circuits, conduits, cabinets, equipment and the like, which are to be grounded by means of suitable lugs, pressure connectors and clamps.
- C. All feeder and three phase motor circuits shall be provided with an appropriately sized grounding conductor. Sizes shall be based on NEC Table 250-95. Grounding conductors shall also be provided wherever the raceway is not a suitable grounding conductor.

2.10 IDENTIFICATION

- A. Wire and Cable Identification
 - 1. Conductor labels shall be white, adhesive self-laminating type. All text shall be typed. String tags shall not be accepted. Temporary tagging during construction shall be allowed, but all permanent adhesive tags shall be in place prior to requesting final acceptance.

2.11 PANELBOARDS

- A. E.C. to provide new Westinghouse Cutler Hammer molded case, bolt-on, thermal-magnetic trip, three pole branch circuit breakers as shown on Drawings. Multiple pole breakers shall be single handle, common-trip. All circuit breakers shall be rated for switching purposes and match existing Westinghouse Cutler Hammer manufacturer's AIC rating.
- B. Update typed panel directories that show use of each new circuit. Directory shall be mounted inside of each panelboard within clear plastic cover.

PART 3 - EXECUTION

3.01 RACEWAYS AND FITTINGS

- A. Conduits usage shall be as follows:

<u>LOCATION</u>	<u>EXPOSED/ CONCEALED</u>	<u>SUBJECT TO DAMAGE, Y/N</u>	<u>WET/DAMP OR DRY</u>	<u>PERMITTED CONDUITS</u>
Interior	Exposed	No	Dry	RGS/EMT
Interior	Exposed	No	Wet	RGS/EMT
Interior	Exposed	Yes	Dry	RGS
Interior	Exposed	Yes	Wet	RGS

*RGS - Rigid Galvanized Steel

- B. All conduits shall be cut square and reamed at the ends. All joints shall be drawn tight. Exposed conduit shall be run parallel to or at right angles to the lines of the building. Right angle bends in exposed conduit shall be made with standard elbows, conduit body fittings, or conduit bent to radii not less than those of standard elbows. All bends shall be free from dents or flattening.
- C. Conduit shall be made mechanically and electrically continuous from service entrance to all outlets
- D. Conduit connected to wall outlets shall be run in such a manner that they will not cross water, steam or waste pipes wherever possible. Overhead conduits shall be run above water, steam or waste lines wherever possible.
- E. Liquid-tight flexible conduits shall be used for connection to motors and other electrical equipment when it is subject to movement, vibration, misalignment or cramped quarters or where noise transmission is to be eliminated or reduced. Proper angle connectors (straight, 45 degree, 90 degree) shall be used for the installation. Improperly installed connectors are not allowed.
- F. Pipe straps and hanger rods shall be fastened to concrete by means of inserts or expansion bolts, to brickwork by means of expansion bolts and to hollow masonry by means of toggle bolts. Hanger rods shall be fastened to beams and joists by means of swivel type beam clamps. Wooden plugs and shields and powder driven fasteners shall not be used.
- G. Individual horizontal conduits shall be supported by one hole pipe straps or separate pipe hangers for sizes 1-1/2" and smaller. Spring steel fasteners may be used for sizes 1-1/2" and smaller in dry locations only. Hanger rods used with spring steel fasteners shall be minimum 1/4" diameter.
- H. Where two or more horizontal conduits run parallel and at the same elevation, they shall be supported on multiple pipe hangers. Conduit shall be secured to the horizontal hanger member.
- I. Pullboxes shall not be utilized for the vertical support of conduits.
- J. Every conduit system shall be installed complete and blown through and swabbed before conductors are installed.
- K. Wireways shall be used for mounting groups of disconnects and/or starters, or where shown on the drawings.

3.02 DEVICE, PULL AND JUNCTION BOXES

- A. Boxes shall be installed in rigid and satisfactory manner supported by bar hangers in frame constructions or fastened directly with wood screws on wood; bolts to hollow expansion shields on concrete or brick, toggle bolts on hollow masonry units and machine screws or welded threaded studs on metal.

Threaded studs provided with lock washers and nuts are acceptable for mounting of outlets on concrete construction.

- B. Location of devices shown on the Drawings is approximate. When necessary, devices shall be relocated at no extra cost within a 10'-0" radius to avoid conflicts with structural conditions or equipment of other trades. Outlets shall be symmetrically located according to room layouts.
- C. Boxes shall be secure to conduit by means of double steel locknuts (inside and outside) and malleable iron or steel insulated throat bushings. Covers on fire alarm system junction and pull boxes shall be painted RED with nameplates.

3.03 WIRE AND CABLE

A. 250 Volt Systems:

1. Conductors shall not be installed in a manner which will injure their insulation or covering. Conduit system shall be complete before any conductors are installed. Conductors shall not be installed until such time that the conductors can be suitably protected against the elements and damage.
2. Provide and use suitable cable pulling winches or equipment of adequate capacity in order to insure a steady, continuous pull. Before any wires or cables are drawn into conduits, the conduit shall be cleaned out by pulling a swab through the conduit with fish tape, and wires shall be pulled through conduit in such a manner as to avoid kinking or injuring the insulation. Only non-metallic approved cable lubricants shall be used when necessary. Cable lubricants shall be completely removed at panelboards, pull and junction boxes and other accessible locations.
3. All feeder cables shall be continuous from origin to panel or equipment termination without running splices in intermediate pull or splice boxes. Where taps and splices are deemed necessary by job conditions, they shall first be approved by the Engineer and shall be made in approved splice boxes with suitable connectors as noted herein. Special note is to be made when extending existing feeders.
4. No splices or joints shall be permitted in branch circuits except within accessible junction boxes. Splices in junction boxes shall be with enough spare wire to enable two or more splices to be remade with the same wire in event of a fault. When a bolted splice or connection presents an irregular surface, duct seal compound shall be molded around the joint. It shall make a smooth taping surface and prevent the formation of air pockets.
5. Use solderless pressure connectors on conductors of No. 8 AWG and larger and tape to provide insulation not less than that of the conductor. Solderless connectors shall be of rugged construction with multi-point

contact on cable, ground contact surfaces for low resistance and low temperature rise, and with high pull-out strength. On conductors of 250 MCM or larger provide not less than 2 pressure connectors.

6. On conductor sizes No. 10 or smaller, connectors shall be molded composition with metal thread-on core.
7. At panelboards, junction boxes and conductors shall be identified with circuit numbers by applying suitable marking.
8. Neatly train all wiring within equipment boxes and panelboards.
9. Inspect all wire and cable for damage after installation. Replace all damaged conductors or insulation. Megger test all feeder conductors and record results in accordance with Section 01 70 00 of this specification. Verify all phasing of conductors and equipment.
10. Conductor color coding for power circuits shall be as follows:

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

3.04 DISCONNECT SWITCHES

- A. Provide manufacturer's nameplates for front cover indicating the following information:
 1. Switch Type
 2. Catalog Number
 3. H.P. Rating
 4. Voltage Rating
 5. Current Rating
- B. Install safety disconnect switches at all locations as shown on drawings. Disconnects shall be mounted within sight, and proximate to the load served. Disconnects are to be mounted 48" AFF, unless otherwise noted.
- C. Provide engraved phenolic (white lettering/black field) nameplate indicating load being fed.

3.05 GROUNDING

- A. The entire electrical wiring raceway system of this project shall be made to form a continuous, permanent and effective equipment grounding circuit which shall be installed as follows:
1. All metallic threaded couplings and conduits shall be wrench-tight.
 2. All termination of rigid conduits at all boxes, cabinets, and other enclosures shall be made with double locknut arrangement and a bushing. Bushings shall be insulating type.
 3. All flexible metallic conduit and liquid-tight flexible conduits over 6' long or with conductors carrying over 20 amps shall have proper size ground conductor jumper bonded to the rigid conduit system and to the electrical equipment.
 4. All electrical, metallic enclosures shall be effectively bonded by a separate green colored bonding screw. The use of a mounting screw for grounding will not be accepted.
 5. All sections of wiring gutters and wireways, all outlet boxes and receptacle grounding terminals, all metal sections of continuous rigid cable supports and fittings and cable bus, and other built-up enclosures with bolted joining of sections shall be firmly bonded and effectively grounded. Conduit expansion fittings shall have factory furnished bonding jumpers.

END OF SECTION

SECTION 26 00 01

TEMPORARY ELECTRICAL DISCONNECTS

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. The General Conditions of the Contract for Construction and the General Requirements are hereby made part of this specification.
- B. Maintain a copy of all applicable drawings, specifications, shop drawings, and approved submittals at the site at all times during the Work.

1.02 SECTION INCLUDES

- A. The work of this Section consists of conducting all temporary or permanent electrical disconnects and/or modifications of any building equipment required to complete the work. The work of this section includes performing all necessary and required modifications to the existing rooftop mechanical units. The Contractor is responsible for all disconnection and reinstallation work that may be required. Contractor shall notify the user of the facility and the Owner a minimum of 48 hours in advance of any electrical work.
- B. The Contractor is responsible to ensure the electrical service does not become interrupted as a result of his operations. Any damages that occur to the existing electrical service as a result of the contractor's operations shall be immediately corrected by the contractor at no additional expense.
- C. The Contractor shall be responsible for temporarily disconnecting electrical service to rooftop equipment to allow the vertical height of the existing curbs to be increased. The Contractor shall be responsible for extension of electrical service to the new height of the curb.
- D. All materials shall be verified by Contractor to be proper for each intended use, and the entire work of this Section shall be done in such a manner that each installation will perform its intended purpose as applicable, in the finished work.
- E. The drawings indicate and show limits of construction for this project. The specifications specify material and work requirements for this project. Both are complementary to each other and both shall be followed to complete the work.
- F. Plans and dimensions under which the Work is to be performed are derived from a variety of sources. The existing conditions are provided for information only. Actual conditions may vary. Contractor is required to verify existing electrical system composition, conditions, and dimensions prior to submitting his bid. No additional compensation or time extension will be made for dimensional errors or discoverable inaccuracies related to existing conditions in the contract documents.

1.03 RELATED WORK

- A. Section 02 41 00 – Demolition
- B. Section 04 50 00 – Masonry Restoration
- C. Section 05 31 00 – Steel Deck Repairs
- D. Section 06 10 63 – Rough Carpentry
- E. Section 07 22 00 – Roof Insulation
- F. Section 07 54 00 – Roofing & Flashing
- G. Section 22 00 01 – Plumbing – Roof Drains
- H. Section 23 00 00 – HVAC (Filed Sub-Bid)
- I. Section 23 00 01 – Temporary Mechanical Disconnects
- J. Section 26 00 00 – Electrical

1.04 QUALITY ASSURANCE

- A. The Contractor shall employ mechanics licensed in the electrical trade.
- B. The Contractor shall disconnect electrical equipment or feeds when performing work as needed to install roofing, to obtain flashing heights and to control fumes.
- C. Each feed or unit shall be fully operational immediately after reinstallation. Shutdown time for each unit shall be limited to an eight-hour period unless otherwise agreed in writing by tenant.
- D. Prior to commencing any disconnects, the Owner shall be given 48 hours notice.

1.05 COORDINATION

- A. Coordinate all work of this section with other trades. Perform all temporary electrical disconnect work in a timely manner as not to delay other trades. The Contractor shall coordinate all work with the roofing and waterproofing trades, to prevent exposure of the building to inclement weather and leaks, at all times.

1.06 CONTRACTOR'S USE OF PREMISES

- A. Contractor shall limit its use of the site for work and for storage to allow for:
 - 1. Owner occupancy and use of the building during construction.
 - 2. Public use of walks, parking lots, and driveways.
- B. Do not block exits at any time. Provide protected entranceways at each entrance when working in these areas.
- C. Coordinate work on the roof, use of the site, storage areas, and staging areas with the Owner. Limit use of the site and working hours to dates, times, and locations approved by the Owner.

- D. Cooperate with the Owner's scheduling requirements for working at an occupied building. Work under this Section shall not interfere with the operation of the building or building occupants at any time.
- E. The Contractor is responsible for protecting all materials and equipment stored on the site.
- F. Smoking is not permitted on the grounds.
- G. Dispose of all trash and debris in a legal manner off-site. Do not throw debris from access equipment or staging. Conduct debris to approved containers on the ground. Locate debris containers only in locations approved by the Owner in advance.

PART 2 - PRODUCTS

- A. Any replacement parts or additional materials needed due to modifications shall be as recommended by the manufacturer of the affected building component or as required by governing codes.

PART 3 - EXECUTION

- A. Perform all work to meet the requirements of the Massachusetts Building Code.
- B. Upon completion of the work the Contractor shall verify in writing to the Owner and Engineer that all modifications are complete and the affected units are in working order.
- C. Any deficiencies shall be corrected by the Contractor at his expense.

END OF SECTION

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