2.7 METAL CHIMNEYS AND FLUES

A. Per 248 CMR 5.00 and 7.00, provide the services of a licensed plumber or gasfitter to be responsible for, supervise, and/or install flue venting system(s) for all gas-fired equipment based on the equipment capacity. The licensed plumber or gasfitter shall obtain a gas fitting permit in compliance with 248 CMR 3.00 as required by the Massachusetts Fuel Gas and Plumbing Code.

B. Boilers and water heaters (without draft hoods, under 85% efficiency unless otherwise noted on drawings).

1. Furnish and install, as shown on the drawings, a positive pressure, dual wall, insulated breeching/stack system.

2. Breeching to be round, double wall, all metal, gas and liquid-tight factory built component system, tested and listed by UL 103 for use with building heating equipment, burning gas, solid or liquid fuels as described in NFPA-85A, B, D and NFPA-211.

3. Breeching inner shell (gas carrying pipe) to be 0.035" 304 stainless steel for liquid fuel or 316 stainless steel for solid fuels and heavy oil. Outer shell to be minimum 0.026" aluminized (indoors only) or 304 [316] stainless steel (outdoors or indoors). Both inner and outer shell construction to be all welded (tacked joints are unacceptable) and all vertical seams to be full strength 100% penetration square groove weld in accordance with AISC and/or AWS specifications and codes. Inner and outer walls to be connected by "J" clips, which shall allow for unobstructed thermal expansion of inner and outer walls.

4. Insulating barrier to consist of two (2) inches of six (6) pounds per cubic foot density insulation secured to the inner shell with steel straps.

5. Inner shell to be sealed by use of 304 stainless steel bands and high-temperature sealant. The outer shell to be joined together with sealant and one piece 304 stainless steel draw bands. Joint sealant to be supplied by the manufacturer for the anticipated temperature range.

6. System to be complete with elbows, tees, laterals, tapered increasers/reducers, thimbles, support plates, expansion sections, flange adapters, boiler kits, and all necessary hangers, guying and supports. Final system design/layout to be by breeching manufacturer. Submit shop drawings.

7. System to be warranted against defects in materials and workmanship for a period of twelve (12) years from date of original installation.

8. System shall be as manufactured by Schebler, Selkirk Metalbestos, Ampco, Metal-Fab, or approved equal providing they meet the specified requirements.

2.8 BOILER CONTROL PANEL

A. Boiler control panel shall be capable of operating one hot water boiler in addition to the requirements listed on Drawings H0.00, H2.0A, H2.0B, and H2.0C. The controller shall be provided with all necessary sensors and accessories for a fully operational system.

B. Panel shall be capable of communicating with existing building automation system (where applicable, refer to drawings H2.0A, H2.0B, and H2.0C) and provided with Bacnet interface.

C. Panel shall be as manufacturered by Weil Mclain, Heat Timer, Tekmar, or approved equal.

2.9 AUTOMATIC TEMPERATURE CONTROLS

A. Manufacturers:

1. Automatic Temperature Controls shall be provided by Automated Logic Corporation of Keenesaw, GA. for the standardization of the Town of Longmeadow facilities.

B. In accordance with Massachusetts General Laws, Chapter 30, Section 39M Paragraph (b), the Owner, in the public interest, has stated in writing in the public records that the Automatic Temperature Controls will be solely allowed under this contract, as manufactured by Automated Logic Corporation of Keenesaw, GA. Bidders may contact the Owner to obtain a copy of the written decision.

C. Furnish an install all control components for stand-alone operation and to interface with existing automatic temperature controls. This system of automatic temperature control shall be complete in all respects including all labor, materials, equipment, and services necessary and shall be installed by personel employed by the ATC Contractor.

1. Automated temperature control system using field programmable micro-processor based units (Stand Alone Digital Controllers or SDC's, Application Specific Controllers or ASC's).

2. All control equipment to be full proportioning, and the latest state of the art in manufacture and design.

3. The controls systems to be installed by competent controls 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.

4. Contractor shall have a large support, technical, and engineering staff on call 24 hours a day, located within 50 miles of the Town of Longmeadow. 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 operation straining.

D. Scope of work:

1. The control system provided to consist of all microprocessors, software, transformers, transducers, relays, 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.

2. ATC contractor to meet with the boiler controls manufacturer to coordinate the required controls signals, status signals (for the graphics), and alarms for the boiler system.

3. Alarms, where applicable, and all interlocking wiring required to be provided by the ATC contractor.

4. The ATC contractor to review and study all HVAC and Electrical drawings and entire specification to familiarize themselves with the equipment and system operation and to verify the quantities and types of components they have to provide.

5. All interlocking wiring and installation of all required control devices associated with boilers 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 specification and shown on drawing H-2.0.

6. The ATC Contractor shall hire licensed electricians and shall provide all required interlock wiring and wiring of all control devices including sensors, control valves and damper actuators, control panels, etc.) Scope of wiring includes the provision of additional required power wiring beyond what is shown on the electrical drawings. Any additional wiring required from electric panels shall be coordinated with the Division 16 electrical Contractor and paid for by the BAS Contractor. All wiring shall comply with the requirements of the electrical section of these specifications.

E. 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 contractor and without limiting the generality thereof, the work they are to perform for the ATC contractor to include the following:

        1) Install sensor wells and other similar equipment that are specified to be supplied by the ATC contractor
        2) Furnish and install all necessary valved pressure taps, water, drain, and overflow connection and piping.
        3) Provide, on all magnetic starters furnished, all necessary auxiliary contacts, with buttons and switched in required configurations.
        4) Provide access doors or other approved means of access through ceilings and walls for service to control equipment.

F. Electric Wiring:

1. All electric wiring, wiring connections and all interlocking required for the installation of the temperature control system, as herein specified and as shown on drawing H-2.0, to be provided by the ATC contractor, unless specifically shown on the Electrical drawings or called for in the Electrical Specifications, Division 16. 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.

G. Submittal Brochure:

1. In addition to the requirements of Division 1, the following to be submitted for Approval:
   a. Control drawings with detailed piping and wiring diagrams, including bill of material and 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 systems.
   b. Data sheets for all control system components.

H. 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 in addition to, and not in lieu of, other liabilities which the Contractor many have by law or other provisions of the Contract Documents.

I. Instruction and Adjustment;

1. Upon completion of the project, the ATC contractor is to:
   a. Fine-tune and "de-bug" 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, etc., provided under this Section.
   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 the following:
      1) Include 4 hours of hands-on training (combined, all 3 facilities included in this Project) 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 will give the Owner's representative a working proficiency in day-to-day operational requirements (i.e., system monitoring, alarm acknowledgement, 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.

J. DDC Sensors and Point Hardware

1. Temperature Sensors

a. All temperature devices shall use precision thermistors or RTDs accurate to +/- 1 degree F over a range of –30 to 230 degrees F. Space temperature sensors shall be accurate to +/- 0.5 degrees F over a range of 40 to 100 degrees F. Outdoor air temperature sensors shall be accurate to +/- 0.7 degrees F over a range of -20 to 120 degrees F.

b. Where manual overrides are required in the sequences for off-hours occupancy, space temperature sensor housings shall feature both an optional means for adjusting the space temperature set point, as well as a push button for selecting after hours operation.

c. Immersion sensors employed for measurement of temperature in all chilled, condenser, glycol and hot water applications as well as steam and refrigerant applications shall incorporate a precision thermistor or RTD type sensor. “Smart” sensors (where called for) shall be RTD type and include either an LED or LCD display. Chilled water sensors shall be accurate to +/- 0.5 degrees F over their normal operating temperature range +/- a 20-degree margin. Condenser and hot water sensors shall be accurate to +/- 0.5 degrees F over their normal operating temperature range +/- a 20-degree margin. Example, for a hot water system that normally varies between 90 and 200 degrees F, the sensor shall have the stated accuracy over a range of 70 to 220 degrees F. Thermal wells shall be brass or stainless steel for non-corrosive fluids below 250 degrees F and 300 series stainless steel for all other applications.

d. Where BTU measurement is called for, the associated temperature sensors shall be matched and calibrated so they differ by no more than 0.2°F.

e. Outside Air Temperature Sensors: Utilize precision thermistor or RTD-type units. Sensors shall be designed to withstand the environmental conditions to which they will be exposed. Sensor enclosure shall allow for adequate air flow over the sensing element. Housing shall be NEMA-3R construction as a minimum.

2. Pressure Sensors

a. Differential pressure measurements of liquids or steam shall be accurate to +/- 0.5% of range. Housings shall be NEMA 4 rated.

b. Provide wind baffles for outdoor pressure sensor locations and indoor locations where there can be turbulence.

3. Current Devices: Current devices shall be used to monitor fans, pumps, motors and electrical loads. Current devices shall be available in solid and split core models, and offer either a digital (switch for on-off status of constant speed equipment) or an analog (sensor for status of VFD driven equipment) signal to the automation system. Current switches shall be capable of differentiating between free-wheeling (belt breakage) and normal motor load. Acceptable manufacturers are Veris, Siemens, or approved equal.

4. Water System Flow Sensors

a. Provide where indicated insertion dual turbine flowmeters for measurement of liquid flows in pipe sizes above 2 inches. Below 2 ½” pipe, provide in-line type flow meters with isolation valves and manual bypass.

b. Install the insertion flow meters on isolation valves to permit removal without process shutdown.
c. Sensors shall be capable of reading velocities between 0.17 and 20 fps with +/- 2% accuracy above 0.4 fps, have local readout, and 4 to 20 mA or 0-10 volt output to the control system. Sensors shall be as manufactured by ONICON or approved equal.
d. Contractor shall ensure proper straight lengths of upstream (minimum 10 pipe diameters) and downstream (minimum 5 pipe diameters) pipe per manufacturer's recommendations for the location chosen.

K. Contractor Responsibilities

1. General: Installation of the building automation system shall be performed by this Contractor or his Subcontractor(s). However, all installation shall be under the personal supervision of the Contractor. The Contractor shall certify all work as proper and complete. Under no circumstances shall the design, scheduling, coordination, programming, training, and warranty requirements for the project be delegated to a Subcontractor.
2. Access to Site: Unless notified otherwise, entrance to building is restricted. No one will be permitted to enter the building unless their names have been cleared with the Owner or the Owner's Representative.
3. Code Compliance: All wiring shall be installed in accordance with the more stringent of all applicable electrical codes, equipment manufacturer's recommendations, and wiring specifications in Division 26.
4. Cleanup: At the completion of the work, all equipment pertinent to this contract shall be checked and thoroughly cleaned, and all other areas shall be cleaned around equipment provided under this contract. Clean the exposed surfaces of tubing, hangers, and other exposed metal of grease, plaster, or other foreign materials.

L. Wiring, Conduit and Cable

1. All wire will be copper and meet the minimum wire size and insulation class listed below:

Wire Class	Wire Size	Isolation Class
Power	12 Gauge	600 Volt
Class One	14 Gauge Std.	600 Volt
Class Two	18 Gauge Std.	300 Volt
Class Three	18 Gauge Std.	300 volt
Communications	Per Mfr.	Per Mfr.

2. Class Two and Three wiring and communications wiring may be run in the same conduit.
3. Where different wiring classes terminate within the same enclosure, maintain clearances and install barriers per the National Electric Code.
4. Where wiring is required to be installed in conduit, galvanized EMT shall be used indoors unless indicated otherwise on the Drawings or as required by Division 26 specifications. Conduit shall be minimum 1/2 inch. Set screw fittings are acceptable for dry interior locations. EMT with compression fittings shall be used for interior damp locations. All exterior conduit shall be GRSC with threaded fittings. Provide conduit seal-off fitting where exterior conduits enter the building or between areas of high temperature/moisture differential.

5. Flexible metallic conduit (max. 3 feet) shall be used for connections to motors, actuators, controllers, and sensors mounted on vibration producing equipment. Liquid-tight flexible conduit shall be use in exterior locations and interior locations subject to moisture.
6. Junction boxes shall be provided at all cable splices, equipment termination, and transitions from EMT to flexible conduit. Interior dry location J-boxes shall be galvanized pressed steel, nominal four-inch square with blank cover. Exterior and damp location JH-boxes shall be cast alloy FS boxes with threaded hubs and gasketed covers.
7. Where the space above the ceiling is a supply or return air plenum, the wiring shall be plenum rated. Teflon wiring can be run without conduit above suspended ceilings. EXCEPTION: Any wire run in suspended ceilings that is used to control outside air dampers or to connect the system to the fire management or smoke control systems shall be in conduit.
8. Coaxial cable shall conform to RG62 or RG59 rating. Provide plenum rated coaxial cable when running in return air plenums.
9. Ethernet 10/100 Base –T network wiring shall be equivalent to Owner's premise wiring or, as a minimum, Category 5e or 6 cabling up to 300' maximum run.
10. Fiber optic cable shall be used for runs over 300' and shall be the following size: 50/125.
11. Only glass fiber is acceptable, no plastic.
12. Fiber optic cable shall only be installed and terminated by an experienced Contractor. The BAS Contractor shall submit to the Engineer the name of the intended Contractor of the fiber optic cable with his submittal documents. Provide all fiber optic transceivers for all fiber cabling runs. Provide all power required at each fiber optic transceiver.
13. Provide all networking electronics required for separate IP based BAS system network.

M. Hardware Installation

1. Installation Practices for Wiring

    a. All controllers are to be mounted vertically and per the manufacturer's installation documentation.
    b. The 120VAC power wiring to each Ethernet or Webserver controller shall be a dedicated run, with a separate breaker. Each run shall include a separate hot, neutral and ground wire. The ground wire shall terminate at the breaker panel ground. This circuit shall not feed any other circuit or device.
    c. A true earth ground must be available in the building. Do not use a corroded or galvanized pipe, or structural steel.
    d. Wires shall be attached to the building proper at regular intervals such that wiring does not droop. Wires shall not to be affixed to or supported by pipes, conduit, ducts, etc.
    e. Conduit in finished areas, shall be concealed in ceiling cavity spaces, plenums, furred spaces and wall construction. Exception; metallic surface raceway may be used in finished areas on masonry walls. All surface raceway in finished areas must be color matched to the existing finish within the limitations of standard manufactured colors.
    f. Conduit, in non-finished areas where possible, shall be concealed in ceiling cavity spaces, plenums, furred spaces, and wall construction. Exposed conduit will run parallel to or at right angles to the building structure.

g. Wires shall be kept a minimum of three (3) inches from all piping.
h. Where sensor wires leave the conduit system, they are to be protected by a plastic insert.
i. Wire shall not be allowed to run across telephone equipment areas.

2. Installation Practices for Field Devices

a. Well-mounted sensors shall include thermal conducting compound within the well to insure good heat transfer to the sensor.
b. Actuators shall be firmly mounted to give positive movement and linkage shall be adjusted to give smooth continuous movement throughout 100 percent of the stroke.
c. Relay outputs shall include transient suppression across all coils. Suppression devices shall limit transients to 150% of the rated coil voltage.
d. Water line mounted sensors shall be removable without shutting down the system in which they are installed.

3. Enclosures

a. For all I/O requiring field interface devices, these devices where practical shall be mounted in field interface panels (FIP). The Contractor shall provide an enclosure, which protects the device(s) from dust, moisture, conceals integral wiring and moving parts.
b. FIPs shall contain power supplies for sensors, interface relays and contactors, and safety circuits.
c. FIP enclosures shall be of steel construction with baked enamel finish, NEMA 1 rated with hinged doors and keyed locks. The enclosures shall be sized for twenty percent spare mounting space. All locks will be keyed identically.
d. All wiring to and from the FIP shall be to labeled screw type terminals. Analog or communications wiring may use the FIP as a raceway without terminating. The use of wire nuts within the FIP is prohibited.
e. All outside mounted enclosures shall meet the NEMA-4 rating.
f. The wiring within all enclosures shall be run in plastic track. Wiring within controllers shall be wrapped and secured.

4. Identification

a. Identify all control wires with labeling tape or sleeves using words, letters, and/or numbers that can be exactly cross-referenced with as-built drawings.
b. All I/O field devices inside field interface panels (FIP) shall be clearly labeled.
c. Junction box covers shall be marked to indicate that they are a part of the BAS system.
d. All enclosures (including controllers), all I/O field devices (except space sensors), all control valves and actuators, all routers and other field devices that are not mounted within FIP's shall be identified as follows:

1) Identification shall be with bakelite nameplates. The lettering shall be in white against a black or blue background, be keyed to the as built drawings, and indicate that the device is a control device.

5. Location

a. The location of sensors shall be per mechanical and architectural drawings. Coordinate with installing Contractor to provide appropriate

straight upstream and/or downstream runs for accurate readings of mixed temperatures or flows.

b. Space humidity, carbon dioxide or temperature sensors shall be mounted away from machinery generating heat, direct light and diffuser air streams.

c. Outdoor air temperature sensors shall be mounted on the north building face directly in the outside air. Install outdoor temperature and humidity sensors with solar radiation/precipitation shields to minimize the effects of heat radiated from the building or sunlight and from rain.

d. Field enclosures shall be located immediately adjacent to the controller panel(s) to which it is being interfaced.

e. Control panels used for smoke control shall be located in building life safety electric rooms, coordinate exact locations with the electrical Contractor.

N. System Startup and Acceptance Testing

1. Cooperate and coordinate with all trade Contractors in the start-up of all BAS controlled and monitored equipment installed under this project.

2. Point to Point Checkout: Each I/O device (both field mounted and located in field interface panels and firefighters override panels (FOP)) shall be inspected and verified for proper installation and functionality (such as fan status and valve positioning). A pre-functional performance test checkout sheet itemizing each device shall be filled out, dated and approved by the Project Manager and submitted (with copy to the Owner's Representative).

3. Controller and Webserver Checkout: A field checkout of all controllers and the Webserver, modem, etc. shall be conducted to verify proper operation of both hardware and software. A pre-functional performance test checkout sheet itemizing each device and a description of the associated tests shall be prepared and submitted (with copy to the Owner's Representative) before the completion of the project.

4. System Acceptance Testing

a. All application software shall be verified and compared against the specified sequences of operation in both normal and failure modes. Control loops shall be exercised by inducing a set point shift of at least 10% and observing whether the system successfully returns the process variable to set point. Record all test results and attach to the Functional Performance Test Results Sheets and submit (with copy to Owner's Representative).

b. Test each alarm in the system and validate that the system generates the appropriate alarm message, that the message appears at all prescribed destinations [existing operator's workstation,] Webserver, Webserver users, or printers, and that any other related actions occur as defined (i.e. graphic panels are invoked, reports are generated, etc.). Submit Functional Performance Test Results Sheets (with copy to the Owner's Representative).

c. Perform an operational test of each unique graphic display and report to verify that the item exists, that the appearance and content are correct, that the control systems readings (flows, temperatures, etc,) match field readings, and that any special features work as intended. Submit Functional Performance Test Results Sheets (with copy to the Owner's Representative).

d. Perform an operational test of each third party interface that has been included as part of the automation system. Verify that all points are

properly polled, that alarms have been configured, and that any associated graphics and reports have been completed. If the interface involves a file transfer over Ethernet, test any logic that controls the transmission of the file, and verify the content of the specified information. Submit Functional Performance Test Results Sheets (with copy to the Owner's Representative).

e. Perform an operational test of the Webserver by testing all graphics and systems (including alarm acknowledgement) from remote locations. Submit Functional Performance Test Results Sheets (with copy to the Owner's Representative).

f. After the above tests have been completed and the system has demonstrated to function as specified, a 30-day performance test period shall begin. If all systems perform as specified throughout the test period, requiring only routine maintenance, submit Functional Performance Test Results Sheets for each system (with copy to the Owner's Representative) and the BAS system shall be accepted. If any system fails during the test, and cannot be fully corrected within 8-hours, the Owner may request that the performance test be repeated and delay acceptance until all systems pass.

O. Sequences of Operation: Sequences of operation shall be as noted on Drawing H-2.0. If any items are not shown, include BAS manufacturer's best standard sequences.

P. Final Documentation: Upon completion of work and prior to request for Certificate of Occupancy, Contractor shall issue a certificate stating that work has been installed generally consistent with construction documents and tested per the specifications. All submittals, test reports, as-builts and O&M manuals are to be provided for engineer's review, prior to request for engineer's completion certificates. In addition, and also prior to request for completion certificates, all punch list items must be completed to the satisfaction of the engineer. The Contractor must verify that all sequences of operations and controls have been incorporated and all systems and equipment are working per the sequences of operations. A blank Contractor's certificate form can be furnished by NV5 upon request.

2.10 CLOSED LOOP HEATING AND COOLING WATER TREATMENT SYSTEM (HVAC ALTERNATE #1)

A. The Contractor shall furnish and install a full slipstream filtration device that incorporates a shot feeder, magnetic filter and cartridge filter all in one device as shown and detailed on the contract documents. Product shall be as manufactured by Skidmore. Alternate manufacturers shall be acceptable provided they meet the intent and function of the specification section. Multiple components to accomplish the above functions shall be acceptable if all functions listed above cannot be provided by alternate manufacturer. Alternate manufacturers shall be Grunfos, BoilerMag, Fernox, or approved equal.

B. Product Description:
The product shall be all stainless steel construction including all valves and fittings. Maximum working pressure shall be 150psi with flow rates up to 6.3 Gal/min with a temperature range of 32 to 200F. Dosing capacity shall be a minimum of 1.18 Gallons and Cartridge Filtration range to be no less than 100 to 0.5µ. Magnetic filtration shall consist of no less than four (4) rare earth magnets designed for easy removal and cleaning. Unit to include an automatic air vent. Total system volume capacity shall be no more than 9,130 Gallons. The product must

be provided with ½" isolation and drain valves and an insulation jacket. The product must be provided with self-supporting wall-mounting brackets.

C. Spare Parts
The product shall be furnished with a quantity of one (1), 100µ, start-up filter and (2) 50µ spare filters to replace start up filter once initial start-up has been completed.

2.11 WATER TREATMENT SYSTEMS AND EQUIPMENT

A. General

1. Supervise the cleaning and flushing out of all systems.

   a. After completing the installation or modification of each system, it shall be properly flushed out prior to start up. Flush out chemicals and procedures shall be furnished by the Water Treatment Subcontractor. Passivation shall be done as recommended by water treatment Subcontractor for the piping and equipment or as required by Boiler Manufacturers.
   b. Systems shall then be refilled as specified and treated chemically in accordance with recommendation of the Water Treatment Subcontractor. HVAC contractor shall notify the Water Treatment Subcontractor at least 48 hours in advance of initial system fill.
   c. Tests shall be made following the flush out and refilling procedure and a written report submitted to the Engineer and Owner stating that the flushing out has been completed satisfactorily.

B. Qualifications of the Water Treatment Subcontractor:

1. The Water Treatment Subcontractor shall have a minimum of five years' experience in the water treatment business, have laboratory facilities and staff capable of performing all necessary analyses relating to this job. All treatment programs shall be performed under the direction of a graduate chemist or licensed professional engineer.

C. Prior to the initial filling of the piping system, the pipes shall be thoroughly flushed and cleaned with non-toxic, environmentally friendly cleaners and charged with the required quantity of the most appropriate non-toxic, environmentally friendly corrosion inhibitors that will best protect the piping and system components. Chemicals shall be by Dearborn, Dow, Barclay, Nalco, or equal.

D. Chemicals: Water to be used in each system shall be treated to maintain the conditions recommended by this specification as well as the recommendations from the manufacturers of the heating, cooling, condenser, and evaporator coils. Chemicals shall meet all required federal, state, and local environmental regulations for the treatment of evaporator coils and direct discharge to the sanitary sewer.

1. Cleaning of piping system: Immediately after hydrostatic testing of piping is completed, systems shall be cleaned, drained, and flushed with clean water. Any chemical additives used in this process shall be thoroughly flushed from the piping system. If the system is not immediately (within 4 days) put into operation after cleaning and flushing, the system shall be drained of any stagnant water left over from testing or flushing.

PART 3 - EXECUTION

3.0 DEMOLITION

A. The existing facility will continue to operate during all phases of the demolition work and subsequent construction. No interruption of the systems will be permitted without prior approval of the Owner's Representative. Work at the school is to be performed only during the hours indicated in the drawing package. Provisions are to be made to ensure remaining boiler and chilled water system are to remain in operation throughout construction during occupied hours.

B. Submit proposed methods and sequence of operations for the selective demolition work to the Owner's Representative for review prior to the start of the work.

C. Perform all demolition while ensuring minimum interference with adjacent occupied areas.

D. Where sections of a system are to be removed and the system serves other areas of the building that are outside the 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.

E. 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.

F. Promptly repair any damage caused to adjacent facilities or areas that are designated to remain at no additional cost to the Owner.

G. Equipment:

1. Coordinate with the Contractor and Subcontractors to provide disconnection prior to equipment removal.
2. Remove 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 has requested that the contractor to provide the boilers removed from School to be salvaged for parts. If the Owner chooses not to take possession of the equipment, the Subcontractor shall remove the equipment and dispose of the equipment in accordance with Paragraph H specified below.
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. 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.

H. All equipment, etc., not turned over to the Owner shall be put into the General Contractor's dumpsters; become the property of the General Contractor, and shall be removed from the site by the General Contractor. For equipment containing any refrigerant, it shall be reclaimed for recycling. Any hazardous materials such as mercury from thermometers or thermostats; ethylene glycol; or lead shall be properly disposed of, following EPA guidelines.

3.1 GENERAL

A. Install all items specified under PART 2 - PRODUCTS, according to the manufacturer's requirements and best quality recommendations, shop drawings, the details as shown on the Drawings and as specified in this specification section.

B. Install all work so that parts requiring inspection, replacements, maintenance and repair shall be readily accessible. Minor deviations from the Drawings may be made to accomplish this, but any substantial change shall not be made without prior written approval from the Owner.

C. Equipment bases mounted on concrete slabs and pads, or mounted on stands, gratings, platforms, or other, shall not be set in any manner, except on the finished and permanent support.

D. Support of equipment on studs or other means, and the placing or building of the supporting slab, pad, pier, stand, grating, or other "to the equipment", is prohibited.

E. Concrete supporting structures shall have been constructed and cured a minimum of 14 days before equipment is mounted.

F. All welding done under this section shall be performed by experienced welders in a neat and workmanlike manner. All welding done on piping, pressure vessels and structural steel under this Section shall be performed only by persons who are currently qualified in accordance with ANSI Code B31.9 and B31.1 for Pressure Piping and certified by the AWS, ASME or an approved independent testing laboratory, and each such welder shall present certificate attesting his/her qualifications to the Owner's representative whenever requested to do so on the job.

G. All pipe welding shall be oxyacetylene or electric arc. High test welding rods suitable for the material to be welded shall be used throughout. All special fittings shall be carefully laid out and joints shall accurately match intersections. Care shall be exercised to prevent the occurrence of protruded weld metal into the pipe. All welds shall be of sound metal free from laps, cold shots, gas pockets, oxide inclusions and similar defects.

H. All necessary precautions shall be taken to prevent fire or damage occurring as the result of welding operations.

I. Care shall be taken when working on the roof. Protect the roof from damage.

3.2 IDENTIFICATION

A. General

1. All piping, ductwork, equipment, panels, and valves furnished and/or installed under this Section of the Specifications shall be marked for ease of identification.

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

B. Equipment Identification (by Unit Manufacturer)

1. Equipment marking shall be prominently located and securely attached with screws or rivets (no adhesives or cements are permitted) on the normally visible side of the equipment.

2. Equipment identification designations shall be taken from equipment callouts as shown on drawings and coordinated with the Owner's facility group to assure designations match up with Owner's maintenance management system identification database.

3. Provide on the label (or on a prominently located second label) all required routine maintenance action (per manufacturer). Label may be limited to identifying, by title or publication number, the operation and maintenance manual for that particular model and type of product.

3.3 PIPING

A. General

1. Piping shall be cut accurately to measurements established at the jobsite, shall be installed without cold springing, and shall properly clear windows, doors and other openings and electrical gear. Cutting or other weakening of the building structure to facilitate piping installation will not be permitted. Piping shall be free of burrs, oil, grease, and other foreign matter. Piping shall be installed to permit free expansion and contraction without damaging building structure, pipe, joints, or hangers. Changes in direction shall be made with fittings. Vent pipes shall be carried through the roof and shall be properly flashed.

2. If the pipe turns from vertical to horizontal, the sealant strip shall be run to a point just beyond the first elbow. When penetrating waterproofing membrane for floors, the metal jacket shall extend from a point below the backup material to a minimum distance of 2 inches above the flashing. For other areas, the metal jacket shall extend from a point below the backup material to a point 12 inches above floor; or when passing through walls above grade, jacket shall extend at least 4 inches beyond each side of the wall.

B. Water Piping:

1. Unless otherwise indicated, horizontal water piping shall pitch down in the direction of flow with a grade of not less than 1 inch in 40 feet and condensate drain piping shall pitch down in direction of flow with a grade of not less than 1 inch in 10 feet. Unless otherwise detailed, horizontal reducers shall be the eccentric type, flat on bottom (FOB), to allow for complete drainage. Open ends of pipelines and equipment shall be properly capped or plugged during installation to keep dirt or

other foreign materials out of the systems. Pipe not otherwise specified shall be uncoated.

2. Unless otherwise allowed in Part 2 Piping and Fittings, or shown on the drawings, connections to equipment shall be made with malleable-iron unions or flanges for steel pipe 2 inches or less in diameter and with flanges or grooved joint couplings for pipe 2-1/2 inches or more in diameter. Unions for copper pipe or tubing shall be brass or bronze. Connections between ferrous piping and copper piping shall be electrically isolated from each other with dielectric waterway as specified in the Part 2 Piping and Fittings section of this specification. Where the temperature or pressure of the system is beyond the waterway limits, dielectric couplings or other approved methods shall be used. Reducing fittings shall be used for changes in pipe sizes.

3. Pipe joints between sections of pipe shall be as listed in the Part 2 Piping and Fittings section in the Schedules for Piping and Fittings tables. Exceptions are pipe and fittings installed in inaccessible conduits or trenches beneath concrete floor slabs or in difficult to access locations such as shafts which shall be welded, soldered or brazed. Some joint types or materials listed may have lower pressure and/or temperature limits and Contractor shall ensure they are only used where those limits will NOT be exceeded.

4. Welded joints shall be fusion welded in accordance with ASME B31.1 for all water piping over 160 psig and any other piping where B31.1 is required. All other piping shall be welded in accordance with ASME B31.9 unless otherwise stated. Changes in direction of piping shall be made with welding fittings only; mitering or notching pipe to form elbows and tees or other similar type construction will not be acceptable. Branch connections may be made with either welding tees or forged branch outlet fittings, either being acceptable without size limitation. Branch outlet fittings, where used, shall be forged, flared for improvement flow where attached to the run, reinforced against external strains, and designed to withstand full pipe bursting strength.

    a. Beveling: Field and shop bevels shall be in accordance with the recognized standards and shall be done by mechanical means or flame cutting. Where beveling is done by flame cutting, surfaces shall be cleaned of scale and oxidation before welding.

    b. Alignment: Before welding, the component parts to be welded shall be aligned so that no strain is placed on the weld when finally positioned. Height shall be so aligned that no part of the pipe wall is offset by more than 20 percent of the wall thickness. Flanges and branches shall be set true. This alignment shall be preserved during the welding operation. If tack welds are used, welds shall be of the same quality and made by the same procedure as the completed weld; otherwise, tack welds shall be removed during the final welding operation.

    c. Erection: Where the temperature of the component parts being welded reaches 32 degrees F or lower, the material shall be heated to within 100 degrees F of the system’s maximum design temperature for a distance of 3 feet on each side of the weld before welding, and the weld shall be finished before the materials cool to within 200 degrees F of the maximum design temperature.

d. Defective Welding: Defective welds shall be removed and replaced. Repairing of defective welds shall be in accordance with the applicable standard: ASME B31.9 or B31.1.

e. Electrodes: After filler metal has been removed from its original package it shall be protected or stored so that its characteristics or welding properties are not affected. Electrode material shall be as required for the pipe material. Electrodes that have been wetted or that have lost any of their coating shall not be used.

5. Flanges and unions shall be faced true, and made square and tight. Gaskets shall be non-asbestos compressed material in accordance with ASME B16.21, 1/16 inch thickness, full-face or self-centering flat ring type. The Gaskets shall contain aramid fibers bonded with styrene butadiene rubber (SBR) or nitrile butadiene rubber (NBR). NBR binder shall be used for hydrocarbon service. Union or flange joints shall be provided in each line immediately preceding the connection to each piece of equipment or material requiring maintenance such as coils, pumps, control valves, and other similar items.

6. Threaded joints shall be made with tapered threads properly cut and shall be made perfectly tight with Teflon (polytetrafluoroethylene) tape or equal. Teflon tape shall be non-toxic and rated for piping systems with temperatures to at least 450 degree F and pressures to at least 1,000 psig. Tape shall be applied the male threads only, and in no case to the fittings.

7. Malleable iron pipe press fittings equal to IMS Fastlock may be used (where allowed in the Part 2 Piping and Fittings section of these specifications) and shall be installed in accordance with the manufacturer's guidelines and recommendations. Pipe shall be certified for use with the IMS Fastlock system. Pipe shall be square cut, properly deburred, and cleaned. Pipe ends shall be marked at the required location to ensure full insertion into the coupling or fitting during assembly. Use an IMS Fastlock approved tool with the proper sized jaw for pressing. Prior to putting the system into operation, Contractor shall perform an air pressure test to provide quick and easy identification of connections which have not been pressed.

8. Grooved joint piping systems may be used (where allowed in the Part 2 Piping and Fittings section of these specifications) and shall be installed in accordance with the manufacturer's guidelines and recommendations. All grooved couplings, fittings, valves and specialties shall be supplied by a single manufacturer. The gasket style and elastomeric material (grade) verified as suitable for the intended service as specified. Gaskets shall be supplied by the grooved coupling manufacturer. Grooved ends shall be clean and free from indentations, projections and roll marks in the area from pipe end to groove. Provide all additional hangers required by the system (at least one hanger per flex coupling) where expansion joints are used. A factory trained field representative (a direct employee) shall provide on-site training to Contractor's field personnel in the installation of grooved piping products. Factory trained representative shall periodically review the product installation. Contractor shall remove and replace any improperly installed products.

9. Soldered and Brazed Joints: Pipe and tubing shall be cut square and burrs shall be removed. Both inside of fittings and outside of tubing shall be cleaned with an abrasive before sweating. Care shall be taken to prevent annealing of fittings and hard drawn tubing when making connection. Changes in direction of piping shall be made with soldered or brazed fittings only. Solder and flux shall be lead free.

Joints for soldered fittings shall be made with silver solder or 95:5 tin-antimony solder, or as specified in the Part 2 Piping specification for the system. Cored solder shall not be used. Joints for brazed fittings shall use brazing alloys with strength equal to B-Ag alloy and have a melting point above 1000 degrees F. Swing joints or offsets shall be provided on all branch connections, mains, and risers to provide for expansion and contraction forces without undue stress to the fittings or to short lengths of pipe or tubing. Care shall be taken to ensure solder is uniformly (360 degrees) drawn into the joint.

10. Viega ProPress press fittings may be used where allowed in the Part 2 Piping and Fittings section of these specifications. Prepare copper tube and install in strict accordance with manufacturer's installation instructions. Pipe ends shall be cleaned, free from indentations, projections, burrs and foreign matter. Use a tube preparation tool as supplied by manufacturer to clean and make installation mark. Push copper tube into fittings to installation depth mark, per manufacturer's installation instructions. Keep fittings free of dirt and oil. Prior to putting the system into operation, Contractor shall verify all connections have been properly pressed.

11. Vic Press 304™ or ProPress stainless steel crimped joints may be used where allowed in the Part 2 Piping and Fittings section of these specifications. Install in strict accordance with manufacturer's installation instructions. Pipe shall be certified for use with the system manufacturer. Pipe shall be square cut, properly deburred, and cleaned. Pipe ends shall be marked at the required location, using a manufacturer-supplied gauge, to ensure full insertion into the coupling or fitting during assembly. Use a system manufacturer's recommended tool with the proper sized jaw for pressing. Prior to putting the system into operation, Contractor shall verify all connections have been properly pressed.

C. Diesel and Fuel Oil Piping

1. Unless otherwise allowed in Part 2 Piping and Fittings, or shown on the drawings, connections to equipment shall be made with malleable-iron unions or flanges for steel pipe 2 inches or less in diameter and with flanges for pipe 2-1/2 inches or more in diameter. Reducing fittings shall be used for changes in pipe sizes. Exceptions are pipe and fittings installed in inaccessible conduits or trenches beneath concrete floor slabs or in difficult to access locations such as shafts which shall be welded. Cast Iron fittings shall NOT be used. Grooved fittings shall NOT be used.

2. All piping for double wall piping systems shall be installed and tested per manufacturer's recommendations.

3. Welded joints shall be welded and tested in accordance with ASME B31.9 unless otherwise stated. Changes in direction of piping shall be made with welding fittings only; mitering or notching pipe to form elbows and tees or other similar type construction will not be acceptable. Branch connections may be made with either welding tees or forged branch outlet fittings, either being acceptable without size limitation. Branch outlet fittings, where used, shall be forged, flared for improvement flow where attached to the run, reinforced against external strains, and designed to withstand full pipe bursting strength.

   a. Beveling: Field and shop bevels shall be in accordance with the recognized standards and shall be done by mechanical means or flame cutting. Where beveling is done by flame cutting, surfaces shall be cleaned of scale and oxidation before welding.

b. Alignment: Before welding, the component parts to be welded shall be aligned so that no strain is placed on the weld when finally positioned. Height shall be so aligned that no part of the pipe wall is offset by more than 20 percent of the wall thickness. Flanges and branches shall be set true. This alignment shall be preserved during the welding operation. If tack welds are used, welds shall be of the same quality and made by the same procedure as the completed weld; otherwise, tack welds shall be removed during the final welding operation.

c. Erection: Where the temperature of the component parts being welded reaches 32 degrees F or lower, the material shall be heated to approximately 100 degrees F for a distance of 3 feet on each side of the weld before welding, and the weld shall be finished before the materials cool to below 50 degrees F.

d. Defective Welding: Defective welds shall be removed and replaced. Repairing of defective welds shall be in accordance with ASME B31.9.

e. Electrodes: After filler metal has been removed from its original package it shall be protected or stored so that its characteristics or welding properties are not affected. Electrode material shall be as required for the pipe material. Electrodes that have been wetted or that have lost any of their coating shall not be used.

4. Flanges and unions shall be faced true, and made square and tight. Gaskets shall be non-asbestos compressed material in accordance with ASME B16.21, 1/16 inch thickness, full-face or self-centering flat ring type. The Gaskets shall be compatible with diesel and fuel oil and shall normally contain aramid fibers bonded with nitrile butadiene rubber (NBR). Union or flange joints shall be provided in each line immediately preceding the connection to each piece of equipment or material requiring maintenance such as pumps, control valves, and other similar items.

5. Threaded joints shall be made with tapered threads properly cut and shall be made perfectly tight with MEGALOC Multi-Purpose Thread Sealant or equal. Sealant shall be non-toxic, non-hazardous, and non-flammable. It shall not contain any lead, heavy metals, or volatile solvents. Sealant shall be applied the male threads only, and in no case to the fittings.

6. All piping shall be inspected for leaks with non-visible piping pressure tested in accordance with NFPA 31.

3.4 CONNECTIONS TO EQUIPMENT

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

3.5 SUPPORTS

A. Hangers used to support piping 2 inches and larger shall be fabricated to permit adequate adjustment after erection while supporting the load. Pipe guides and anchors shall be

installed to keep pipes in accurate alignment, to direct the expansion movement, and to prevent buckling, swaying, and undue strain. All piping subjected to vertical movement when operating temperatures exceed ambient temperatures, shall be supported by variable spring hangers and supports or by constant support hangers.

B. Piping and attached valves shall be supported and braced to resist seismic loads as specified under the SEISMIC PROTECTION FOR MECHANICAL, ELECTRICAL EQUIPMENT section. Structural steel required for reinforcement to properly support piping, headers, and equipment, but not shown, shall be provided under this section. Material used for supports shall be as specified under the STRUCTURAL STEEL section.

1. Structural steel brackets required to support piping, headers, and equipment, but not shown, shall be provided under this section. Material and installation shall be as specified under the STRUCTURAL STEEL section. Pipe hanger loads suspended from steel joist panel points shall not exceed 50 pounds. Loads exceeding 50 pounds shall be suspended from panel points.

2. Multiple pipe runs on a common base member shall be supported by clamps where each pipe crosses the base support member. Spacing of the base support members shall not exceed the hanger and support spacing required for any individual pipe in the multiple pipe run.

C. Pipe hangers, inserts and supports shall conform to MSS SP-58 and MSS SP-69, except as specified as follows:

1. Types 5, 12, and 26 shall not be used.

2. Type 3 shall not be used on insulated pipe which has a vapor barrier. Type 3 may be used on insulated pipe that does not have a vapor barrier if clamped directly to the pipe and if the clamp bottom does not extend through the insulation and the top clamp attachment does not contact the insulation during pipe movement.

3. Type 18 inserts shall be secured to concrete forms before concrete is placed. Continuous inserts which allow more adjustment may be used if they otherwise meet the requirements for Type 18 inserts.

4. Type 19 and 23 C-clamps shall be torqued per MSS SP-69 and have both locknuts and retaining devices, furnished by the manufacturer. Field-fabricated C-clamp bodies or retaining devices are not acceptable.

5. Type 20 attachments used on angles and channels shall be furnished with an added malleable iron heel plate or adapter.

6. Type 24 may be used only on trapeze hanger systems or on fabricated frames.

7. Where Type 39 saddle or Type 40 shield are permitted for a particular pipe attachment application, the Type 39 saddle shall be used on all pipe 4 inches and larger.

8. Horizontal pipe supports shall be spaced as specified in MSS SP-69 and a support shall be installed not over 1 foot from the pipe fitting joint at each change in direction of the piping. Pipe supports shall be spaced not over 5 feet apart at valves.

9. Vertical pipe shall be supported at each floor, except at slab-on-grade, and at intervals of not more than 15 feet, except that pipe shall be supported not more than 8 feet from end of risers, and at vent terminations.

10. Type 35 guides using steel, reinforced PTFE or graphite slides shall be provided where required to allow longitudinal pipe movement. Lateral restraints shall be provided as required. Slide materials shall be suitable for the system operating temperatures, atmospheric conditions and bearing loads encountered. Where steel slides do not require provision for restraint or lateral movement, an alternate guide method may be used. On piping 4 inches and larger, a Type 39 saddle may be welded to the pipe and freely rest on a steel plate. On piping under 4 inches, a Type 40 protection shield may be attached to the pipe or insulation and freely rest on a steel slide plate. Where there are high system temperatures and welding to piping is not desirable, then the Type 35 guide shall include a pipe cradle, welded to the guide structure and strapped securely to the pipe. The pipe shall be separated from the slide material by at least 4 inches, or by an amount adequate for the insulation, whichever is greater.

11. Except for Type 3, pipe hangers on horizontal insulated pipe shall be the size of the outside diameter of the insulation.

D. Piping in trenches shall be supported as indicated on drawings and as required by the manufacturer.

E. Escutcheons shall be provided at all finished surfaces where exposed piping, bare or covered, passes through floors, walls, or ceilings, except in boiler, utility, or equipment rooms. Escutcheons shall be fastened securely to pipe sleeves or to extensions of sleeves without any part of sleeves being visible. Where sleeves project slightly from floors, special deep-type escutcheons shall be used. Escutcheons shall be chromium-plated iron or chromium-plated brass, either one-piece or split pattern, held in place by internal spring tension or setscrew.

3.6 VALVES AND EQUIPMENT ACCESSORIES

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

B. Gravity flow-control (check) valves to control the flow of water shall be installed where specified or indicated on the drawings. The valve shall operate to prevent reverse flow and so that when the circulating pump starts, the increased pressure within the main will open the valve; when the pump stops, the valve will close. The valve shall be constructed with a cast iron body and shall be provided with a device whereby the valve can be opened manually to allow gravity circulation. The flow-control valve shall be designed for the intended purpose, and shall be installed as recommended by the manufacturer.

C. Relief valves shall be installed where specified or indicated on drawings. Every closed loop piping system shall have system relief valve(s). For glycol systems, discharge shall be piped for gravity flow into a funnel to the glycol fill tank.

D. A thermometer well (or Pete’s plug) shall be provided in each return line for each circuit in multicircuit systems.

E. All branches from main piping (including mains that serve different wings or buildings) shall be provided with isolation valves.

F. Air vents shall be installed where indicated, and on all high points and piping offsets where air can collect or pocket.

1. Water air vents shall be high capacity type, automatic or manual, as specified and shown on drawings. For glycol systems, discharge shall be piped for gravity flow into a funnel to glycol fill tank.

2. Steam air vents shall be a quick-acting thermostatic valve that continuously removes air. Valve shall be constructed of corrosion-resisting metal, and be designed to withstand the maximum piping system pressure, and shall automatically close tight to prevent escape of steam and condensate. Vent shall be provided with a manual isolation valve. A vent shall be provided at all locations shown on drawings.

3.7 GAS OR OIL FIRED HEATING SYSTEMS INSTALLATION

A. Equipment shall be installed as indicated and in accordance with the recommendations of the equipment manufacturer and the listing agency, except as otherwise specified. Combustion air supply, ventilation, piping and pressure testing shall be in accordance with NFPA 31 (Oil) and/or NFPA 54 (Gas) depending upon fuel(s) used.

B. Heaters shall be installed with clearance to combustibles complying with minimum distances as determined by AGAL-01, UL-06 and as indicated on each heater approval and listing plate.

C. Vent dampers, piping and structural penetrations shall be located as indicated. Vent damper installation shall conform to ANSI Z21.66. Vent pipes, where not connected to a masonry chimney conforming to NFPA 211, shall extend through the roof or an outside wall and shall terminate, in compliance with NFPA 54. Vents passing through waterproof membranes shall be provided with the necessary flashings to obtain waterproof installations.

D. Gas piping shall be connected as indicated and shall comply with the applicable requirements at Section 22 00 00 PLUMBING.

E. Warm air heating installations shall conform to the requirements contained in NFPA 90A or NFPA 90B, as applicable.

F. Foundations, settings, or suspensions for mounting equipment and accessories including supports, vibration isolators, stands, guides, anchors, clamps, and brackets shall be provided. Foundations and suspension for equipment shall conform to the recommendations of the manufacturer, unless otherwise indicated on drawings. Suspended equipment shall be independently supported from the building structure and not from suspended ceiling systems. Anchor bolts and sleeves shall be set accurately using properly constructed templates. Anchor bolts, when embedded in concrete, shall be provided with welded-on plates on the head end and guarded against damage until equipment is installed. Equipment bases shall be leveled, using jacks or steel wedges, and when resting on concrete shall be neatly grouted in with a nonshrinking type of grout. Equipment shall be located as indicated and in such a manner that working space is available for all necessary servicing, such as shaft removal, replacing, or adjusting drives,

motors, or shaft seals, air filters, access to automatic controls, and lubrication. Electrical isolation shall be provided between dissimilar metals for the purpose of minimizing galvanic corrosion. The interior of cabinets or casings shall be cleaned before completion of installation.

G. Nonmetallic tubing shall be run within securely covered rigid metallic raceway or electric metallic tubing except as indicated. Single nonmetallic tubing in a protective sheath may be used above accessible ceilings and in other concealed accessible locations. Tubing concealed in walls containing insulation, fill or other packing materials shall be hard-drawn copper tubing or nonmetallic tubing run in conduit. Terminal single lines shall be hard-drawn copper tubing, except if the run is less than 12 inches, flexible polyethylene may be used. Nonmetallic tubing shall not be used for applications where the tubing could be subjected to a temperature exceeding 130 degrees F. Multitube instrument bundle may be used instead of individual tubes where a number of tubes run to the same points. Tubing shall be periodically tested for leaks during installation and all tubing shall be free of installation impurities and moisture before connecting to the control instrument. Tubing shall be number coded or color coded and keyed to the submittal drawings for future identification and servicing the control system.

3.8 HYDROSTATIC TESTS

A. Prior to flushing and cleaning and before the application of any insulation, hydrostatic tests shall be made in accordance with applicable ASME requirements. Coordinate with Owner's Representative for witnessing of tests. Test reports shall be submitted to the Engineer and Owner's Representative The systems shall be proved tight for four (4) hour tests (with no loss in pressure) under gauge pressures of 1-1/2 times the working pressure specified, but not less than the following:

1. Water piping (including pumped steam condensate) 150 psi

B. Retesting: If any deficiencies are revealed during test, such deficiencies shall be corrected and the tests reconducted at no additional costs to the Owner.

3.9 PIPING SYSTEM, CLEANING AND FLUSHING

A. Supply all materials, labor and power required for cleaning and flushing. Cleaning shall be started only after all piping has been successfully hydrostatically tested and all systems have been completely connected up.

B. Piping Cleaning and Flushing

1. Exercise every precaution to avoid introducing foreign matter such as welding beads and slag or dirt into the piping system. All completed welds shall be hammered to loosen debris. All piping, valves and fittings shall be internally cleaned of oil, grease or dirt, prior to assembly into system by use of wire brush and swab.

2. All cleaning and flushing work shall be coordinated with and supervised by the Water Treatment Sub Subcontractor for chemicals and procedures to be followed. See the Water Treatment Section of these Specifications.

3. Following the successful testing of the piping systems, they shall be cleaned under the supervision of the Water Treatment Sub Subcontractor.

4. Before submitting piping systems for acceptance, all strainers shall be inspected and thoroughly cleaned.

5. Cleaning shall be started only after all piping has been hydrostatically tested and all systems have been completely connected up.

6. Operate pumps or provide other means of circulating water throughout system for period of 8 hours. At the end of circulation, remove and clean all strainer baskets and blow off all low points.

3.10 BOILER/BURNER EFFICIENCY AND OPERATING TESTS

A. Upon completion, and before acceptance of the work, each boiler shall be subjected to such operating tests as may be required to demonstrate satisfactory functional operation. Each operating test shall be conducted at such times as the Owner's Representative may direct. Instruments, test equipment, and test personnel required to properly conduct all tests shall be provided by the Contractor and the necessary fuel, water, and electricity will be furnished by the Owner. The boiler operating tests for each modulating or staged boiler shall, as a minimum, be conducted continuously at the following capacities for the following times:

Time	Capacity
First hour	25% (or minimum)
Next hour	50%
Next hour	75%
Next 2 hours	100%

B. The general performance tests on the heating plant shall be conducted by an experienced test engineer and will be observed by the Owner's Representative. A test report including logs, tabulated results, and conclusions shall be submitted to the engineer and the Owner's Representative.

C. Retesting if any deficiencies are revealed during test, such deficiencies shall be corrected and the tests reconducted at no additional costs to the Owner.

3.11 BASES AND SUPPORTS

A. In addition to supports and hangers as mentioned in the MISCELLANEOUS METALS section, provide all bases and supports not part of the building structure, of required size, type, and strength, as approved by the Engineer, for all equipment and materials furnished by him. All equipment, bases and supports shall be adequately anchored to the building structure to prevent shifting of position under operating conditions.

B. All concrete foundations and all concrete supports will be provided by the General Contractor. The HVAC Subcontractor shall furnish shop drawings and templates for all concrete foundations and supports for setting all required hanger and foundation bolts and other appurtenances necessary for the proper installation of his equipment. All concrete work shall be shown in detail on the shop drawings prepared by the HVAC Subcontractor, and be submitted to the Engineer, showing the complete details of all foundations, including the necessary concrete and steel work and vibration isolation devices.

C. All floor-mounted equipment shall be erected on concrete pads over the complete floor area of the equipment, unless specified to the contrary herein.

3.12 MISCELLANEOUS IRON AND STEEL

A. All work shall be cut, assembled, welded and finished by skilled mechanics. Welds shall be ground smooth. Stands, brackets, and framework shall be properly sized and firmly constructed.

B. Measurements shall be taken on the job and worked out to suit adjoining and connecting work. All work shall be by experienced metal working mechanics. Members shall be straight and true and accurately fitted. Scale, rust, and burrs shall be removed. Welded joints shall be ground smooth where exposed. Drilling, cutting and fitting shall be done as required to properly install the work and accommodate the work of other trades as directed by them.

C. Members shall be generally welded, except that bolting may be used for field assembly where welding would be impractical.

D. All shop fabricated iron and steel work shall be cleaned and dried and given a shop coat of paint on all surfaces and in all openings and crevices.

3.13 PLACING IN SERVICE

A. At the completion of performance tests and following approval of test result, recheck all equipment to see that each item is adequately lubricated and functioning correctly.

B. Furnish upon completion of all work, certificates of inspections from the manufacturers stating that authorized factory engineers have inspected and tested the operation of their respective equipment and found same to be in satisfactory operating conditions.

3.14 CLEANING AND ADJUSTING

A. During the progress of the work, clean up and remove all oil, grease, and other debris caused by the work performed under this Section.

B. At the conclusion of the project, clean and repair all areas and finishes as installed or affected by this installation of work under this Section.

C. Pipes shall be cleaned free of scale and thoroughly flushed of all foreign matter. A temporary bypass shall be provided for all water coils to prevent flushing water from passing through coils. Strainers and valves shall be thoroughly cleaned. Prior to testing and balancing, air shall be removed from all water systems by operating the air vents. Temporary measures, such as piping the overflow from vents to a collecting vessel shall be taken to avoid water damage during the venting process. Air vents shall be plugged or capped after the system has been vented.

D. Equipment shall be wiped clean, with all traces of oil, dust, dirt, or paint spots removed. Temporary filters shall be provided for all fans that are operated during construction, and

new filters shall be installed after all construction dirt has been removed from the building. System shall be maintained in this clean condition until final acceptance. Bearings shall be properly lubricated with oil or grease as recommended by the manufacturer. Belts shall be tightened to proper tension. Control valves and other miscellaneous equipment requiring adjustment shall be adjusted to setting indicated or directed. Fans shall be adjusted to the speed indicated by the manufacturer to meet specified conditions.

3.15 OPERATING AND MAINTENANCE INSTRUCTIONS

A. All operating equipment installed under this section shall be placed in operation and shall function continuously in an operating test for a period of one week without shutdown due to mechanical failure or necessity of adjustment. Prior to scheduling the Project Final Inspection and after completion of all installation and running adjustments, the HVAC Subcontractor shall perform all work required to place the equipment in complete operating condition to meet all requirements under this Specification.

B. During this running test period, the HVAC Subcontractor shall deliver to the designated representative of the Owner six complete sets of operating, service and replacement data for all equipment which will require operating maintenance or replacement and one copy of this literature shall be available during the instruction of the operating personnel while the other is checked for completeness by the Engineer.

3.16 TRAINING

A. Conduct a training course for the maintenance and operating staff. The training shall start after the system is functionally complete but before the final acceptance tests. The training shall include all of the items contained in the operating and maintenance instructions as well as demonstrations of routine maintenance operations. The Owner’s Representative shall be given at least two weeks advance notice of such training.

B. During all working hours of the one week operating test, the HVAC Subcontractor's instruction personnel shall be available for and provide thorough and detailed training to the Owner's operating and maintenance personnel in operation, maintenance and adjustment of all equipment installed. The instructions shall be videotaped by the Subcontractor. The master tape and one (1) copy shall be turned over to the Owner not more than 10 days following the completion of the training.

C. Give sufficient notice to the designated operating personnel of the Owner in advance of this period. Upon completion of instruction, obtain from such representatives written verification on that which the above mentioned instruction has been performed, such verification to be forwarded to the owner.

D. Provide instruction time of 8 hours for systems and an additional 8 hours for ATC.

END OF SECTION

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SECTION 26 00 00

ELECTRICAL

(FILED SUB-BID REQUIRED)

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ELECTRICAL

PART 1 - GENERAL

1.0 GENERAL PROVISIONS

A. The GENERAL REQUIREMENTS, DIVISION 01, and BIDDING AND CONTRACT REQUIREMENTS, DIVISION 00, are hereby made a part of this Specification Section.

B. Examine all Drawings and all Sections of the Specifications and requirements and provisions affecting the work of this Section.

1.1 SCOPE OF WORK

A. This project consists of the replacement of one (1) of the two (2) cast iron boilers located at the Blueberry Hill Elementary School in Longmeadow, MA. Scope of work shall include demolition of existing boiler (and associated branch circuitry), demolition of existing oil transfer pump skid and boiler oil feed pump (and associated branch circuitry), providing new branch circuitry for replacement boiler, and a new independent control contactor interlocked to relocated firestat. Existing Electrical, Heating, Cooling, and Domestic Hot Water Systems are to remain in operation during construction while the building is occupied.

B. Contractor to coordinate work hours with building owner. Refer to general notes on drawings for acceptable work hours.

C. The building is to be commissioned and Contractor shall provide all labor required to fully test and demonstrate that all systems operate as designed.

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

1. Identification
2. Raceways and Conduit
3. Wire and Cable (600V)
4. Wiring Devices and Plates
5. Outlet Boxes
6. Junction Boxes, Pull Boxes and Wireways
7. Safety Disconnect Switches
8. Fire Seal and Fireproof Sealant
9. Supervision and Approval
10. Electrical Connections to HVAC and Plumbing Equipment, and other Equipment provided under other Sections or by Owner.
11. Relocation of existing electrical components that interfere with new construction and removal and disposal of obsolete components.

12. Testing
13. Coordination drawings
14. Shop drawings
15. Record (as-built) drawings

E. Work of this Section is generally shown on the Electrical Drawings.

1.2 RELATED WORK

A. Principal classes of Work related to the Work of this Section are listed in the Specification Table of Contents, and are specified to be performed under the indicated Sections of the Specifications. Refer to the indicated Sections for description of the extent and nature of the indicated Work, and for coordination with related trades. This listing may not include all related Work items. It is the responsibility of the Contractor to coordinate and schedule the Work of this Section with that of all other trades.

B. The following work is not included in this section and will be provided under other sections:

1. Furnishing and installation of motors.
2. Structural supports necessary to distribute loading from equipment to roof or floor except as specified.
3. Temporary light, power, water, heat, gas and sanitary facilities for use during construction and testing. Refer to Division 01, General Conditions.
4. Automatic Temperature Control and Direct Digital Communication wiring except as noted on Drawings.
5. Painting, except as specified herein.

1.3 DEFINITIONS

A. As used in this Section, the following items are understood to have the following meaning:

1. "**Contractor or Subcontractor** ", unless otherwise qualified, shall mean the installer of the work specified under this Section.
2. **"Furnish"** shall mean purchase and deliver to the project site, complete with every necessary appurtenance.
3. **"Install"** shall mean unload at the delivery point at the site and perform all work necessary to establish secure mounting and proper operation at the proper location in the project.
4. **"Provide"** shall mean "Furnish" and "Install".
5. **"Work"** shall mean all labor, materials, equipment, apparatus, controls, accessories and all other items required for a proper and complete installation.
6. **"Concealed"** shall mean hidden from sight in chases, furred-in spaces, shafts, hung ceilings, embedded in construction or in a crawl space. Areas to be concealed as part of tenant alterations to the building shall also be considered in this definition.

7. **“Exposed”** shall mean not installed underground or concealed as defined above.

8. **“Furnished by Others"** shall mean materials or equipment purchased under other sections of the general contract and installed by this section of the specifications by this trade Contractor.

9. **“Owners Representative”** shall be the party responsible to make decisions regarding all contractual obligations in reference to the Scope of Work for the Owner.

10. **“Date of Substantial Completion"** shall indicate the date where the work has been formally accepted as evidenced by completed final punch list or where the work has reached the stage that the Owner obtains beneficial use and commences utilization of the installed systems for business or occupancy purposes. The GENERAL REQUIREMENTS, DIVISION 01, shall supersede this definition where specifically defined.

1.4 CODES, REFERENCES AND PERMITS

A. Materials, installation of systems and equipment provided under this section shall be done in strict accordance with the Department of Public Safety, Department of Environmental Protection, State Building Code and any other Codes and Regulations having jurisdiction including but not limited to:

1. All Applicable NFPA Standards
2. National Electrical Code (NEC)
3. Occupational Safety and Health Administration (OSHA)
4. State and Local Building Codes
5. Underwriters' Laboratories, Inc. (UL)

B. Unless otherwise specified or indicated, materials, workmanship and equipment performance shall conform with the latest governing edition of the following standards, codes, specifications, requirements, and regulations, except when more rigid requirements are specified or are required by applicable codes but not limited to:

1. American National Standards Institute (ANSI)
2. American Society of Mechanical Engineers (ASME)
3. American Society of Testing and Materials (ASTM)
4. Certified Ballast Manufacturers (CME)
5. Illuminating Engineering Society (IES)
6. Institute of Electrical and Electronics Engineers (IEEE)
7. Insulated Cable Engineers Association (ICEA)
8. National Electrical Contractors Association (NECA)
9. National Electric Manufacturers Association (NEMA)
10. Thermal Insulation Manufacturers Association (TIMA)

C. Codes, laws and standards provide a basis for the minimum installation criteria acceptable. The drawings and specifications illustrate the scope required for this project, which may exceed minimum codes, laws and standards.

D. Give all notices, file all plans, obtain all permits and licenses, and obtain all necessary approvals from authorities having jurisdiction. Deliver all certificates of inspection to the authorities having jurisdiction. No work shall be covered before examination and approval by the Owner's Representative, inspectors, and authorities having jurisdiction. Replace imperfect or condemned work to conform to requirements, satisfactory to Owner's Representative, and without extra cost to the Owner. If work is covered before inspection and approval, this Contractor shall pay costs of uncovering and reinstalling the covering, whether it meets contract requirements or not.

1.5 GENERAL REQUIREMENTS

A. Nameplates

1. Each major component of equipment shall have the manufacturer's name, address, type or style, model or serial number, and catalog number on a plate secured to the equipment.

B. Equipment Guards

1. Belts, pulleys, chains, gears, couplings, projecting setscrews, keys, and other rotating parts so located that any person may come in close proximity thereto shall be completely enclosed or guarded. High-temperature equipment and piping so located as to endanger personnel or create a fire hazard shall be guarded or covered with insulation of type specified for service.

1.6 MATERIAL AND EQUIPMENT STANDARDS

A. Where equipment or materials are specified with the name of a manufacturer, such specification shall be deemed to be used for the purpose of establishing a standard for that particular item. No equipment or material shall be used unless previously approved by the Owner's Representative.

B. Substitutions may be offered for review provided the material, equipment or process offered for consideration is equal in every respect to that indicated or specified. The request for each substitution must be accompanied by complete specifications together with drawings or samples to properly appraise the materials, equipment or process. The Contractor shall highlight and list all applicable specification requirements which the substituted material deviates from.

C. If a substitution of materials or equipment in whole or in part is made, this Contractor shall bear the cost of any changes necessitated by any other trade as a result of said substitution.

D. All materials, equipment and accessories provided under this section shall be new and unused products of recognized manufacturers as approved.

1.7 SUBMITTALS

A. Conform to the requirements of Division 01, General Conditions, for schedule and form of all submittals unless specifically noted otherwise in this section. Coordinate this submittal with submittals for all other finishes. Shop drawings and design layouts shall be prepared by licensed installing Contractor s and shall note the name(s), license number(s) and license expiration date(s) of the Contractor (s) installing electrical systems.

B. Definitions:

1. Shop Drawings are information prepared by the Contractor to illustrate portions of the work in more detail than indicated in the Contract Documents.

2. Acceptable Manufacturers: The mechanical design for each product is based on the single manufacturer listed in the schedule or shown on the drawings. In Part 2 of the specifications, certain Alternate Manufacturers are listed as being acceptable. In addition, the MATERIAL AND EQUIPMENT STANDARDS paragraph potentially allows for substitutions as being acceptable. These are acceptable only if, as a minimum, they:

   a. Meet all performance criteria listed in the schedules and outlined in the specifications. For example, to be acceptable, an emergency generator must deliver equal kW / kVA at equal or greater efficiency using equal or less fuel as the emergency generator listed in the schedules.

   b. Fit within the available space it was designed for, including space for maintenance and component removal, with no modification to either the space or the product. Clearances to walls, ceilings, and other equipment will be at least equal to those shown on the design drawings. The fact that a manufacturer's name appears as acceptable shall not be taken to mean the Engineer has determined that the manufacturer's products will fit within the available space – this determination is solely the responsibility of the Contractor.

   c. For rooftop mounted equipment and equipment mounted in areas where structural matters are a concern, the products must have a weight no greater than the product listed in the schedules or specifications.

   d. Products must adhere to all architectural considerations including, but not limited to; being of the same color as the product scheduled or specified, fitting within the architectural enclosures and details, and for lighting – being the same size and of the same physical appearance as scheduled or specified products.

C. Submittal Procedures, Format and Requirements

1. Review submittal packages for compliance with Contract Documents and then submit to Owner's Representative for review. Submit enough sets of shop drawings such that, after review, two sets will be kept by the reviewer, with only the remaining sets returned with reviewer's marks and comments.

2. Each Shop Drawing shall indicate in title block, and each Product Data package shall indicate on cover sheet, the following information:

   a. Title

   b. Equipment number

   c. Name and location of project

   d. Names of Owner, Engineer and Seller

   e. Names of manufacturers, suppliers, vendors, etc.

   f. Date of submittal

   g. Whether original submittal or resubmitted

3. Shop Drawings showing manufacturer's product data shall contain detailed dimensional drawings (minimum ¼" – 1' scale) including plans and sections

(where physical clearance could be an issue). Provide larger scale details as necessary.

4. Submit accurate and complete description of materials of construction, manufacturer's published performance characteristics, sizes, weights, capacity ratings (performance data, alone, is not acceptable), electrical requirements, starting characteristics, wiring diagrams, and acoustical performance for complete assemblies. Drawings shall clearly indicate location (terminal block or wire number), voltage and function for all field terminations, and other information necessary to demonstrate compliance with all requirements of Contract Documents.

5. Provide Shop Drawings showing details of piping connections to all equipment. If connection details are not submitted and connections are found to be installed incorrectly, this Contractor shall reinstall them within the original contract price.

6. Provide complete data for all auxiliary services and utilities required by submitted equipment. This shall include fuel, cooling and exhaust requirements and points of connections.

7. Provide a complete description of all controls and instrumentation required including electrical power connection drawing for all components and interconnection wiring to starters, detailed information on starters, control diagrams, termination diagrams, and all control interfaces with a central control system.

8. Provide installation and erection information including; lifting requirements, and any special rigging or installation requirements for all equipment.

9. The Owner's Representative shall approve all materials before commitment for materials is made.

D. Specifications and Schedule Compliance Statement

1. The manufacturer shall submit a point by point statement of compliance with each specification criteria listed in each paragraph for those submittals listed in Paragraph E: Product Data that are noted with an asterisk (*).

2. The statement of compliance shall consist of a list of all paragraphs (line by line) identified in Part 2 and applicable Part 3 of the specification for which the submitted product in the opinion of the manufacturer complies, deviates, or does not meet.

3. Where the proposed submittal complies fully, the word "comply" shall be placed opposite the paragraph number.

4. Where the proposed submittal does not comply, or accomplishes the stated function in a manner different from that described, a full description of the deviation shall be provided.

5. Verify each field of the associated schedule where associated technical data is presented on the drawings. Where the submitted material does not 'comply" provide the value the submitted equipment will achieve based upon the specified conditions.

6. Where a full description of a deviation is not provided, it shall be assumed that the proposed system does not comply with the paragraph in question and the product will be rejected.

7. Submissions which do not include a point by point statement of compliance as specified shall be disapproved.

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

1. Identification
2. Raceways and Conduit
3. Wire and Cable (600V)
4. Wiring Devices and Plates
5. Outlet Boxes
6. Junction Boxes, Pull Boxes and Wireways
7. Safety Disconnect Switches
8. Fire Seal and Fireproof Sealant
9. Identification, labels and tags.

F. Submit shop drawings and product data grouped to include complete submittals of related systems, products and accessories in a single submittal.

1. Access panel shop drawings shall be submitted to the Construction Supervisor for approval.
2. Do not submit multiple product information in a single bound manual.
3. Three-ring binders shall not be accepted.

G. Deviations:

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

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

1. If more than five shop drawings of a single trade are received in one calendar week.

I. Responsibility

1. Intent of Submittal review is to check for capacity, rating, and certain construction features. The Contractor shall ensure that work meets requirements of Contract

Documents regarding information that pertains to fabrication processes or means, methods, techniques, sequences and procedures of construction; and for coordination of work of this and other Sections. Work shall comply with approved submittals to extent that they agree with Contract Documents. Submittal review shall not diminish responsibility under this Contract for dimensional coordination, quantities, installation, wiring, supports and access for service, nor the shop drawing errors or deviations from requirements of Contract Documents. The Engineer's noting of some errors while overlooking others will not excuse the Contractor from proceeding in error. Contract Documents requirements are not limited, waived nor superseded in any way by review.

2. Inform Contractor, manufacturers, suppliers, etc. of scope and limited nature of review process and enforce compliance with contract documents.

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

1. The Contractor shall furnish and install all materials and equipment herein specified in complete accordance with these Specifications.

2. If the Contractor furnishes and installs material and/or equipment that is not in complete accordance with these Specifications, he shall be responsible for the removal of this material and/or equipment. He shall also be responsible for the replacement of this material and/or equipment with material and/or equipment that is in complete accordance with these Specifications, at the direction of the Owner’s Representative.

3. Removal and replacement of materials and/or equipment that is not in complete compliance with these Specifications shall be done at no extra cost to the Owner.

4. Removal and replacement of materials and/or equipment that is not in complete compliance with these Specifications shall not be allowed as a basis for a claim of delay of completion of the Work.

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

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

1.8 RECORD DRAWINGS

A. Refer to DIVISION 01, General Conditions, for record drawings and procedures to be provided under this section, unless specifically noted otherwise in this section.

B. Record Drawings (red-line drawings) will be updated by this Contractor daily for review with the monthly requisition. The record drawing shall be an accurate depiction of the systems as completed, including dimensions (vertical/horizontal) of concealed components off fixed building elements.

C. The Electrical Foreman shall maintain complete and separate set of prints of Contract Drawings at job site at all times and shall record work completed and all changes from original Contract Drawings clearly and accurately including work installed as a modification or addition to the original design.

D. At completion of work the Electrical Contractor shall prepare a complete set of record drawings on AutoCAD showing all systems as actually installed. The Architectural background AutoCAD files will be made available for the Contractor’s copying, at his expense, to serve as backgrounds for the drawings. The Electrical Contractor shall

transfer changes from field drawings onto AutoCAD drawings and submit copy of files and three sets of prints to Owner's Representative for comments as to compliance with this section. CADD layering as established by the design team shall be maintained with any and all changes done by the Contractor.

E. The Engineer is not granting to the Contractor any ownership or property interest in the CADD Drawings by the delivery of the CADD Disks to the Contractor. The Contractor's rights to use the CADD disks and the CADD Drawings are limited to use for the sole purpose of assisting in the Contractor's performance of its contractual obligations under its contract with respect to the Project. The Engineer are granting no further rights. Any reuse or other use by the Contractor will be at the Contractor's sole risk and without liability to the Engineer. The Contractor hereby waives and releases any losses, claims, damages, liabilities of any nature whatsoever, and costs (including attorney fees) arising out of, resulting from, or otherwise related to the use of the CADD Disks and CADD Drawings by the Contractor. The Contractor, to the maximum extent permitted by law, hereby agrees to indemnify, defend and hold the Engineer harmless from all loses, claims, damages, liabilities, and costs (including attorney fees) arising out of, resulting from, or otherwise related to the use of the CADD Disks and CADD Drawings by the Contractor.

F. Record Drawings, shall show "as-built" condition of details, sections, riser diagrams, control changes and corrections to schedules. Schedules shall show actual manufacturer and model numbers of final equipment installation.

G. The Electrical Contractor shall submit the record set for approval by the engineer a minimum of four weeks prior to seeking the permanent certificate of occupancy.

1.9 WARRANTIES

A. Submit manufacturer's standard replacement warranties for material and equipment furnished under this Section. Such warranties shall be in addition to and not in lieu of all liabilities which the manufacturer and the Electrical Contractor may have by law or by provisions of the Contract Documents.

B. All materials, equipment and work furnished under this Section shall be guaranteed against all defects in materials and workmanship for a minimum period of one-year (1) commencing with the Date of Substantial Completion. Where individual equipment sections specify longer warranties, provide the longer warranty. Any failure due to defective material, equipment or workmanship which may develop, shall be corrected at no expense to the Owner including all damage to areas, materials and other systems resulting from such failures.

C. Guarantee that all elements of each system meet the specified performance requirements as set forth herein or as indicated on the Drawings.

D. Upon receipt of notice from the Owner of the failure of any part of the systems during the warranty period, the affected parts shall be replaced. Any equipment requiring excessive service shall be considered defective and shall be replaced.

1.10 COORDINATION

A. Refer to Division 01, General Conditions, for coordination requirements applicable to this section, unless specifically noted otherwise in this section.

B. Materials and apparatus shall be installed as fast as conditions of the building will permit and must be installed promptly when and as required. Existing Conduit pathways shall be used where practicable.

C. Confer with all other trades relative to location of all apparatus and equipment to be installed and select locations so as not to conflict with work of other Sections. Any conflicts shall be referred immediately to the Owner's Representative for decision to prevent delay in installation of work. All work and materials placed in violation of this clause shall be readjusted to the Owner's Representative's satisfaction at no expense to the Owner.

D. Where work of this section will be installed in close proximity to work of other sections or where there is evidence that the work of this section may interfere with work of other sections, assist in working out space conditions to make satisfactory adjustment. Prepare and submit for approval 3/8" scale or larger working drawings and sections, clearly showing how the work is to be installed in relation to the work of other sections. If the work of this section is installed before coordinating with other trades or so as to cause interference with work of other trades, make changes necessary to protect conditions without extra charge.

E. Keep fully informed as to the shape, size and position of all openings required for all apparatus, conduit, cable, sleeves, etc., and give information in advance to allow construction of required openings. Furnish all sleeves, pockets, supports and incidentals, and coordinate with the General Contractor for the proper setting of same.

F. All distribution systems which require pitch or slope such as condensate drains and water piping shall have the right of way over those which do not. Confer with other trades as to the location of pipes, ducts, lights and apparatus and install work to avoid interferences.

G. Make reasonable modifications in the work as required by structural interferences, or by interference with work of other trades, or for proper execution of the work without extra charge.

1.11 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

A. It is the intention of the Specifications and Drawings to call for complete, finished work, tested and ready for continuous operation. Any apparatus, appliance, material or work not shown on the Drawings, but mentioned in the Specifications or vice-versa, or any incidental accessories necessary to make the work complete in all respects and ready for operation, even if not particularly specified, shall be provided by this Contractor without additional expense to the Owner.

1.12 INSPECTION OF SITE CONDITIONS

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

1.13 SURVEY AND MEASUREMENTS

A. Base all required measurements, horizontal and vertical, from referenced points established WITH the Owner's Representative. The Electrical Contractor shall be responsible for correctly laying out the Work required under this Section of the Specifications.

B. In the event of discrepancy between actual measurements and those indicated, notify the Owner's Representative in writing and do not proceed with the related work until instructions have been issued.

1.14 DELIVERY, STORAGE AND HANDLING

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

B. All manufactured materials shall be delivered to the site in original packages or containers bearing the manufacturer's labels and product identification.

C. Protect materials against dampness. Store off floors, under cover and adequately protected from damage.

D. Inspect all equipment and materials, upon receipt at the job site, for damage and conformance to approved shop drawings.

1.15 PROTECTION OF WORK AND PROPERTY

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

B. Protect all equipment and materials from damage from all causes including, but not limited to, fire, vandalism and theft. All materials and equipment damaged or stolen shall be repaired or replaced with equal material or equipment at no additional cost to the Owner.

C. Protect all equipment, outlets and openings with temporary plugs, caps and covers. Protect work and materials of other trades from damage that might be caused by work or workmen under this Section and make good damage thus caused.

D. Damaged materials are to be removed from the site; no site storage of damaged materials will be allowed.

1.16 SUPERVISION

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

1.17 SAFETY PRECAUTIONS

A. Life safety and accident prevention shall be a primary consideration. Comply with all of the safety requirements of the Owner and OSHA throughout the entire construction period of the project.

B. Furnish, place and maintain proper guards and any other necessary construction required to secure safety of life and/or property.

1.18 SCHEDULE

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

1.19 CUTTING AND PATCHING

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

B. All work shall be fully coordinated with all phases of construction, in order to minimize the requirements for cutting and patching.

C. Form all chases or openings for the installation of the work of this Section of the specifications, or cut the same in existing work and see that all sleeves or forms are in the work and properly set in ample time to prevent delays. Be responsible that all such chases, openings, and sleeves are located accurately and are of the proper size and shape and consult with the Owner's Representative and all other trades concerned in reference to this work. Confine the cutting to the smallest extent possible consistent with the work to be done. In no case shall piers or structural members be cut without the approval of the Owner's Representative.

D. Fit around, close up, repair, patch, and point around the work specified herein to match the existing adjacent surfaces and to the satisfaction of the Owner's Representative.

E. Fill and patch all openings or holes left in the existing structures by the removal of existing equipment which is part of this Section of the Specifications.

F. All of this work shall be carefully done by workmen qualified to do such work and with the proper and smallest tools applicable.

G. Any cost caused by defective or ill-timed work required by this Section of the specifications shall be borne by this Contractor.

H. When, in order to accommodate the work required under this Section of the specifications, finished materials of other trades must be cut or fitted, furnish the necessary drawings and information to the trades whose materials must be cut or fitted.

1.20 SUPPLEMENTARY STEEL, CHANNELS AND SUPPORTS

A. Provide all supplementary steel, factory fabricated channels and supports required for the proper installation, mounting and support of all Electrical equipment, piping, etc., required by the Specifications.

B. Supplementary steel and factory fabricated channels shall be firmly connected to building construction in a manner approved by the Owner's Representative as shown on the drawings or herein specified.

C. The type and size of the supporting channels and supplementary steel shall be determined by the Contractor and shall be of sufficient strength and size to allow only a minimum deflection in conformance with the manufacturer's requirements for loading.

D. All supplementary steel and factory fabricated channels shall be installed in a neat and workmanlike manner parallel to the walls, floors and ceiling construction. All turns shall be made with 90 degree and 45 degree fittings, as required to suit the construction and installation conditions.

E. All supplementary steel including factory fabricated channels, supports and fittings shall be galvanized steel, aluminum or stainless steel where exposed or subject to rust producing atmosphere. Factory fabricated channels shall be manufactured by Unistrut, H-strut, Powerstrut or approved equal.

1.21 HAZARDOUS MATERIALS

A. Where it has been identified that asbestos-containing material exists within the scope limits, refer to the Asbestos Abatement specification section for requirements.

1.22 ACCESSIBILITY

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

1.23 PROJECT CLOSEOUT

A. Certificates Of Approval

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

   a. Fire Alarm System

B. Construction Observations By The Engineer

1. The engineer shall make progress site visits during construction and one substantial completion (punch list) site visit for determining substantial completion.

2. The Trade Contractors and the General Contractor are required to inspect their own work and make any corrections to the work to comply with the specifications and the contract documents. It is not the responsibility of the engineer to develop lists of incomplete work items.

3. Progress Site Visits

   a. The purpose of the progress site visit by the engineer is to observe if the work is proceeding in accordance with the contract documents.

   b. The engineer will prepare a field report which will note in general the work completed since the last observation visit, work found not to be in accordance with the contract documents and work not corrected since the previous observation visit.

C. Substantial Completion

1. When the Contractor considers the Work under this Section is substantially complete, the Contractor shall submit written notice, through the General Contractor, with a detailed list of items remaining to be completed or corrected and a schedule of when each remaining work item will be completed. Should the engineer determine the list of remaining work does not constitute substantial completion the engineer will notify the Architect and/or Owner and he will not make a substantial completion site visit.

2. The following items shall be completed prior to the written request for substantial completion site visit:

   a. Certification of successful operation of all systems.

   b. Record Drawings in accordance with the contract specifications.

   c. Testing reports.

   d. Manufacturer’s certificates of approvals.

   e. Emergency contact list for reporting of malfunctioning equipment during the warrantee period.

   f. Contractors Project Completion certificate.

3. Should the Engineer, during the substantial completion visit, observe that the Work is substantially complete, s/he will provide a written listing of the observed deficiencies referred herein as the Punch List. The Punch List will provide for a place for the Contractor and general Contractor to sign off and date each item individually indicating that the observed deficiency item has been corrected.

4. Should the Engineer, during the substantial completion site visit, observe that the Work is not substantially complete, s/he will provide, a written list of the major deficiencies and a reason for the work not being considered substantially complete.

5. If the work is found not to be substantially complete then the engineer shall be reimbursed for his time to reobserve the work. A reobservation fee shall be charged to the Contractor through the contractual agreement for any further observations by the engineer.

6. The Contractor shall remedy all deficiencies listed in the punch list within the time frame required by the contract.

D. Engineers Construction Completion Certification

1. Where required by the applicable code, the Engineers Construction Completion Certification will be issued by NV5 when all life safety and health related issues are complete, all required functional tests are complete and all reports are complete. The following is a minimum listing of the required systems to be tested with reports generated indicating they are complete and ready for use:

a. Fire Alarm System

2. There shall be NO outstanding items identified on the punch list for scope within any of these categories.

E. Final Completion

1. The following items shall be submitted prior to the written request for Final completion:

   a. Revised Substantial Completion items to be resubmitted in accordance with the review process comments.

   b. Warranties commencing the date of Substantial completion

   c. Individual Signed and dated Punch List acknowledging completion of all punch list items

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

3. If the work is not fully complete then the engineer shall be reimbursed for his time to reobserve the work. A reobservation fee shall be charged to the Contractor through the contractual agreement for any reobservations by the engineer.

F. Re-observation Fees

1. The re-observation fee shall be $1200.00 per visit.

G. Contractor's Project Completion Certificate

1. Upon completion of work and prior to request for Certificate of Occupancy, each Trade Contractor and the General Contractor shall issue a certificate stating that work has been installed generally consistent with construction documents and all applicable codes. NV5 can furnish a blank Contractor's certificate form upon request. The certificate shall certify:

   a. Execution of all work has been in accordance with the approved construction documents.

   b. Execution and control of all methods of construction was in a safe and satisfactory manner in accordance with all applicable local, state and federal statutes and regulations.

2. The certificate shall include the following information:

   a. Project.

   b. Permit Number.

   c. Location.

   d. Construction Documents.

e. Date on Plans and Specifications submitted for approval and issuance of the Building Permit.

f. Addendum(a) and Revision Dates.

3. The certificate shall be signed by the Contractor and include the following:

a. Signature.

b. Date.

c. Company.

d. License Number.

e. License Expiration Date.

PART 2 - PRODUCTS

2.0 IDENTIFICATION

A. Nameplates

1. Nameplates shall be laminated black Bakelite with minimum 1/4” high white recessed letters.

2. Nameplates shall be securely attached to the equipment. Utilize mechanical fasteners such as galvanized steel or brass screws for exterior applications. High strength adhesives or cements may be used for interior applications.

2.1 RACEWAYS AND CONDUIT

A. Rigid Galvanized Steel (RGS) Conduit

1. RGS shall be zinc-coated steel that conforms to ANSI C80.1, UL Specification No. 6 and Federal Specification WW-C-581e by Allied Tube and Conduit, Republic Steel, Wheatland Tube or approved equal.

2. RGS fittings shall be threaded. Split couplings or non-threaded fittings shall not be used.

3. Nipples and Close Nipples shall be RGS, length as noted or as required to conform to field conditions.

B. Electrical Metallic Tubing (EMT)

1. EMT shall be zinc-coated steel that conforms to ANSI C80.3, UL Standard No. 797 and Federal Specification WW-C-563 a by Republic Steel, Allied Tube and Conduit or approved equal.

2. EMT fittings shall be zinc plated pressed steel gland and ring compression up to 2” and zinc plated pressed steel double set screw from 2” and up.

C. Miscellaneous Conduit Fittings

1. Elbows shall be standard radius unless noted otherwise. Where Large Radius elbows are specified, provide 48” radius unless noted otherwise.

2. Bushings shall be threaded pressed steel hot dipped galvanized with conduit end stop and integrally molded noncombustible phenolic insulated surface rated for 150^{o}C.

3. Bonding bushings shall be threaded pressed steel hot dipped galvanized with conduit end stop and integrally molded noncombustible phenolic insulated surface rated for 150°C with a lay-in tin plated copper grounding lug.

4. Exposed conduit expansion fittings shall be hot-dipped galvanized malleable iron with external bonding jumper equal to O.Z./Gedney Type EX for RGS or Type TX for EMT (4" maximum expansion).

5. Provide water-tight gland sealing assemblies with pressure bushings equal to OZ/Gedney Type WSK for new cast-in-place installations or Type CSCM for retrofit (core drilling of existing walls) as required for below grade wall and floor penetrations.

D. Flexible Metallic Conduit

1. Liquidtight Metal Conduit shall be UL Listed fabricated from a spiral wound strip of heavy gauge, corrosion resistant, hot dipped galvanized steel equal to Electri-flex Company Type LA. The jacket shall be flame retardant, sunlight resistant PVC extruded over the spiral wrap. Sizes through 1 ¼" shall have an integral copper bonding strip.

2. Liquidtight fittings shall be UL listed zinc plated insulated throat.

3. Flexible metal conduit shall be UL Listed non-jacketed steel fabricated from a spiral wound strip of heavy gauge, corrosion resistant, hot dipped galvanized steel equal to Electri-flex Company Type BR.

E. Wireways shall be minimum 16-gauge steel with all straight runs having hinged spring-latched covers. Finish shall be painted over a corrosion resistant phosphate pretreatment to protect against corrosion. Interior parts shall be smooth and free of sharp edges and burrs. Provide wireway as identified on the drawings for NEMA 1, 3R or 12 service. Wireways shall be equal to Square D and UL Listed.

2.2 WIRE AND CABLE (600V)

A. Provide single-conductor, annealed copper wire and cable with insulation rated for 600 V, of sizes specified and scheduled on Drawings, by General Electric, Southwire, Okonite or approved equal, for secondary service, feeders, branch and system wiring. Wire sizes shown and specified are American Wire Gauge for copper conductors.

B. The use of aluminum conductors is not allowed.

C. Wire #10 and larger shall be stranded; #12 and smaller shall be solid. Wire and cable shall have THWN-THHN or XHHW insulation for branch circuit and feeder conductors. Type RHWUSE shall be used for all conductors installed in below grade raceways for generator applications only.

D. Conductor Color-coding

1. Service entrance, branch circuit and feeder conductors shall be color-coded. Conductors #12 and #10 shall be colored with a factory applied solid or striped compound coating (black, red, blue, brown, orange or yellow). Neutrals and equipment grounds shall have solid compound or solid color coating (white, gray and green), except that neutrals with colored stripe shall be used where required by code. Phase conductors #8 and larger with stripes, bands or hash marks shall have background color other than white, green and gray.

2. Alternative field-applied color coding methods may be used for wire #8 or larger, with color code as specified in other sections of this specification. Coloring shall be applied by the use of flame-retardant vinyl tape, equal to 3M Scotch 35.

E. Cable

1. Flexible Metal Clad (MC) cable shall be UL Listed with THHN insulated conductors with an insulated grounding conductor within galvanized steel or aluminum interlocked armor. Connectors shall be provided with lock nut connection to the termination point enclosure.

2. Flexible Metal Clad (MC) cable utilized for Fire Alarm service shall be identified with a factory applied tracer along the entire length.

F. Splices and Terminations

1. Ampacity and temperature rating of splices and connectors shall be equal to or greater than those of associated wires and cables.

2. Make splices in branch circuit or feeder wiring from #12 to #10 with UL-listed, solderless screw on connectors rated 600 V.

3. Make splices in branch circuit or feeder wiring above #10 with UL-listed 90°C, 600V, compression butt splice barrel equal to Burndy YS-L HYLINK.

4. Conductor terminations shall be standard bolt-on lugs with hex screws listed for attachment of copper wire and cable to panelboards, switchboards, disconnect switches and other electrical equipment.

5. Make terminations for stranded conductors on screw terminals with UL Listed 105°C, 600V PVC insulated barrel compression locking fork tongue terminal equal to Burndy TP-LF VINYLUG.

6. Make bus terminations for conductors #6 and larger with UL-listed 90°C, 600V, compression standard barrel length lugs equal to Burndy YA-L for conductor sizes to #4/0. Connectors for cable 250 KCMil and larger shall be with UL-listed 90°C, 600V, compression long barrel length two hole lugs equal to Burndy YA-2N. Lugs shall be high conductivity seamless copper electro-tin plated for corrosion protection.

G. Wire management shall be provided by self-extinguishing self-locking nylon ties with -65 to 350°F. range for bundling conductors.

H. Arc-proofing

1. Provide flexible, flame-retardant, organic-composition-coated elastomer arc-proofing tape equal to 3M Scotch 77 on power cable in manholes and handholes, suitable to withstand 200 A arc for 30 seconds. Tape shall be self-extinguishing and shall not support combustion. Cover with glass cloth tape equal to 3M Scotch 69 as a binder.

2. Tape shall have been tested with 186-hour distilled water exposure and 3% salt water and shall be ultra-violet and weather resistant.

2.3 WIRING DEVICES AND PLATES

A. Provide wiring devices by single manufacturer. Catalog designations of Cooper are specified, unless noted otherwise, to establish standards of quality for materials and performance. Colors of devices as specified below are White for standard applications.

Refer to the drawings for color requirements that vary from White. Equal products by Leviton, Pass & Seymour or Hubbell will be accepted. Provide published manufacturers cross-reference sheet highlighted with the device specified and that being submitted with all device product data for approval.

B. Wall switches shall be of the totally enclosed tumbler type. Wiring terminals shall be spring loaded terminal screws for back or side wiring. Switches shall be rated 20-ampere 277 volt for use on alternating current only. The yoke shall have a grounding terminal with a green hex head screw.

C. Toggle Switches shall be heavy duty, UL listed, specification grade as follows:

1. Single-pole shall be No. 2221W

D. Wiring Device Plates:

1. Provide 0.032” nominal brushed Type 430 stainless steel device plates by the manufacturer of the wiring device for all flush mounted switches and receptacles installed in dry locations and where not subjected to physical abuse. Ganged plates shall be of one-piece construction to accommodate the required number of installed devices. Oversized plates to cover wall finish blemishes adjacent to the device box shall not be used.

2.4 OUTLET BOXES

A. Outlet and switch boxes on concealed work shall be at least 4” square, galvanized pressed steel conforming to UL 514A. Where installed in plaster, boxes shall be fitted with galvanized steel plaster covers of required depth to finish flush with finished wall or ceiling. Outlet boxes shall be by Steel City Electric Company, Appleton Electric Company, or approved equal.

B. Outlet boxes installed in masonry walls or in concrete decking shall be UL Listed for the application.

C. Outlet boxes for interior surface mounted locations where RGS is specified where exposed to moisture, at kitchen and cafeteria equipment, adjacent to water or steam connections, and where indicated as weatherproof on Drawings shall be cast malleable iron with an aluminum polymer enamel coating equal to Appleton Type FD. Conduit entries shall be threaded cast hubs. Device covers shall be coated malleable iron with moisture sealing gasket and stainless steel fasteners.

D. All boxes shall have at least one tapped and threaded grounding hole for connection of a 10-32 grounding screw.

E. Box depth shall accommodate code required volume for the specified installation. Through wall boxes shall not be used.

F. Outlet boxes for various systems including but not limited to fire alarm shall be sized as required by the manufacturer. Boxes shall be cast where exposed to physical damage.

2.5 JUNCTION AND PULL BOXES

A. Provide galvanized steel junction and pull boxes where indicated and as necessary to facilitate installation. Steel shall be minimum 16 gauge. Junction and pull boxes shall be

of code required dimensions. Cover shall be of the same type and thickness material as the box construction.

B. Junction and pull boxes intended for dry interior locations shall be NEMA 1 enclosures with accessible, removable screw-on covers. Covers shall be secured with corrosion-resistant screws with keyhole slots to accommodate easy removal.

C. Custom fabricated medium to large junction and pull boxes shall have internal structural steel bracing welded to form a rigid assembly adequate to maintain alignment and shape in shipment and installation.

2.6 SAFETY DISCONNECT SWITCHES

A. Switches shall be three-pole heavy-duty type rated for 600V in NEMA 1 (interior dry applications) and NEMA 3R (exterior applications) enclosures unless noted otherwise on the drawings. All switches shall be horsepower rated and suitable for service entrance use. Provide with solid neutral where four wire circuits are indicated and with 200% solid neutral where neutrals are sized for 200% full load ampacity.

1. Operating mechanisms shall be quick-make/quick-break. Current-carrying parts shall be high-conductivity copper. Contacts shall be silver-tungsten or plated. Provide positive pressure fuse clips and switch operating mechanism suitable for continuous use at rated capacity without auxiliary springs in current path. Switches shall withstand available fault current or let-through current before operating, without damage or rating change.

2. Terminations shall be suitable for copper or aluminum conductors 60°/75° C rated. Clear shielding shall prevent accidental contact with energized line terminals.

3. The cover shall be mechanically interlocked to prevent access unless the disconnect is in the OFF position. A defeater shall be provided to bypass this interlock. With the door open, an interlock shall be provided to prevent inadvertent closing of the disconnect. Padlocking facilities shall be provided to positively lock the disconnect in the OFF position with from one to three padlocks with the door open or closed.

4. The enclosure shall be given a phosphatizing pretreatment. The paint finish shall be manufacturer's standard color and shall pass 600 hours of corrosion resistance testing per ASTM B 117.

PART 3 - EXECUTION

3.0 DEMOLITION

A. General

1. The Electrical Contractor shall visit the site before submitting his bid to familiarize himself with the existing conditions and the extent of the work. No extra compensation will be allowed for work required to be performed or to overcome existing conditions, by failure to visit the site.

2. The Electrical demolition work shall be performed by the Electrical Contractor in cooperation with the other trades and as scheduled and approved by the Owner's Representative.

3. The locations of existing equipment to remain including piping, ductwork, conduits, etc., are shown in an approximate way only. The Contractor shall determine the exact location of all existing equipment before commencing work.

4. Power outages caused by demolition that affect other areas shall be held to a minimum. Shutdowns shall be coordinated with the users and the Owner. Night, weekend and/or Holiday time required to perform electrical demolition work or new electrical work shall be carried as part of the Contract Cost.

B. Scope

1. Disconnect and make safe all electrical equipment identified for removal on the Electrical, HVAC, and Plumbing plans. The electrical scope may extend beyond the area defined by the demolition limits to fully comply with various requirements of these specifications.

2. The electrical demolition plans and notes indicate the general scope and are not intended to show all items to be removed or retained. Devices and equipment located on walls and/or ceilings to be removed shall be disconnected and made safe. The Electrical Contractor shall notify the Owner's Representative of any unanticipated hidden conditions encountered during demolition.

3. The Electrical Contractor shall circuit trace and label all existing branch circuits and feeders within the area of demolition scope prior to de-energizing and disconnection. All circuits within panelboards identified for removal shall be traced and labeled to ensure that no area outside the demolition scope limit is affected.

4. The Electrical Contractor shall identify all branch circuits, feeders and system components, which are to remain within the area of demolition scope. There shall be no interruption of service to any area outside the scope limits without approval from the Owner's Representative. Existing equipment to remain shall be left in a code compliant manner.

5. The Electrical Contractor shall de-energize and remove all conductors and raceways to their points of origin within the area of demolition scope. Items identified for demolition shall not be abandoned in place. Raceways that enter masonry walls and floors shall be cut flush at the surface for patching by others. All circuit breakers associated with the demolition scope shall be de-energized and labeled spare.

6. The Electrical Contractor shall be responsible for the repair of all systems or building components damaged during the execution of the work. Damage shall include but not be limited to destruction or disposal of items intended to remain or to be salvaged.

7. The Electrical Contractor shall temporarily support all items to remain that are affected by the demolition of building structural components (walls, ceilings, etc.). Temporarily supported items shall be permanently supported and installed when finalized structures are in place.

8. The existing fire alarm system shall remain fully functional during the entire demolition and construction period. Reuse of existing fire alarm system raceways shall not be allowed. All required system shutdowns shall be coordinated with and approved by the Owner's Representative and the Authority Having Jurisdiction.

C. Disposal

1. All removed items shall be legally disposed of unless identified for reuse. Refer to Part 1 of this specification for requirements for Hazardous Material disposal.

2. The Owner's Representative shall inspect all retained items prior to placement in the identified storage location by the Electrical Contractor . Selected items will be disposed at no additional cost to the project.

3.1 IDENTIFICATION

A. Nameplates

1. Provide nameplates on all equipment listed in other sections of this specification including but not limited to junction and pull boxes, disconnect switches, and contactors.

2. Nameplates shall designate equipment tag number as defined on the drawings, system voltage where applicable, circuit number, device controlled and system function. Refer to typical nameplate detail on the drawings for additional requirements.

3. Submit a complete list of proposed nameplates prior to order to ensure conformance to design criteria. Submittal shall include nomenclature, size and layout of each tag.

4. Samples of stickers together with color schedules shall be submitted during the submittal phase of this project.

B. Equipment Identification

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

3.2 RACEWAYS AND CONDUIT

A. General

1. Unless specified or shown on Drawings otherwise, install raceways and conduits concealed. Raceways and conduits may be run exposed on unfinished walls and basement ceilings with exposed structure, in mechanical rooms, electric rooms, attics and roof spaces.

2. Run concealed raceways and conduits in as direct lines as possible with minimum number of bends of longest possible radius. Install exposed raceways and conduits parallel to or at right angles to building lines.

3. Raceway and conduit runs shall be mechanically and electrically continuous from supply to outlet. Conduit shall enter and be secured to metallic enclosures with lock nut and bushing inside. Provide additional exterior lock nut for RGS connections. Bushings shall be the bonding type for conduit connections to metallic enclosures with concentric or eccentric knockouts. Lock nuts and bushings will not be required where conduits are screwed into threaded hubs.

4. Size raceways and conduits as required by NEC unless oversized raceways and conduits are shown on the Drawings. Raceways and conduits shall be ¾" minimum.

5. Install conduit systems complete before installation of conductors. Blow through and swab after plaster is finished and dry, and before conductors are installed.

6. Raceways and conduits supports shall be rigidly attached to the building structure utilizing corrosion resistant components suitable for use with the selected raceway or conduit. Refer to the seismic restraint sections of this specification for any additional requirements.

7. Field bending, cutting and threading shall be executed with the proper tools, resulting in bends and shortened conduits and raceways that are equivalent to factory fabricated and purchased components.

8. Provide standoff clips for conduits on exterior and wet location walls.

9. Protect all vertical conduit runs from the entrance of foreign material before installation of conductors and the final closure of the raceway system. All spare conduits (vertical and horizontal runs) shall be sealed with a bushing and appropriate insert to prohibit entrance of debris or vermin. Affix a label that indicates “Spare Conduit to _____” at each seal. Label shall be in accordance with the labeling section of this specification.

B. Rigid Galvanized Steel (RGS) Conduit

1. RGS may be used for all raceway applications outlined for EMT and PVC. RGS shall be used in locations where subject to accidental damage or abuse and for all above grade exterior applications unless other wiring methods are specified on the drawings. All circuit conductors in excess of 600 V shall be installed in RGS.

2. RGS shall not be used in corrosive environments.

3. All RGS fittings shall be threaded. Utilize Erickson couplings where joining two threaded conduits that cannot be rotated.

C. Electrical Metallic Tubing (EMT)

1. EMT may be used for lighting and receptacle branch circuits, telephone, fire alarm, communications, signal and instrumentation circuits and for control circuits. EMT may be used in masonry walls, above hung ceilings, in equipment rooms, in mechanical and electrical chases and closets, in exposed locations along ceilings or walls above normal traffic level and where not subject to accidental damage or abuse.

2. EMT shall not be used in exposed applications below 8 feet above finished floor or in exterior or damp/wet/corrosive locations. Electrical, telephone and communications closets are considered exempt from this restriction and EMT may be installed below 8’ AFF in this application only. EMT shall not be installed underground, in slabs on grade, in exterior locations, in hazardous areas, or for circuits operating at more than 600 V.

D. Miscellaneous Conduit Fittings

1. Expansion/Deflection Fittings: Raceways and conduit buried or secured rigidly on opposite sides of building expansion joints and long runs of exposed conduit subject to expansion and contraction due to variations in temperature shall have expansion fittings. Raceways and conduit shall cross building expansion joints at right angles. Provide separate external copper bonding jumper secured with grounding straps on each end of fitting. Fittings shall safely deflect and/or expand/contract to twice the distance of potential movement.

2. Penetrations of all below grade exterior walls and flooring shall require approval by the Engineer. Submit proposed penetration points, size openings and penetration methods to Engineer. Penetrations shall utilize sealing fittings appropriately sized for the application. Duct bank penetrations are excluded from this requirement.

3. Sealing Fittings shall be installed wherever conduits pass from warm to cold locations to minimize condensation within the conduit. Sealing fittings shall be installed with RGS penetration of the wall and terminate in a suitably sized junction box.

4. Refer to other specification sections for requirements pertaining to sealing for hazardous atmospheres.

E. Flexible Metallic Conduit

1. Provide flexible metallic conduits for connections to electrical equipment and to equipment furnished under other Divisions that are subject to movement, vibration or misalignment and/or where noise transmission must be eliminated or reduced.

2. Flexible metallic conduit shall be liquid-tight under the following conditions:

a. Exterior locations

b. Moisture or humidity-laden atmospheres

c. Environments where seepage or dripping of water, grease, oil or other fluids is possible. All mechanical equipment rooms and penthouses, kitchens and;

d. Corrosive atmospheres

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

3.3 WIRE AND CABLE (600V)

A. Homerun designations on the drawings are diagrammatic only. Install branch circuits and feeders from the power source to the attachment point as required for a complete system. Provide slack wire for connections to equipment installed by others. Refer to schedules and risers where specific conductor and associated raceway sizes are not indicated on the floor plans.

B. Connect branch circuit homerun with two or three circuits and common neutral only where specifically shown on the drawings. Circuits with common neutrals shall not be connected to the same phase to ensure cancellation of the return current in the neutral conductor.

C. Install wires and cable in raceways as specified. All conductor sizing is based upon no greater than three current carrying conductors in a conduit. Installation of up to six circuits (no greater than twelve current carrying conductors) in a single conduit will be allowed if the conductor sizing is increased to the required ampacity to accommodate de-rating factors required by the NEC and NFPA 70.

D. The minimum wire size shall be #12 unless #14 specifically allowed on the drawings for wiring of controls. Branch circuits longer than 75' for 120 V and 175' for 277 V from panel to last outlet shall be increased a minimum of one size above that shown on the drawings to minimize voltage drop to less than 3%.

E. Conductors shall be identified at all accessible locations in the following manner:

1. Color code secondary service, feeders and branch circuit conductors as follows:

208/120 Volts	**Phase**
Black	A
Red	B
Blue	C
White	Neutral
Green	Ground

2. Provide nonferrous wire markers, embossed or printed to correspond with the Drawings. Labels shall be permanently marked so that the source of the branch circuit or feeder may be readily identified. Hand written labels are not acceptable. Embossed tag equal to 3M Scotch Code STL-TAG or SCS-TM shall be applied with two miniature cable ties or slipped through both end holes. Heat bonded tag equal to 3M Scotch Code SCS-HB shall be permanently affixed with a heat gun.

F. Cable

1. Flexible Metal Clad (MC) cable may be used in concealed locations for branch circuit wiring.

2. Conductor color code shall comply with identification requirements as indicated in this Section.

G. Splices and Terminations

1. No more than twelve splices of current carrying conductors or six circuits, whichever is greater, shall be allowed in a single enclosure or junction box.

2. Splices and terminations shall be sized to the specified conductor. The insulation shall be cut back with the appropriate tools such that the conductors are not nicked or damaged.

3. The compression tool shall be appropriate for the installation of the provided lug or butt splice to ensure pressure necessary for a proper connection is applied.

4. Terminations shall not be stacked or bent unless specifically listed for the application.

H. Arc-proofing shall be applied to all feeders greater than 100 Amperes where multiple circuits are installed in common enclosures such as handholes, manholes and junction boxes. Apply tape in single, half-lapped layer as required by manufacturer's recommendations. Secure with strips of red plastic film tape on 208Y/120V conductors and yellow plastic film tape on 408Y/277V conductors.

3.4 WIRING DEVICES AND PLATES

A. Branch circuitry shall be attached to all devices using the attachment screw or utilizing back wiring chambers that utilize screws for compressing the connection on the wire.

Quick stab features that do not require a positive screw on attachment for the conductor are not acceptable.

B. All switches/dimmers illustrated together on drawings shall be installed in ganged configuration with single faceplate unless specifically noted otherwise.

C. Provide metal barriers to separate switches where voltage between adjacent switches exceeds 300 volts.

3.5 OUTLET BOXES

A. Outlet and switch boxes shall be securely fastened to metal studs with a minimum of two self-tapping screws. Boxes three gang and greater shall be securely fastened to studs on both sides of the box.

B. Fasteners for mounting boxes in damp or wet locations shall be stainless steel.

C. Pressed steel boxes shall not be used for exposed surface mounted locations below 8’0” AFF.

D. Outlet and switch boxes shall not be installed back to back. Stagger box installation to adjacent stud spaces to maintain sound separation between rooms.

3.6 JUNCTION AND PULL BOXES

A. Junction box covers shall be accessible. Do not install junction boxes above suspended ceilings except where ceiling is removable or where an access panel is provided.

B. Pull boxes connected to concealed conduits shall be mounted with covers flush with finished wall or ceiling.

C. Pull boxes exposed to rain or in damp/wet locations shall be weatherproof NEMA 3R unless noted otherwise on the drawings.

D. No pull box shall be within 2 feet of another.

E. Provide clamps, grids, cable ties and other non-conductive or combustible appurtenances to secure cables. No cable shall be unsupported for more than 30". Cables shall not touch or be unsupported within 1” of the box cover.

F. Each junction and pull box shall have a suitable laminated plastic nameplate with white cut letters identifying power source, voltage and driven load of the associated branch circuits or feeders.

G. Submit box sizing calculations to confirm all box dimensions are in accordance with code requirements with product data prior to installation.

3.7 SAFETY DISCONNECT SWITCHES

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

B. Each disconnect switch shall have a suitable laminated plastic nameplate with white cut letters identifying power source, voltage and driven load.

3.8 BASIC ACCEPTANCE TESTS

A. General Scope

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

B. Inspection and Test Procedures

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

1. Low Voltage Cables - All feeders illustrated on the one line diagram shall be inspected and tested in accordance with the referenced standard. Visually inspect cables for physical damage, color code and proper termination. Check continuity for proper labeling and megger for insulation resistance. Megger test voltage shall be 1000VDC for 1 minute with no values less than 50 megohms. Tabulate readings for each feeder. NETA ATS-7.3

END OF SECTION

CONTRACT

OWNER-CONTRACTOR AGREEMENT
FOR PUBLIC BUILDING CONSTRUCTION OR RENOVATION

THIS AGREEMENT made this _____day of July in the year Two Thousand and Nineteen, between VENDOR, with a usual place of business at ADDRESS, hereinafter called the CONTRACTOR, and the Town of Longmeadow, Massachusetts acting by its Town Manager and/or Select Board, with a usual place of business at 20 Williams Street, Longmeadow, MA 01106, hereinafter called the OWNER.

The CONTRACTOR and the OWNER, for the consideration hereinafter named, agree as follows:

1. Scope of Work

The Contractor shall furnish all labor, materials, equipment and insurance to perform all work required for the project known as Blueberry Hill Elementary School Boiler Replacement in strict accordance with the Contract Documents and all related Drawings and Specifications per IFB packet, ATTACHMENT A: Town of Longmeadow, Invitation for Bid (IFB): Blueberry Hill School Boiler Replacement, dated July 17, 2019, and Addendum No….(if any), The said Documents, Specifications, Drawings and any general supplementary conditions are incorporated herein by reference and are made a part of this Agreement.

2. Contract Price

The Owner shall pay the Contractor for the performance of this Agreement, subject to additions and deductions provided herein, in current funds, the sum of $ TBD per bid price proposal specifications, ATTACHMENT B,Bid Submission Forms submitted by __TBD_____, signed and dated by _TBD_____.

3. Commencement and Completion of Work and Liquidated Damages

It is agreed that time is of the essence of this Agreement. The Contractor shall commence with the Scope of Work and obtain **Substantial Completion by October 11, 2019**. Work shall be completed during hours and as specified in the IFB document.

A. Definition of Term: The Term "Substantial Completion" shall mean the date certified by the Owner when construction is sufficiently complete, in accordance with the Contract Documents, so the Owner may occupy the project, or designated portion(s) thereof, for the use for which it is intended.

B. Time as Essential Condition: It is understood and agreed that the commencement of and substantial completion of the work are essential conditions of this Agreement. It is further agreed that time is of the essence for each and every portion of the Contract Documents wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where under the Contract Documents any additional time is

allowed for the completion of any work, the new time fixed by such extension shall be of the essence of this Agreement. It is understood and agreed that the times for the completion of the work are reasonable, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.

C. Progress and Completion: Contractor shall commence work promptly upon execution of this Agreement and shall prosecute and complete the work regularly, diligently and uninterruptedly at such a rate of progress as will insure Substantial Completion within the stipulated number of calendar days.

D. Liquidated Damages: It is expressly agreed between the Contractor and the Owner that the Contractor will be responsible for all damages which may arise due to the Contractor's failure to substantially complete the work within the above specified time. If the Contractor shall neglect, fail or refuse to complete the work within the specified number of days, or any extension thereof authorized by the Owner, Contractor agrees, as a part of the consideration for the execution of this Contract by the Owner, to pay the Owner the amount specified herein, not as a penalty, but as liquidated damages for such breach of contract as hereinafter set forth, for each and every calendar day, excluding Saturdays, Sundays and legal Holidays, that the Contractor shall be in default of Substantial completion after the date specified in the Agreement. Due to the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain, said amount is agreed to be the amount of damages which the Owner would sustain, and said amount shall be retained from time to time by the Owner from current periodic estimates. The amount of liquidated damages shall $500.00 per calendar day per for Liquidated Damages after the Substantial Completion Date.

4. Performance of the Work

A. Direction of the Work: The Contractor shall supervise and direct the Work, using his best skills and attention which shall not be less than such state of skill and attention generally rendered by the contracting profession for projects similar to the Project in scope, difficulty and location. The Contractor shall maintain adequate supervisory personnel at the project site during the performance of the Work. He shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Agreement.

B. Responsibility for the Work: (1) The Contractor shall be responsible to the Owner for the acts and omissions of his employees, Subcontractors and their agents and employees, and other persons performing any of the Work under a contract with the Contractor. This obligation shall also extend to the presence on the Site of suppliers of materials or equipment, their employees, contractors, and agents engaged in the work.

(2) The Contractor shall not be relieved from his obligations to perform the Work in accordance with the Contract Documents either by the activities or duties of the Owner in its administration of the Agreement, or by inspections, tests or approvals required or performed by persons other than the Contractor.

C. Permits and Fees: Unless otherwise expressly provided, the Contractor shall secure and pay for all permits and fees, licenses and inspections necessary for the proper execution

and completion of the Work which are customarily secured after execution of the Agreement and which are legally required at the time the bids are received, and the same shall at all times be the property of the Owner and shall be delivered to the Owner upon completion of the Project. Permits that would be obtained from the Town of Longmeadow Building Department shall be provided at no charge to the Contractor.

D. Notices, Compliance With Laws: (1) The Contractor shall give all notices and comply with all federal, state and local laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the performance of the Work. The Contractor shall provide the Owner with reproductions of all permits, licenses and receipts for any fees paid. The Owner represents that it has disclosed to the Contractor all orders and requirements known to the Owner of any public authority particular to this Agreement.

(2) If the Contractor observes that any of the Contract Documents are at variance with applicable laws, statutes, codes and regulations in any respect, he shall promptly notify the Owner in writing, and any necessary changes shall be accomplished by appropriate modification.

(3) If the Contractor performs any Work which he knows or should know is contrary to such laws, ordinances, rules and regulations, and without such notice to the Owner, he shall assume full responsibility therefor and shall bear all costs attributable thereto.

(4) In the performance of the Work, the Contractor shall comply with all applicable federal, state and local laws and regulations including those relating to workplace and employee safety. The Contractor shall notify the Owner immediately of any conditions at the place of the work which violate said laws and regulations and shall take prompt action to correct and eliminate any such violations.

E. Project Superintendent: The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site at all times during the progress of the Work. The superintendent shall represent the Contractor and all 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 so confirmed on written request in each case.

F. Progress Schedule: The Contractor, immediately after being awarded the Contract, shall prepare and submit for the Owner's information an estimated progress schedule for the Work. The progress schedule 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.

G. Drawings, Specifications and Submittals:

(1) The Contractor shall maintain at the site for the Owner one record copy of all Drawings, Specifications, Addenda, Change Orders and other Modifications, and "As-Built" Drawings and Specifications in good order and marked currently to record all changes made during construction, and approved Shop Drawings, Product Data and Samples. These shall be delivered to the Owner upon completion of the Work.

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

(3) The Contractor shall not relieved of responsibility for any deviation from the requirements of the Contract Documents by the Owner's approval of Shop Drawings, Product Data or Samples unless the Contractor has specifically informed the Owner in writing of such deviation at the time of submission and the Owner has given written approval to the specific deviation. The Contractor shall not be relieved from responsibility for errors or omissions in the Shop Drawings, Product Data or Samples by the Owner's approval thereof.

(4) The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data or Samples, to revisions other than those requested by the Owner on previous submittals.

(5) No portion of the Work requiring submission of a Shop Drawing, Product Data or Sample shall be commenced until the submittal has been approved by the Owner. All such portions of the Work shall be in accordance with approved submittals.

H. Protection of the Work and Owner's Property: The Contractor shall at all times safely guard the Owner's property from injury or loss in connection with this Agreement. He shall at all times safely guard and protect his own work, and that of adjacent property from damage. The Contractor shall replace or make good any such damage, loss or injury. The Contractor shall clean the work area and restore it to its original condition upon completion of the work.

(6) The Contractor shall comply with applicable OSHA, State and municipal regulations and requirements for services and facilities in the performance of all requrements of this contract. OSHA safety requirements shall be adhered to for all personnel performing construction, reconstruction, alteration, remodeling or repair of any building or public works project.

I. Quality of the Work: The Contractor shall perform the work in a good, workmanlike manner. The Contractor hereby guarantees that the entire work constructed by him under the Agreement will meet fully all requirements thereof as to quality of workmanship and materials. The Contractor hereby agrees to make at his own expense any repairs or replacements made necessary by defects in materials or workmanship supplied to him that become evident within one (1) year after the date of the final payment, and to restore to full compliance with the requirements set forth herein any part of the work constructed hereunder, which during said one (1) year period is found to be deficient with respect to any provisions of the Contract Documents. The Contractor also agrees to hold the Owner harmless from claims of any kind arising from damage due to said defects. The Contractor shall make all repairs and replacements promptly upon receipt of written orders for same from the Owner. If the Contractor fails to make the repairs and replacements promptly, the Owner may do the work and the Contractor shall be liable to the Owner for the cost thereof.

J. Warranty: The Contractor guarantees to Owner that all materials incorporated into the work will be new unless otherwise specified or agreed. Prior to final payment, the Contractor shall deliver to the Owner all manufacturers' warranties, together with such endorsements or assignments as are necessary to ensure to the Owner the full rights and benefits of such warranties.

5. Equal Employment Opportunity

The Contractor is directed to comply with all applicable State Laws, Ordinances, Bylaws, and rules and regulations regarding affirmative action/equal employment opportunity requirements. Failure of the Contractor to comply with any such law, rule or regulation shall constitute grounds for the Owner to terminate the Agreement.

6. Site Information Not Guaranteed; Contractor's Investigation

All information given in the Contract Documents relating to subsurface and other conditions, natural phenomena, existing pipes, and other structures is from the best sources at present available to the Owner. All such information is furnished only for the information and convenience of the Contractor and is not guaranteed.

It is agreed and understood that the Owner does not warrant or guarantee that the subsurface or other conditions, natural phenomena, existing pipes, or other structures encountered during construction will be the same as those indicated in the Contract Documents.

Contractor has familiarized himself with the nature and extent of the Contract Documents, work, locality, and with all local conditions and federal, state, and local laws, rules, ordinances, and regulations that in any manner may affect costs, progress, or performance of the work. Contractor has made, or has caused to be made, examinations, investigations, and tests and studies of such reports and related data in addition to those referred to in the paragraph above as he deems necessary for the performance of the work at the Contract Price, within the Contract Time, and in accordance with the other Terms and Conditions of the Contract Documents; and no additional examinations, tests, investigations, reports, and similar data are or will be required by the Contractor for such purposes.

Contractor has correlated the results of all such observations, examinations, investigations, tests, reports, and data with the Contract Documents. Contractor has given the Owner written notice of all conflicts, errors, or discrepancies that he has discovered in the Contract Documents, and the resolution thereof by the Owner is acceptable to the Contractor.

It is further agreed and understood that the Contractor shall not use or be entitled to use any of the information made available to him or obtained in any examination made by him in any manner as a basis of or ground for any claim or demand against the Owner, arising from or by reason of any variance which may exist between the information made available and the actual subsurface conditions or other conditions or structures actually encountered during the construction work, except as may otherwise be expressly provided for in the Contract Documents.

7. Project Architect or Engineer

There is not _____, There is _____X____ is a project architect-engineer for this

project who is NV5. Except as otherwise indicated in the Contract Documents, the Architect/Engineer shall be a representative of the Owner and the Contractor shall direct all communications, questions and comments on the work and the performance thereof to the Architect/Engineer. Except as otherwise provided, the Architect/Engineer shall have all the authority of the Owner set forth in the Contract Documents. In general, the Architect/Engineer shall have the authority to review the performance of the work, reject work which is defective or otherwise does not comply with the Contract Documents and to order the Contractor to remedy defective work and take such actions which are necessary to make the work conform to the Contract Documents.

8. Wage Rates

Prevailing Wage Rates as determined by the Commissioner of the Department of Labor and Workforce Development under the provisions of Massachusetts General Laws, Chapter 149, Section 26 to 27H, as amended, apply to this project. It is the responsibility of the Contractor to provide the Town with certified payrolls and to comply with all requirements of the above-cited statutes.

The schedules of prevailing wage rates are included in the Contract Documents.

9. Payments to the Contractor

Within fifteen (15) days after receipt from the Contractor of a periodic estimate requesting payment of the amount due for the preceding month, the Owner shall have fifteen (15) days to make payment for:

A. The work performed during the preceding month.

B. The materials not incorporated in the Work but delivered and suitably stored at the site (or at some location agreed upon in writing) to which the Contractor has title, or to which a Subcontractor has title and has authorized the Contractor to transfer title to the Owner.

C. Less the following retention items:

1. A retention based on an estimate of the fair value of the Owner's claims against the Contractor.

2. A retention for direct payments to Subcontractors, if any, based on demands for same in accordance with the provisions of Section 39F of Chapter 30 of the General Laws.

3. A retention not exceeding five percent (5%) of the approved amount of the periodic payment.

D. After the receipt of a periodic estimate requesting final payment and within sixty-five (65) days after the Contractor fully completes the Work, or substantially completes the Work so that the value of the Work remaining to be done is, on the estimate of the Owner, less than 1% of the original Contract Price, or substantially completes the Work

and the Owner takes possession or occupancy, whichever occurs first, the Owner shall pay the Contractor the entire balance due on the Contract less:

1. A retention based on an estimate of the fair value of the Owner's claims against the Contractor and of the cost of completing the incomplete and unsatisfactory items of work.

2. A retention for direct payments to Subcontractors, if any, based on demands of same in accordance with the provisions of Section 39F of Chapter 30 of the General Laws, or based on the record of payments by the Contractor to the Subcontractors under this Contract if such record of payment indicates that the Contractor has not paid Subcontractors as provided in Section 39F of Chapter 30 of the General Laws.

If the Owner fails to make payment as herein provided, there shall be added to each such payment, daily interest at the rate of 3 percentage points above the rediscount rate than charged by the Federal Reserve Bank of Boston, commencing on the first day after said payment is due, and continuing until the payment is delivered or mailed to the Contractor; provided that no interest shall be due, in any event, on the amount of a periodic estimate for final payment until fifteen (15) days after receipt of such a periodic estimate by the Owner as provided in the first paragraph of this Article. The Contractor agrees to pay to each subcontractor a portion of any such interest paid in accordance with the amount due each subcontractor.

The Owner may make changes in any periodic estimate submitted by the Contractor and the payment due on said periodic estimate shall be computed in accordance with the changes so made, and such changes and any requirements for a corrected periodic estimate shall not affect the due date for the periodic payment or the date for the commencement of interest charges on the amount of the periodic payment computed in accordance with the changes made, as provided herein; provided further, that the Owner may, within seven (7) days after receipt, return to the Contractor for correction, any periodic estimate which is not in acceptable form or which contains computations not arithmetically correct, and in that event, the date of receipt of such periodic estimate shall be the date of receipt of the corrected periodic estimate in proper form and with arithmetically correct computations. The date of receipt of a periodic estimate received on a Saturday shall be the first working day thereafter.

E. Changes in the Work: No changes in the work covered by the approved Contract Documents shall be made without prior written approval of the Owner. Charges or credits for the work covered by the approved change shall be determined by one or more, or a combination of the following methods:

(a) Unit bid prices previously approved.

(b) An agreed lump sum.

(c) The actual cost of:

(1) Labor.

(2) Materials entering permanently into the work.

(3) The ownership or rental cost of construction equipment during the time of use on the extra work.

(4) Power and consumable supplies for the operation of power equipment.

(5) Wages to be paid.

To the cost under (c) there shall be added a fixed fee to be agreed upon but not to exceed fifteen percent (15%) of the actual cost of work. The fee shall be compensation to cover the cost of supervision, overhead, bond, profit and any other general expenses.

F. Claims for Additional Costs: If the Contractor wishes to make a claim for an increase in the Contract Sum, he shall give the Owner written notice thereof within twenty days after the occurrence of the event giving rise to such claim. This notice shall be given by the Contractor before proceeding to execute the Work, except in an emergency endangering life or property. No such claim shall be valid unless so made. Any change in the Contract Sum resulting from such claim shall be authorized by Change Order.

10. Final Payment, Effect

The acceptance of final payment by the Contractor shall constitute a waiver of all claims by the Contractor arising under the Agreement.

11. Contract Documents

The Contract Documents consist of the following, together with this Agreement:

Invitation for Bid
Instructions to Bidders
This Contract Form
General Bid, Bid Form
Sub-Bid Plumber, Bid Form
Sub-Bid Electrician, Bid Form
100% Payment Bond
100% Performance Bond
Non-Collusion Certificate
Tax Compliance Certificate
Clerk's Certificate of Corporate Vote
Certificate of Insurance
General Conditions
Specifications and Addenda
Contract Drawings
Schedule of Prevailing Wages

12. Terms Required By Law

This Agreement shall be considered to include all terms required to be included in it by the Massachusetts General Laws, and all other laws, as though such terms were set forth in full herein.

13. Indemnification

The Contractor shall indemnify and hold harmless the Owner from and against any and all claims, damages, losses, and expenses, including attorney's fees, arising out of the performance of this Agreement when such claims, damages, losses, and expenses are caused, in whole or in part, by the acts, errors, or omissions of the Contractor or his employees, agents, subcontractors or representatives.

14. Insurance

The Contractor shall purchase and maintain such insurance as will protect both the Owner and the Contractor from claims which may arise under the Agreement, including operations performed for the named insured by independent contractors and general inspection thereof by the named insured. In addition, the Contractor shall require its subcontractors to maintain such insurance. Coverage shall be 1,000,000.00 aggregate provided for:

.1 claims under workers' or workmen's compensation, disability benefit and other applicable employee benefit acts;

.2 claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

.3 claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

.4 claims for damages insured by usual personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor, or (2) by any other person;

.5 claims for damages, including damages to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom; and

.6 claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

.7 claims involving contractual liability applicable to the Contractor's obligations

The limits of liability for coverage required under the preceding paragraph shall be as required by the Owner.

Except for Workmen's Compensation, all liability coverage shall name the Town of Longmeadow as an additional insured and shall provide for 30 days prior written notice to the Town of any modification or termination of coverage provided thereby. The Contractor shall provide the Owner with appropriate certificate(s) of insurance evidencing compliance with this provision prior to the commencement of any work under this Agreement.

In the event that the ‘Standard General Conditions of the Construction Contract prepared by Engineers Joint Contract Documents Committee’ contained within this IFB requires additional insurances, the additional insurances will be required from the awarded contractor as part of the requirement for receiving the contract award.

15. Notice

All notices required to be given hereunder shall be in writing and delivered to, or mailed first class to, the parties' respective addresses stated above. In the event that immediate notice is required, it may be given by telephone or facsimile, but shall, to the extent possible, be followed by notice in writing in the manner set forth above.

16. Termination

A. Each party shall have the right to terminate this Agreement in the event of a failure of the other party to comply with the terms of the Agreement. Such termination shall be effective upon seven days' notice to the party in default and the failure within that time of said party to cure its default.

B. The Owner shall have the right to terminate the Agreement without cause, upon ten (10) days' written notice to the Contractor. In the event that the Agreement is terminated pursuant to this subparagraph, the Contractor shall be reimbursed in accordance with the Contract Documents for all Work performed up to the termination date, and for all materials or equipment not incorporated in the Work, but delivered and suitably stored at the site. Payment for material or equipment stored at the site shall be conditioned upon submission by the Contractor of bills of sale or such other evidence as is satisfactory to Owner to establish the Owner's title to such material or equipment or otherwise protect the Owner's interests.

17. Miscellaneous

A. Royalties and Patents: The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save the Owner harmless from loss on account thereof, except that the Owner shall be responsible for all such loss when a particular design, process or the product of a particular manufacturer or manufacturers is specified; but if the Contractor believes or has reason to believe that the design, process or product specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to the Owner, and thereafter the Owner insists on the use of the design, process or products specified.

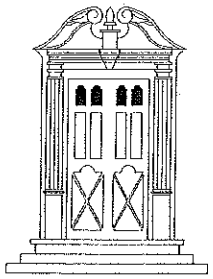
B. Assignment: The Contractor shall not assign or transfer any of its rights, duties or obligations under this Agreement without the written approval of the Owner.

C. Governing Law: This Agreement shall be governed by and construed in accordance with the law of the Commonwealth of Massachusetts.

D. By its signature hereon, the Contractor certifies, under the pains and penalties of perjury, that it has complied with all laws of the Commonwealth of Massachusetts relating to taxes, reporting of employees and contractors, and withholding and remitting child support.

IN WITNESS WHEREOF, the parties hereto have set their hands and seals, the Owner by its authorized representatives who, however, incur no personal liability by reason of the execution hereof or of anything herein contained, as of the day and year first above written.

ASBESTOS PROCEDURE ACKNOWLEDGEMENT FORM



incorporated 1783

Town of
LONGMEADOW, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

This notice should be distributed annually to all contractors and vendors conducing work in schools where asbestos has been identified, or is assumed to be present. Each contract should complete a copy of this notice and sign into the school's Visitor Log. The original copy will be maintained in the management plan.

Your work may disturb Asbestos Containing Materials ("ACM").

Location of Asbestos Containing Materials

A list of the known and presumed ACM is located in the "asbestos maintenance plan" binder of each school. You must review the list before conducting any work in this school building.

Disturbing Asbestos Containing Materials and Presumed Asbestos Containing Materials

- If you suspect a material may contain asbestos, contact the district Designated Person, ____TODD CARNEY_____ at __413-565-4232_____ before disturbing it.
- Personnel who disturb ACM must be properly trained, and use proper equipment and personal protective gear.
- Personnel who disturb ACM must follow the specific Operations and Maintenance Procedures in the school's management plan to ensure that school occupants are not exposed to asbestos dust, and ensure that asbestos dust does not contaminate building areas.
- A licensed Asbestos Contractor is required when more than three linear or square feet are disturbed.

Warning Signs are located in non-public maintenance areas. The lack of a warning sign does not indicate that no asbestos containing materials are present.

Please sign below and return this document to the school office as agreement that you have been notified of the presence of asbestos, and your acceptance that you will not disturb suspect asbestos containing materials.

Print Name:_____

TO BE COMPLETED UPON CONTRACT AWARD

Sig _____

Company_____

BID BOND

KNOW ALL PERSONS BY THESE PRESENTS, that we, the undersigned

_____ as Principal, and

_____ as Surety, are hereby held and firmly bound unto

The Town of Longmeadow, Massachusetts as Owner, in the penal sum of $ _____ (_____ dollars and _____ cents) for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, heirs, executors, administrators, successors and assigns.

Signed this_____ day of _____ 20___.

The Condition of the above obligation is such that whereas the Principal has submitted to **The Town of Longmeadow, Massachusetts** A certain BID, attached hereto and hereby made a part hereof, to enter into a contract in writing, for _____.

NOW, THEREFORE,

(a) If the said BID shall be rejected, or in the alternate,

(b) If said BID shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract contained in the Contract Document properly completed in accordance with said BID) and shall furnish a BOND for his/her faithful performance of said contract, and for a payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said BID. then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by an extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

_____ (SEAL)
Principal

_____
Surety

_____
By

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State of Massachusetts.

PAYMENT BOND

Know all persons by these presents, that _____ as principal,

and _____ as surety are held and firmly bound unto **The Town of Longmeadow, Massachusetts** the sum of _____ lawful money of the United States of America, for a **100% Payment Bond** to be paid to **The Town of Longmeadow, Massachusetts** for which payments, well and truly to be made, we bind ourselves, our respective heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents. Whereas, the said principal has made a contract with **The Town of Longmeadow, Massachusetts** bearing the date of _____, 20 ____ for the construction of the Project entitled:

PROJECT TITLE: BOILER REPLACEMENTS

Now the condition of this obligation is such that if the principal shall pay for all labor performed or furnished and for all materials used or employed in said contract and in any and all duly authorized modifications, alterations, extensions of time, changes or additions to said contract that may hereafter be made, notice to the surety of such modifications, alterations, extensions of time, changes or additional being hereby waived, the foregoing to include any other purposes or items set out in, and to be subject to, provisions of Massachusetts General Laws Chapter 149, Section 29, as amended, then this obligation shall become null and void; otherwise, it shall remain in full force and effect.

In witness whereof we hereunto set outs hands and seals this _____ day of _____, 20 ___.

By _____
(Seal) Principal

By _____
(Seal) Surety

Surety Agent _____
Address _____
_____
Telephone _____

PERFORMANCE BOND

Know all persons by these presents, that _____ as principal, and _____ as surety, are held and firmly bound unto **The Town of Longmeadow, Massachusetts** in the sum of _____ lawful money of the United States of America, for a **100% Performance Bond** to be paid to **The Town of Longmeadow, Massachusetts** for which payments, well and truly to be made, we find ourselves, or respective heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents. Whereas, the said principal has made a contract with **The Town of Longmeadow, Massachusetts** bearing the date of _____ 20___ for the construction of the Project entitled:

PROJECT TITLE: BOILER REPLACEMENTS

Now the condition of this obligation is such that if the principal shall well and truly keep and perform all the undertakings, covenants, agreements, terms, and conditions of said contract and any extensions thereof that may be granted by **The Town of Longmeadow, Massachusetts** and during the life of any guaranty required under the Contract, with or without notice to the surety, and shall also well and truly keep and perform all the undertakings, covenants, agreements, terms, and conditions of any and all duly authorized modifications, alterations, changes or additions to said contract that may hereafter be made, notice to the surety of such modifications, alterations, changes or additions being hereby waived, then this obligation shall become null and void; otherwise it shall remain in full force and effect.

In the event that the contract is abandoned by the Contractor, or is terminated by **The Town of Longmeadow, Massachusetts** said surety agrees that it shall, if requested in writing by **The Town of Longmeadow, Massachusetts** take such action as is necessary to complete the contract.

In witness whereof we hereunto set our hands and seals this _____ day of _____ 20___.

By _____
(Seal) Principal

By _____
(Seal) Surety

Countersigned Mass. Resident Agent
Surety Agent _____
Address _____
_____
Telephone _____

PREVAILING WAGE

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

Prevailing Wage Rates

CHARLES D. BAKER
Governor

KARYN E. POLITO
Lt. Governor

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

ROSALIN ACOSTA
Secretary

WILLIAM D MCKINNEY
Director

Awarding Authority: Town of Longmeadow

Contract Number:

City/Town: LONGMEADOW

Description of Work: Blueberry Hill School - Removal and disposal of boiler system, installation of new boiler system, abatement.

Job Location: Blueberry Hill School, 275 Blueberry Hill Rd

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 *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	06/01/2019	$34.25	$11.91	$12.70	$0.00	$58.86
	08/01/2019	$34.25	$12.41	$12.70	$0.00	$59.36
	12/01/2019	$34.25	$12.41	$13.72	$0.00	$60.38
	06/01/2020	$35.15	$12.41	$13.72	$0.00	$61.28
	08/01/2020	$35.15	$12.91	$13.72	$0.00	$61.78
	12/01/2020	$35.15	$12.91	$14.82	$0.00	$62.88
	06/01/2021	$35.95	$12.91	$14.82	$0.00	$63.68
	08/01/2021	$35.95	$13.41	$14.82	$0.00	$64.18
	12/01/2021	$35.95	$13.41	$16.01	$0.00	$65.37
(3 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	06/01/2019	$34.32	$11.91	$12.70	$0.00	$58.93
	08/01/2019	$34.32	$12.41	$12.70	$0.00	$59.43
	12/01/2019	$34.32	$12.41	$13.72	$0.00	$60.45
	06/01/2020	$35.22	$12.41	$13.72	$0.00	$61.35
	08/01/2020	$35.22	$12.91	$13.72	$0.00	$61.85
	12/01/2020	$35.22	$12.91	$14.82	$0.00	$62.95
	06/01/2021	$36.02	$12.91	$14.82	$0.00	$63.75
	08/01/2021	$36.02	$13.41	$14.82	$0.00	$64.25
	12/01/2021	$36.02	$13.41	$16.01	$0.00	$65.44
(4 & 5 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	06/01/2019	$34.44	$11.91	$12.70	$0.00	$59.05
	08/01/2019	$34.44	$12.41	$12.70	$0.00	$59.55
	12/01/2019	$34.44	$12.41	$13.72	$0.00	$60.57
	06/01/2020	$35.34	$12.41	$13.72	$0.00	$61.47
	08/01/2020	$35.34	$12.91	$13.72	$0.00	$61.97
	12/01/2020	$35.34	$12.91	$14.82	$0.00	$63.07
	06/01/2021	$36.14	$12.91	$14.82	$0.00	$63.87
	08/01/2021	$36.14	$13.41	$14.82	$0.00	$64.37
	12/01/2021	$36.14	$13.41	$16.01	$0.00	$65.56
ADS/SUBMERSIBLE PILOT *PILE DRIVER LOCAL 56 (ZONE 3)*	08/01/2018	$97.80	$9.90	$21.15	$0.00	$128.85
	08/01/2019	$102.78	$9.90	$21.15	$0.00	$133.83
For apprentice rates see "Apprentice- PILE DRIVER"						
AIR TRACK OPERATOR *LABORERS - ZONE 3 (BUILDING & SITE)*	06/03/2019	$32.25	$7.85	$14.22	$0.00	$54.32
	12/02/2019	$33.06	$7.85	$14.22	$0.00	$55.13
For apprentice rates see "Apprentice- LABORER"						
AIR TRACK OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2019	$32.25	$7.85	$12.18	$0.00	$52.28
	12/01/2019	$33.04	$7.85	$12.18	$0.00	$53.07
	06/01/2020	$33.85	$7.85	$12.18	$0.00	$53.88
	12/01/2020	$34.66	$7.85	$12.18	$0.00	$54.69
	06/01/2021	$35.50	$7.85	$12.18	$0.00	$55.53
	12/01/2021	$36.33	$7.85	$12.18	$0.00	$56.36
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
ASBESTOS WORKER (PIPES & TANKS) *HEAT & FROST INSULATORS LOCAL 6 (SPRINGFIELD)*	06/01/2019	$32.76	$12.50	$8.00	$0.00	$53.26
	12/01/2019	$33.66	$12.50	$8.00	$0.00	$54.16
	06/01/2020	$34.56	$12.50	$8.00	$0.00	$55.06
	12/01/2020	$35.46	$12.50	$8.00	$0.00	$55.96

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
ASPHALT RAKER *LABORERS - ZONE 3 (BUILDING & SITE)*	06/03/2019	$31.75	$7.85	$14.22	$0.00	$53.82
	12/02/2019	$32.56	$7.85	$14.22	$0.00	$54.63
For apprentice rates see "Apprentice- LABORER"						
ASPHALT RAKER (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2019	$31.75	$7.85	$12.18	$0.00	$51.78
	12/01/2019	$32.54	$7.85	$12.18	$0.00	$52.57
	06/01/2020	$33.35	$7.85	$12.18	$0.00	$53.38
	12/01/2020	$34.16	$7.85	$12.18	$0.00	$54.19
	06/01/2021	$35.00	$7.85	$12.18	$0.00	$55.03
	12/01/2021	$35.83	$7.85	$12.18	$0.00	$55.86
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
AUTOMATIC GRADER-EXCAVATOR (RECLAIMER) *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$35.05	$11.69	$14.08	$0.00	$60.82
	12/01/2019	$35.65	$11.69	$14.35	$0.00	$61.69
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BACKHOE/FRONT-END LOADER OPERATOR *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$35.05	$11.69	$14.08	$0.00	$60.82
	12/01/2019	$35.65	$11.69	$14.35	$0.00	$61.69
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BARCO-TYPE JUMPING TAMPER *LABORERS - ZONE 3 (BUILDING & SITE)*	06/03/2019	$31.75	$7.85	$14.22	$0.00	$53.82
	12/02/2019	$32.56	$7.85	$14.22	$0.00	$54.63
For apprentice rates see "Apprentice- LABORER"						
BATCH/CEMENT PLANT - ON SITE *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$34.52	$11.69	$14.08	$0.00	$60.29
	12/01/2019	$35.12	$11.69	$14.35	$0.00	$61.16
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BLOCK PAVER, RAMMER / CURB SETTER *LABORERS - ZONE 3 (BUILDING & SITE)*	06/03/2019	$32.25	$7.85	$14.22	$0.00	$54.32
	12/02/2019	$33.06	$7.85	$14.22	$0.00	$55.13
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2019	$32.25	$7.85	$12.18	$0.00	$52.28
	12/01/2019	$33.04	$7.85	$12.18	$0.00	$53.07
	06/01/2020	$33.85	$7.85	$12.18	$0.00	$53.88
	12/01/2020	$34.66	$7.85	$12.18	$0.00	$54.69
	06/01/2021	$35.50	$7.85	$12.18	$0.00	$55.53
	12/01/2021	$36.33	$7.85	$12.18	$0.00	$56.36
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
BOILER MAKER *BOILERMAKERS LOCAL 29*	01/01/2019	$44.71	$7.07	$17.72	$0.00	$69.50
	01/01/2020	$46.10	$7.07	$17.98	$0.00	$71.15

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *BOILERMAKER - Local 29*

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	$29.06	$7.07	$11.52	$0.00	$47.65
2	65	$29.06	$7.07	$11.52	$0.00	$47.65
3	70	$31.30	$7.07	$12.40	$0.00	$50.77
4	75	$33.53	$7.07	$13.30	$0.00	$53.90
5	80	$35.77	$7.07	$14.18	$0.00	$57.02
6	85	$38.00	$7.07	$15.07	$0.00	$60.14
7	90	$40.24	$7.07	$15.95	$0.00	$63.26
8	95	$42.47	$7.07	$16.84	$0.00	$66.38

Effective Date - 01/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	$29.97	$7.07	$11.69	$0.00	$48.73
2	65	$29.97	$7.07	$11.69	$0.00	$48.73
3	70	$32.27	$7.07	$12.59	$0.00	$51.93
4	75	$34.58	$7.07	$13.49	$0.00	$55.14
5	80	$36.88	$7.07	$14.38	$0.00	$58.33
6	85	$39.19	$7.07	$15.29	$0.00	$61.55
7	90	$41.49	$7.07	$16.18	$0.00	$64.74
8	95	$43.80	$7.07	$17.09	$0.00	$67.96

Notes:

Apprentice to Journeyworker Ratio:1:4

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING) *BRICKLAYERS LOCAL 3 (SPRINGFIELD/PITTSFIELD)*	02/01/2019	$41.96	$10.75	$18.77	$0.00	$71.48
	08/01/2019	$42.81	$10.75	$19.41	$0.00	$72.97
	02/01/2020	$43.36	$10.75	$19.41	$0.00	$73.52
	08/01/2020	$44.71	$10.75	$19.56	$0.00	$75.02
	02/01/2021	$45.26	$10.75	$19.56	$0.00	$75.57
	08/01/2021	$46.66	$10.75	$19.72	$0.00	$77.13
	02/01/2022	$47.19	$10.75	$19.72	$0.00	$77.66

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *BRICK/PLASTER/CEMENT MASON - Local 3 Springfield/Pittsfield*

Effective Date - 02/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.98	$10.75	$18.77	$0.00	$50.50
2	60	$25.18	$10.75	$18.77	$0.00	$54.70
3	70	$29.37	$10.75	$18.77	$0.00	$58.89
4	80	$33.57	$10.75	$18.77	$0.00	$63.09
5	90	$37.76	$10.75	$18.77	$0.00	$67.28

Effective Date - 08/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.41	$10.75	$19.41	$0.00	$51.57
2	60	$25.69	$10.75	$19.41	$0.00	$55.85
3	70	$29.97	$10.75	$19.41	$0.00	$60.13
4	80	$34.25	$10.75	$19.41	$0.00	$64.41
5	90	$38.53	$10.75	$19.41	$0.00	$68.69

Notes:

Apprentice to Journeyworker Ratio:1:5

BULLDOZER/POWER SHOVEL/TREE SHREDDER /CLAM SHELL*OPERATING ENGINEERS LOCAL 98*	06/01/2019	$35.05	$11.69	$14.08	$0.00	$60.82
	12/01/2019	$35.65	$11.69	$14.35	$0.00	$61.69
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
CAISSON & UNDERPINNING BOTTOM MAN *LABORERS - FOUNDATION AND MARINE*	06/01/2019	$40.25	$7.85	$16.05	$0.00	$64.15
	12/01/2019	$41.25	$7.85	$16.05	$0.00	$65.15
	06/01/2020	$42.24	$7.85	$16.05	$0.00	$66.14
	12/01/2020	$43.22	$7.85	$16.05	$0.00	$67.12
	06/01/2021	$44.24	$7.85	$16.05	$0.00	$68.14
	12/01/2021	$45.25	$7.85	$16.05	$0.00	$69.15
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING LABORER *LABORERS - FOUNDATION AND MARINE*	06/01/2019	$39.10	$7.85	$16.05	$0.00	$63.00
	12/01/2019	$40.10	$7.85	$16.05	$0.00	$64.00
	06/01/2020	$41.09	$7.85	$16.05	$0.00	$64.99
	12/01/2020	$42.07	$7.85	$16.05	$0.00	$65.97
	06/01/2021	$43.09	$7.85	$16.05	$0.00	$66.99
	12/01/2021	$44.10	$7.85	$16.05	$0.00	$68.00
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING TOP MAN *LABORERS - FOUNDATION AND MARINE*	06/01/2019	$39.10	$7.85	$16.05	$0.00	$63.00
	12/01/2019	$40.10	$7.85	$16.05	$0.00	$64.00
	06/01/2020	$41.09	$7.85	$16.05	$0.00	$64.99
	12/01/2020	$42.07	$7.85	$16.05	$0.00	$65.97
	06/01/2021	$43.09	$7.85	$16.05	$0.00	$66.99
	12/01/2021	$44.10	$7.85	$16.05	$0.00	$68.00
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CARBIDE CORE DRILL OPERATOR *LABORERS - ZONE 3 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	06/03/2019	$31.75	$7.85	$14.22	$0.00	$53.82
	12/02/2019	$32.56	$7.85	$14.22	$0.00	$54.63
CARPENTER *CARPENTERS LOCAL 108 - HAMPDEN HAMPSHIRE FRANKLIN*	03/04/2019	$38.64	$8.26	$15.00	$0.00	$61.90

Apprentice - *CARPENTER - Local 108 Hampden Hampshire Franklin*

Effective Date - 03/04/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.32	$8.26	$1.22	$0.00	$28.80
2	60	$23.18	$8.26	$1.22	$0.00	$32.66
3	70	$27.05	$8.26	$11.34	$0.00	$46.65
4	75	$28.98	$8.26	$11.34	$0.00	$48.58
5	80	$30.91	$8.26	$12.56	$0.00	$51.73
6	80	$30.91	$8.26	$12.56	$0.00	$51.73
7	90	$34.78	$8.26	$13.78	$0.00	$56.82
8	90	$34.78	$8.26	$13.78	$0.00	$56.82

Notes:

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80
Step 1&2 $25.93/ 3&4 $30.77/ 5&6 $46.41/ 7&8 $51.29

Apprentice to Journeyworker Ratio:1:5

CARPENTER WOOD FRAME *CARPENTERS LOCAL 108 - HAMPDEN HAMPSHIRE FRANKLIN* All Aspects of New Wood Frame Work	04/01/2019	$23.10	$7.07	$7.86	$0.00	$38.03
	10/01/2019	$23.49	$7.07	$7.86	$0.00	$38.42

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *CARPENTER (Wood Frame) - 108 Hampden Hampshire*

Effective Date - 04/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$13.86	$7.07	$0.00	$0.00	$20.93
2	60	$13.86	$7.07	$0.00	$0.00	$20.93
3	65	$15.02	$7.07	$7.86	$0.00	$29.95
4	70	$16.17	$7.07	$7.86	$0.00	$31.10
5	75	$17.33	$7.07	$7.86	$0.00	$32.26
6	80	$18.48	$7.07	$7.86	$0.00	$33.41
7	85	$19.64	$7.07	$7.86	$0.00	$34.57
8	90	$20.79	$7.07	$7.86	$0.00	$35.72

Effective Date - 10/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$14.09	$7.07	$0.00	$0.00	$21.16
2	60	$14.09	$7.07	$0.00	$0.00	$21.16
3	65	$15.27	$7.07	$7.86	$0.00	$30.20
4	70	$16.44	$7.07	$7.86	$0.00	$31.37
5	75	$17.62	$7.07	$7.86	$0.00	$32.55
6	80	$18.79	$7.07	$7.86	$0.00	$33.72
7	85	$19.97	$7.07	$7.86	$0.00	$34.90
8	90	$21.14	$7.07	$7.86	$0.00	$36.07

Notes:

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80
Step 1&2 $17.47/ 3&4 $24.53/ 5&6 $31.10/ 7&8 $33.41

Apprentice to Journeyworker Ratio:1:5

CEMENT MASONRY/PLASTERING *BRICKLAYERS LOCAL 3 (SPRINGFIELD/PITTSFIELD)*	07/01/2019	$40.46	$12.70	$17.64	$0.62	$71.42
	01/01/2020	$41.94	$12.70	$17.64	$0.62	$72.90

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *CEMENT MASONRY/PLASTERING - Springfield/Pittsfield*

Effective Date - 07/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.23	$12.70	$15.41	$0.00	$48.34
2	60	$24.28	$12.70	$17.64	$0.62	$55.24
3	65	$26.30	$12.70	$17.64	$0.62	$57.26
4	70	$28.32	$12.70	$17.64	$0.62	$59.28
5	75	$30.35	$12.70	$17.64	$0.62	$61.31
6	80	$32.37	$12.70	$17.64	$0.62	$63.33
7	90	$36.41	$12.70	$17.64	$0.62	$67.37

Effective Date - 01/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.97	$12.70	$15.41	$0.00	$49.08
2	60	$25.16	$12.70	$17.64	$0.62	$56.12
3	65	$27.26	$12.70	$17.64	$0.62	$58.22
4	70	$29.36	$12.70	$17.64	$0.62	$60.32
5	75	$31.46	$12.70	$17.64	$0.62	$62.42
6	80	$33.55	$12.70	$17.64	$0.62	$64.51
7	90	$37.75	$12.70	$17.64	$0.62	$68.71

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 3 (BUILDING & SITE)*	06/03/2019	$31.75	$7.85	$14.22	$0.00	$53.82
	12/02/2019	$32.56	$7.85	$14.22	$0.00	$54.63
For apprentice rates see "Apprentice- LABORER"						
COMPRESSOR OPERATOR *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$34.52	$11.69	$14.08	$0.00	$60.29
	12/01/2019	$35.12	$11.69	$14.35	$0.00	$61.16
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
CRANE OPERATOR *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$38.55	$11.69	$14.08	$0.00	$64.32
	12/01/2019	$39.15	$11.69	$14.35	$0.00	$65.19
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DELEADER (BRIDGE) *PAINTERS LOCAL 35 - ZONE 3*	07/01/2019	$50.66	$8.20	$21.45	$0.00	$80.31
	01/01/2020	$50.96	$8.20	$22.10	$0.00	$81.26
	07/01/2020	$52.06	$8.20	$22.10	$0.00	$82.36
	01/01/2021	$53.16	$8.20	$22.10	$0.00	$83.46

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 07/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.33	$8.20	$0.00	$0.00	$33.53
2	55	$27.86	$8.20	$5.78	$0.00	$41.84
3	60	$30.40	$8.20	$6.30	$0.00	$44.90
4	65	$32.93	$8.20	$6.83	$0.00	$47.96
5	70	$35.46	$8.20	$18.30	$0.00	$61.96
6	75	$38.00	$8.20	$18.83	$0.00	$65.03
7	80	$40.53	$8.20	$19.35	$0.00	$68.08
8	90	$45.59	$8.20	$20.40	$0.00	$74.19

Effective Date - 01/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.48	$8.20	$0.00	$0.00	$33.68
2	55	$28.03	$8.20	$5.94	$0.00	$42.17
3	60	$30.58	$8.20	$6.48	$0.00	$45.26
4	65	$33.12	$8.20	$7.02	$0.00	$48.34
5	70	$35.67	$8.20	$18.51	$0.00	$62.38
6	75	$38.22	$8.20	$19.05	$0.00	$65.47
7	80	$40.77	$8.20	$19.59	$0.00	$68.56
8	90	$45.86	$8.20	$20.67	$0.00	$74.73

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

DEMO: ADZEMAN *LABORERS - ZONE 3 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	06/01/2019	$39.30	$7.85	$15.85	$0.00	$63.00
	12/01/2019	$40.30	$7.85	$15.85	$0.00	$64.00
DEMO: BACKHOE/LOADER/HAMMER OPERATOR *LABORERS - ZONE 3 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	06/01/2019	$40.30	$7.85	$15.85	$0.00	$64.00
	12/01/2019	$41.30	$7.85	$15.85	$0.00	$65.00
DEMO: BURNERS *LABORERS - ZONE 3 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	06/01/2019	$40.05	$7.85	$15.85	$0.00	$63.75
	12/01/2019	$41.05	$7.85	$15.85	$0.00	$64.75
DEMO: CONCRETE CUTTER/SAWYER *LABORERS - ZONE 3 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	06/01/2019	$40.30	$7.85	$15.85	$0.00	$64.00
	12/01/2019	$41.30	$7.85	$15.85	$0.00	$65.00
DEMO: JACKHAMMER OPERATOR *LABORERS - ZONE 3 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	06/01/2019	$40.05	$7.85	$15.85	$0.00	$63.75
	12/01/2019	$41.05	$7.85	$15.85	$0.00	$64.75
DEMO: WRECKING LABORER *LABORERS - ZONE 3 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	06/01/2019	$39.30	$7.85	$15.85	$0.00	$63.00
	12/01/2019	$40.30	$7.85	$15.85	$0.00	$64.00

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DIVER *PILE DRIVER LOCAL 56 (ZONE 3)* For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2018	$65.20	$9.90	$21.15	$0.00	$96.25
	08/01/2019	$68.52	$9.90	$21.15	$0.00	$99.57
DIVER TENDER *PILE DRIVER LOCAL 56 (ZONE 3)* For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2018	$46.57	$9.90	$21.15	$0.00	$77.62
	08/01/2019	$48.94	$9.90	$21.15	$0.00	$79.99
DIVER TENDER (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 3)* For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2018	$69.86	$9.90	$21.15	$0.00	$100.91
	08/01/2019	$73.41	$9.90	$21.15	$0.00	$104.46
DIVER/SLURRY (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 3)* For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2018	$97.80	$9.90	$21.15	$0.00	$128.85
	08/01/2019	$102.78	$9.90	$21.15	$0.00	$133.83
ELECTRICIAN (Including Core Drilling) *ELECTRICIANS LOCAL 7*	06/30/2019	$42.66	$10.75	$12.33	$0.00	$65.74
	12/29/2019	$43.41	$11.00	$12.60	$0.00	$67.01

Apprentice - *ELECTRICIAN - Local 7*

Effective Date - 06/30/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$17.06	$5.85	$0.51	$0.00	$23.42
2	45	$19.20	$5.85	$0.58	$0.00	$25.63
3	50	$21.33	$10.75	$6.94	$0.00	$39.02
4	55	$23.46	$10.75	$7.00	$0.00	$41.21
5	65	$27.73	$10.75	$8.13	$0.00	$46.61
6	70	$29.86	$10.75	$9.20	$0.00	$49.81

Notes:
Steps 1-2 are 1000 hrs; Steps 3-6 are 1500 hrs.

Apprentice to Journeyworker Ratio:2:3****

ELEVATOR CONSTRUCTOR *ELEVATOR CONSTRUCTORS LOCAL 41*	01/01/2019	$53.11	$15.58	$17.51	$0.00	$86.20
	01/01/2020	$54.85	$15.73	$18.41	$0.00	$88.99
	01/01/2021	$56.69	$15.88	$19.31	$0.00	$91.88
	01/01/2022	$58.62	$16.03	$20.21	$0.00	$94.86

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ELEVATOR CONSTRUCTOR - Local 41*

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.56	$15.58	$0.00	$0.00	$42.14
2	55	$29.21	$15.58	$17.51	$0.00	$62.30
3	65	$34.52	$15.58	$17.51	$0.00	$67.61
4	70	$37.18	$15.58	$17.51	$0.00	$70.27
5	80	$42.49	$15.58	$17.51	$0.00	$75.58

Effective Date - 01/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$27.43	$15.73	$0.00	$0.00	$43.16
2	55	$30.17	$15.73	$18.41	$0.00	$64.31
3	65	$35.65	$15.73	$18.41	$0.00	$69.79
4	70	$38.40	$15.73	$18.41	$0.00	$72.54
5	80	$43.88	$15.73	$18.41	$0.00	$78.02

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

Apprentice to Journeyworker Ratio:1:1

ELEVATOR CONSTRUCTOR HELPER *ELEVATOR CONSTRUCTORS LOCAL 41*	01/01/2019	$37.18	$15.58	$17.51	$0.00	$70.27
	01/01/2020	$38.40	$15.73	$18.41	$0.00	$72.54
	01/01/2021	$39.68	$15.88	$19.31	$0.00	$74.87
	01/01/2022	$41.03	$16.03	$20.21	$0.00	$77.27
For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"						
FENCE & GUARD RAIL ERECTOR (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2019	$31.75	$7.85	$12.18	$0.00	$51.78
	12/01/2019	$32.54	$7.85	$12.18	$0.00	$52.57
	06/01/2020	$33.35	$7.85	$12.18	$0.00	$53.38
	12/01/2020	$34.16	$7.85	$12.18	$0.00	$54.19
	06/01/2021	$35.00	$7.85	$12.18	$0.00	$55.03
	12/01/2021	$35.83	$7.85	$12.18	$0.00	$55.86
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
FIELD ENG.INST/ROD-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 98*	06/01/1999	$18.84	$4.80	$4.10	$0.00	$27.74
FIELD ENG.PARTY CHIEF:BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 98*	06/01/1999	$21.33	$4.80	$4.10	$0.00	$30.23
FIELD ENG.SURVEY CHIEF-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 98*	06/01/1999	$22.33	$4.80	$4.10	$0.00	$31.23
FIRE ALARM INSTALLER *ELECTRICIANS LOCAL 7*	06/30/2019	$42.66	$10.75	$12.33	$0.00	$65.74
	12/29/2019	$43.41	$11.00	$12.60	$0.00	$67.01
For apprentice rates see "Apprentice- ELECTRICIAN"						
FIRE ALARM REPAIR / MAINTENANCE / COMMISSIONING*ELECTRICIANS LOCAL 7*	06/30/2019	$42.66	$10.75	$12.33	$0.00	$65.74
	12/29/2019	$43.41	$11.00	$12.60	$0.00	$67.01
For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIREMAN *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$34.52	$11.69	$14.08	$0.00	$60.29
	12/01/2019	$35.12	$11.69	$14.35	$0.00	$61.16

Apprentice - *OPERATING ENGINEERS - Local 98 Class 3*

Effective Date - 06/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$20.71	$11.69	$14.08	$0.00	$46.48
2	70	$24.16	$11.69	$14.08	$0.00	$49.93
3	80	$27.62	$11.69	$14.08	$0.00	$53.39
4	90	$31.07	$11.69	$14.08	$0.00	$56.84

Effective Date - 12/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$21.07	$11.69	$14.35	$0.00	$47.11
2	70	$24.58	$11.69	$14.35	$0.00	$50.62
3	80	$28.10	$11.69	$14.35	$0.00	$54.14
4	90	$31.61	$11.69	$14.35	$0.00	$57.65

Notes:
Steps 1-2 are 1000 hrs.; Steps 3-4 are 2000 hrs.

Apprentice to Journeyworker Ratio:1:6

FLAGGER & SIGNALER (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2019	$22.50	$7.85	$12.18	$0.00	$42.53
	12/01/2019	$23.50	$7.85	$12.18	$0.00	$43.53
	06/01/2020	$23.50	$7.85	$12.18	$0.00	$43.53
	12/01/2020	$24.50	$7.85	$12.18	$0.00	$44.53
	06/01/2021	$24.50	$7.85	$12.18	$0.00	$44.53
	12/01/2021	$24.50	$7.85	$12.18	$0.00	$44.53
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
FLOORCOVERER *FLOORCOVERERS LOCAL 2168 ZONE III*	03/01/2016	$32.60	$8.55	$14.42	$0.00	$55.57

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *FLOORCOVERER - Local 2168 Zone III*

Effective Date - 03/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$16.30	$8.55	$1.20	$0.00	$26.05
2	55	$17.93	$8.55	$1.20	$0.00	$27.68
3	60	$19.56	$8.55	$10.82	$0.00	$38.93
4	65	$21.19	$8.55	$10.82	$0.00	$40.56
5	70	$22.82	$8.55	$12.02	$0.00	$43.39
6	75	$24.45	$8.55	$12.02	$0.00	$45.02
7	80	$26.08	$8.55	$13.22	$0.00	$47.85
8	85	$27.71	$8.55	$13.22	$0.00	$49.48

Notes: Steps are 750 hrs.
% After 09/1/17; 45/45/55/55/70/70/80/80 (1500hr Steps)
Step 1&2 $24.42/ 3&4 $28.84/ 5&6 $43.39/ 7&8 $47.85

Apprentice to Journeyworker Ratio:1:1

FORK LIFT *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$34.74	$11.69	$14.08	$0.00	$60.51
	12/01/2019	$35.34	$11.69	$14.35	$0.00	$61.38
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GENERATORS/LIGHTING PLANTS *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$31.29	$11.69	$14.08	$0.00	$57.06
	12/01/2019	$31.89	$11.69	$14.35	$0.00	$57.93
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS) *GLAZIERS LOCAL 1333*	06/01/2019	$38.18	$10.60	$9.90	$0.00	$58.68
	06/01/2020	$39.18	$10.80	$10.45	$0.00	$60.43

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *GLAZIER - Local 1333*

Effective Date - 06/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.09	$10.60	$1.80	$0.00	$31.49
2	56	$21.48	$10.60	$1.80	$0.00	$33.88
3	63	$23.86	$10.60	$2.40	$0.00	$36.86
4	69	$26.25	$10.60	$2.40	$0.00	$39.25
5	75	$28.64	$10.60	$2.90	$0.00	$42.14
6	81	$31.02	$10.60	$2.90	$0.00	$44.52
7	88	$33.41	$10.60	$9.90	$0.00	$53.91
8	94	$35.79	$10.60	$9.90	$0.00	$56.29

Effective Date - 06/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.59	$10.80	$1.80	$0.00	$32.19
2	56	$22.04	$10.80	$1.80	$0.00	$34.64
3	63	$24.49	$10.80	$2.45	$0.00	$37.74
4	69	$26.94	$10.80	$2.45	$0.00	$40.19
5	75	$29.39	$10.80	$3.15	$0.00	$43.34
6	81	$31.83	$10.80	$3.15	$0.00	$45.78
7	88	$34.28	$10.80	$10.45	$0.00	$55.53
8	94	$36.73	$10.80	$10.45	$0.00	$57.98

Notes:

Apprentice to Journeyworker Ratio:1:3

GRADER/TRENCHING MACHINE/DERRICK *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$35.05	$11.69	$14.08	$0.00	$60.82
	12/01/2019	$35.65	$11.69	$14.35	$0.00	$61.69
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
HVAC (DUCTWORK) *SHEETMETAL WORKERS LOCAL 63*	07/01/2019	$35.74	$10.64	$16.22	$1.77	$64.37
	01/01/2020	$36.99	$10.64	$16.22	$1.77	$65.62
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (ELECTRICAL CONTROLS) *ELECTRICIANS LOCAL 7*	06/30/2019	$42.66	$10.75	$12.33	$0.00	$65.74
	12/29/2019	$43.41	$11.00	$12.60	$0.00	$67.01
For apprentice rates see "Apprentice- ELECTRICIAN"						
HVAC (TESTING AND BALANCING - AIR) *SHEETMETAL WORKERS LOCAL 63*	07/01/2019	$35.74	$10.64	$16.22	$1.77	$64.37
	01/01/2020	$36.99	$10.64	$16.22	$1.77	$65.62
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (TESTING AND BALANCING -WATER) *PLUMBERS & PIPEFITTERS LOCAL 104*	03/17/2019	$40.21	$8.75	$16.35	$0.00	$65.31
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HVAC MECHANIC *PLUMBERS & PIPEFITTERS LOCAL 104*	03/17/2019	$40.21	$8.75	$16.35	$0.00	$65.31
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
HYDRAULIC DRILLS (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2019	$32.25	$7.85	$12.18	$0.00	$52.28
	12/01/2019	$33.04	$7.85	$12.18	$0.00	$53.07
	06/01/2020	$33.85	$7.85	$12.18	$0.00	$53.88
	12/01/2020	$34.66	$7.85	$12.18	$0.00	$54.69
	06/01/2021	$35.50	$7.85	$12.18	$0.00	$55.53
	12/01/2021	$36.33	$7.85	$12.18	$0.00	$56.36
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
INSULATOR (PIPES & TANKS) *HEAT & FROST INSULATORS LOCAL 6 (SPRINGFIELD)*	09/01/2018	$37.67	$12.50	$15.60	$0.00	$65.77
	09/01/2019	$39.67	$12.50	$15.60	$0.00	$67.77

Apprentice - *ASBESTOS INSULATOR (Pipes & Tanks) - Local 6 Springfield*

Effective Date - 09/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$18.84	$12.50	$11.40	$0.00	$42.74
2	60	$22.60	$12.50	$12.24	$0.00	$47.34
3	70	$26.37	$12.50	$13.08	$0.00	$51.95
4	80	$30.14	$12.50	$13.92	$0.00	$56.56

Effective Date - 09/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.84	$12.50	$11.40	$0.00	$43.74
2	60	$23.80	$12.50	$12.24	$0.00	$48.54
3	70	$27.77	$12.50	$13.08	$0.00	$53.35
4	80	$31.74	$12.50	$13.92	$0.00	$58.16

Notes:
Steps are 1 year

Apprentice to Journeyworker Ratio:1:4

IRONWORKER/WELDER *IRONWORKERS LOCAL 7 (SPRINGFIELD AREA)*	03/16/2019	$34.20	$8.00	$20.75	$0.00	$62.95
	09/16/2019	$35.10	$8.00	$20.75	$0.00	$63.85
	03/16/2020	$35.95	$8.00	$20.75	$0.00	$64.70
	09/16/2020	$36.85	$8.00	$20.75	$0.00	$65.60
	03/16/2021	$37.70	$8.00	$20.75	$0.00	$66.45

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *IRONWORKER - Local 7 Springfield*

Effective Date - 03/16/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$20.52	$8.00	$20.75	$0.00	$49.27
2	70	$23.94	$8.00	$20.75	$0.00	$52.69
3	75	$25.65	$8.00	$20.75	$0.00	$54.40
4	80	$27.36	$8.00	$20.75	$0.00	$56.11
5	85	$29.07	$8.00	$20.75	$0.00	$57.82
6	90	$30.78	$8.00	$20.75	$0.00	$59.53

Effective Date - 09/16/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$21.06	$8.00	$20.75	$0.00	$49.81
2	70	$24.57	$8.00	$20.75	$0.00	$53.32
3	75	$26.33	$8.00	$20.75	$0.00	$55.08
4	80	$28.08	$8.00	$20.75	$0.00	$56.83
5	85	$29.84	$8.00	$20.75	$0.00	$58.59
6	90	$31.59	$8.00	$20.75	$0.00	$60.34

Notes:
Structural 1:6; Ornamental 1:4

Apprentice to Journeyworker Ratio:

JACKHAMMER & PAVING BREAKER OPERATOR *LABORERS - ZONE 3 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	06/03/2019	$31.75	$7.85	$14.22	$0.00	$53.82
	12/02/2019	$32.56	$7.85	$14.22	$0.00	$54.63
LABORER *LABORERS - ZONE 3 (BUILDING & SITE)*	06/03/2019	$31.50	$7.85	$14.22	$0.00	$53.57
	12/02/2019	$32.31	$7.85	$14.22	$0.00	$54.38

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *LABORER - Zone 3 Building & Site*

Effective Date - 06/03/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$18.90	$7.85	$14.22	$0.00	$40.97
2	70	$22.05	$7.85	$14.22	$0.00	$44.12
3	80	$25.20	$7.85	$14.22	$0.00	$47.27
4	90	$28.35	$7.85	$14.22	$0.00	$50.42

Effective Date - 12/02/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$19.39	$7.85	$14.22	$0.00	$41.46
2	70	$22.62	$7.85	$14.22	$0.00	$44.69
3	80	$25.85	$7.85	$14.22	$0.00	$47.92
4	90	$29.08	$7.85	$14.22	$0.00	$51.15

Notes:

Apprentice to Journeyworker Ratio:1:5

LABORER (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2019	$31.50	$7.85	$12.18	$0.00	$51.53
	12/01/2019	$32.29	$7.85	$12.18	$0.00	$52.32
	06/01/2020	$33.10	$7.85	$12.18	$0.00	$53.13
	12/01/2020	$33.91	$7.85	$12.18	$0.00	$53.94
	06/01/2021	$34.75	$7.85	$12.18	$0.00	$54.78
	12/01/2021	$35.58	$7.85	$12.18	$0.00	$55.61

Apprentice - *LABORER (Heavy & Highway) - Zone 3*

Effective Date - 06/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$18.90	$7.85	$12.18	$0.00	$38.93
2	70	$22.05	$7.85	$12.18	$0.00	$42.08
3	80	$25.20	$7.85	$12.18	$0.00	$45.23
4	90	$28.35	$7.85	$12.18	$0.00	$48.38

Effective Date - 12/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$19.37	$7.85	$12.18	$0.00	$39.40
2	70	$22.60	$7.85	$12.18	$0.00	$42.63
3	80	$25.83	$7.85	$12.18	$0.00	$45.86
4	90	$29.06	$7.85	$12.18	$0.00	$49.09

Notes:

Apprentice to Journeyworker Ratio:1:5

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
LABORER: CARPENTER TENDER *LABORERS - ZONE 3 (BUILDING & SITE)*	06/03/2019	$31.50	$7.85	$14.22	$0.00	$53.57
	12/02/2019	$32.31	$7.85	$14.22	$0.00	$54.38
For apprentice rates see "Apprentice- LABORER"						
LABORER: CEMENT FINISHER TENDER *LABORERS - ZONE 3 (BUILDING & SITE)*	06/03/2019	$31.75	$7.85	$14.22	$0.00	$53.82
	12/02/2019	$32.56	$7.85	$14.22	$0.00	$54.63
For apprentice rates see "Apprentice- LABORER"						
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER *LABORERS - ZONE 3 (BUILDING & SITE)*	06/01/2019	$31.60	$7.85	$14.22	$0.00	$53.67
	12/01/2019	$32.41	$7.85	$14.22	$0.00	$54.48
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER *LABORERS - ZONE 3 (BUILDING & SITE)*	06/03/2019	$32.50	$7.85	$14.22	$0.00	$54.57
	12/02/2019	$33.31	$7.85	$14.22	$0.00	$55.38
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2019	$31.75	$7.85	$12.18	$0.00	$51.78
	12/01/2019	$32.54	$7.85	$12.18	$0.00	$52.57
	06/01/2020	$33.35	$7.85	$12.18	$0.00	$53.38
	12/01/2020	$34.16	$7.85	$12.18	$0.00	$54.19
	06/01/2021	$35.00	$7.85	$12.18	$0.00	$55.03
	12/01/2021	$35.83	$7.85	$12.18	$0.00	$55.86
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
LABORER: MULTI-TRADE TENDER *LABORERS - ZONE 3 (BUILDING & SITE)*	06/03/2019	$31.50	$7.85	$14.22	$0.00	$53.57
	12/02/2019	$32.31	$7.85	$14.22	$0.00	$54.38
For apprentice rates see "Apprentice- LABORER"						
LABORER: TREE REMOVER *LABORERS - ZONE 3 (BUILDING & SITE)*	06/03/2019	$31.50	$7.85	$14.22	$0.00	$53.57
	12/02/2019	$32.31	$7.85	$14.22	$0.00	$54.38
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 *LABORERS - ZONE 3 (BUILDING & SITE)*	06/03/2019	$31.75	$7.85	$14.22	$0.00	$53.82
	12/02/2019	$32.56	$7.85	$14.22	$0.00	$54.63
For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2019	$31.75	$7.85	$12.18	$0.00	$51.78
	12/01/2019	$32.54	$7.85	$12.18	$0.00	$52.57
	06/01/2020	$33.35	$7.85	$12.18	$0.00	$53.38
	12/01/2020	$34.16	$7.85	$12.18	$0.00	$54.19
	06/01/2021	$35.00	$7.85	$12.18	$0.00	$55.03
	12/01/2021	$35.83	$7.85	$12.18	$0.00	$55.86
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
MARBLE & TILE FINISHERS *BRICKLAYERS LOCAL 3 (SPR/PITT) - MARBLE & TILE*	02/01/2019	$34.67	$10.75	$18.26	$0.00	$63.68
	08/01/2019	$35.17	$10.75	$18.87	$0.00	$64.79
	02/01/2020	$35.67	$10.75	$18.87	$0.00	$65.29
	08/01/2020	$36.67	$10.75	$18.99	$0.00	$66.41
	02/01/2021	$37.17	$10.75	$18.99	$0.00	$66.91
	08/01/2021	$38.17	$10.75	$19.12	$0.00	$68.04
	02/01/2022	$38.62	$10.75	$19.12	$0.00	$68.49

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *MARBLE-TILE FINISHER-Local 3 Marble/Tile (Spr/Pitt)*

Effective Date - 02/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$17.34	$10.75	$18.26	$0.00	$46.35
2	60	$20.80	$10.75	$18.26	$0.00	$49.81
3	70	$24.27	$10.75	$18.26	$0.00	$53.28
4	80	$27.74	$10.75	$18.26	$0.00	$56.75
5	90	$31.20	$10.75	$18.26	$0.00	$60.21

Effective Date - 08/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$17.59	$10.75	$18.87	$0.00	$47.21
2	60	$21.10	$10.75	$18.87	$0.00	$50.72
3	70	$24.62	$10.75	$18.87	$0.00	$54.24
4	80	$28.14	$10.75	$18.87	$0.00	$57.76
5	90	$31.65	$10.75	$18.87	$0.00	$61.27

Notes:

Apprentice to Journeyworker Ratio:1:5

MARBLE MASON/TILE LAYER(SP/PT)SeeBrick
BRICKLAYERS LOCAL 3 (SPR/PITT) - MARBLE & TILE

See "BRICK/STONE/ARTIFICIAL MASONRY(INCL.MASONRY WATERPROOFING)

MECH. SWEEPER OPERATOR (ON CONST. SITES) *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$35.05	$11.69	$14.08	$0.00	$60.82
	12/01/2019	$35.65	$11.69	$14.35	$0.00	$61.69
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MECHANIC/WELDER/BOOM TRUCK *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$34.52	$11.69	$14.08	$0.00	$60.29
	12/01/2019	$35.12	$11.69	$14.35	$0.00	$61.16
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MILLWRIGHT (Zone 3) *MILLWRIGHTS LOCAL 1121 - Zone 3*	04/01/2019	$37.11	$9.90	$18.50	$0.00	$65.51

Apprentice - *MILLWRIGHT - Local 1121 Zone 3*

Effective Date - 04/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$20.41	$9.90	$5.31	$0.00	$35.62
2	65	$24.12	$9.90	$15.13	$0.00	$49.15
3	75	$27.83	$9.90	$16.10	$0.00	$53.83
4	85	$31.54	$9.90	$17.06	$0.00	$58.50

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 *LABORERS - ZONE 3 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	06/03/2019	$31.75	$7.85	$14.22	$0.00	$53.82
	12/02/2019	$32.56	$7.85	$14.22	$0.00	$54.63
OILER *OPERATING ENGINEERS LOCAL 98* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	06/01/2019	$30.21	$11.69	$14.08	$0.00	$55.98
	12/01/2019	$30.81	$11.69	$14.35	$0.00	$56.85
OTHER POWER DRIVEN EQUIPMENT - CLASS VI *OPERATING ENGINEERS LOCAL 98* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	06/01/2019	$28.23	$11.69	$14.08	$0.00	$54.00
	12/01/2019	$28.83	$11.69	$14.35	$0.00	$54.87
PAINTER (BRIDGES/TANKS) *PAINTERS LOCAL 35 - ZONE 3*	07/01/2019	$50.66	$8.20	$21.45	$0.00	$80.31
	01/01/2020	$50.96	$8.20	$22.10	$0.00	$81.26
	07/01/2020	$52.06	$8.20	$22.10	$0.00	$82.36
	01/01/2021	$53.16	$8.20	$22.10	$0.00	$83.46

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 07/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.33	$8.20	$0.00	$0.00	$33.53
2	55	$27.86	$8.20	$5.78	$0.00	$41.84
3	60	$30.40	$8.20	$6.30	$0.00	$44.90
4	65	$32.93	$8.20	$6.83	$0.00	$47.96
5	70	$35.46	$8.20	$18.30	$0.00	$61.96
6	75	$38.00	$8.20	$18.83	$0.00	$65.03
7	80	$40.53	$8.20	$19.35	$0.00	$68.08
8	90	$45.59	$8.20	$20.40	$0.00	$74.19

Effective Date - 01/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.48	$8.20	$0.00	$0.00	$33.68
2	55	$28.03	$8.20	$5.94	$0.00	$42.17
3	60	$30.58	$8.20	$6.48	$0.00	$45.26
4	65	$33.12	$8.20	$7.02	$0.00	$48.34
5	70	$35.67	$8.20	$18.51	$0.00	$62.38
6	75	$38.22	$8.20	$19.05	$0.00	$65.47
7	80	$40.77	$8.20	$19.59	$0.00	$68.56
8	90	$45.86	$8.20	$20.67	$0.00	$74.73

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SIGN, PICTORIAL & DISPLAY) *PAINTERS LOCAL 35 - ZONE 3*	06/01/2013	$25.81	$7.07	$7.05	$0.00	$39.93

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER SIGN - Local 35 Zone 3*

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

PAINTER (SPRAY OR SANDBLAST, NEW) *	07/01/2019	$34.03	$8.20	$17.55	$0.00	$59.78
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 3*	01/01/2020	$34.33	$8.20	$18.20	$0.00	$60.73
	07/01/2020	$35.43	$8.20	$18.20	$0.00	$61.83
	01/01/2021	$36.53	$8.20	$18.20	$0.00	$62.93

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 Zone 3 - Spray/Sandblast - New*

Effective Date - 07/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$17.02	$8.20	$0.00	$0.00	$25.22
2	55	$18.72	$8.20	$3.63	$0.00	$30.55
3	60	$20.42	$8.20	$3.96	$0.00	$32.58
4	65	$22.12	$8.20	$4.29	$0.00	$34.61
5	70	$23.82	$8.20	$15.57	$0.00	$47.59
6	75	$25.52	$8.20	$15.90	$0.00	$49.62
7	80	$27.22	$8.20	$16.23	$0.00	$51.65
8	90	$30.63	$8.20	$16.89	$0.00	$55.72

Effective Date - 01/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$17.17	$8.20	$0.00	$0.00	$25.37
2	55	$18.88	$8.20	$3.80	$0.00	$30.88
3	60	$20.60	$8.20	$4.14	$0.00	$32.94
4	65	$22.31	$8.20	$4.49	$0.00	$35.00
5	70	$24.03	$8.20	$15.78	$0.00	$48.01
6	75	$25.75	$8.20	$16.13	$0.00	$50.08
7	80	$27.46	$8.20	$16.47	$0.00	$52.13
8	90	$30.90	$8.20	$17.16	$0.00	$56.26

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, REPAINT) *PAINTERS LOCAL 35 - ZONE 3*	07/01/2019	$31.35	$8.20	$17.55	$0.00	$57.10
	01/01/2020	$31.65	$8.20	$18.20	$0.00	$58.05
	07/01/2020	$32.75	$8.20	$18.20	$0.00	$59.15
	01/01/2021	$33.85	$8.20	$18.20	$0.00	$60.25

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 Zone 3 - Spray/Sandblast - Repaint*

Effective Date - 07/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$15.68	$8.20	$0.00	$0.00	$23.88
2	55	$17.24	$8.20	$3.63	$0.00	$29.07
3	60	$18.81	$8.20	$3.96	$0.00	$30.97
4	65	$20.38	$8.20	$4.29	$0.00	$32.87
5	70	$21.95	$8.20	$15.57	$0.00	$45.72
6	75	$23.51	$8.20	$15.90	$0.00	$47.61
7	80	$25.08	$8.20	$16.23	$0.00	$49.51
8	90	$28.22	$8.20	$16.89	$0.00	$53.31

Effective Date - 01/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$15.83	$8.20	$0.00	$0.00	$24.03
2	55	$17.41	$8.20	$3.80	$0.00	$29.41
3	60	$18.99	$8.20	$4.14	$0.00	$31.33
4	65	$20.57	$8.20	$4.49	$0.00	$33.26
5	70	$22.16	$8.20	$15.78	$0.00	$46.14
6	75	$23.74	$8.20	$16.13	$0.00	$48.07
7	80	$25.32	$8.20	$16.47	$0.00	$49.99
8	90	$28.49	$8.20	$17.16	$0.00	$53.85

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, NEW) *	07/01/2019	$32.63	$8.20	$17.55	$0.00	$58.38
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 3*	01/01/2020	$32.93	$8.20	$18.20	$0.00	$59.33
	07/01/2020	$34.03	$8.20	$18.20	$0.00	$60.43
	01/01/2021	$35.13	$8.20	$18.20	$0.00	$61.53

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER - Local 35 Zone 3 - BRUSH NEW*

Effective Date - 07/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$16.32	$8.20	$0.00	$0.00	$24.52
2	55	$17.95	$8.20	$3.63	$0.00	$29.78
3	60	$19.58	$8.20	$3.96	$0.00	$31.74
4	65	$21.21	$8.20	$4.29	$0.00	$33.70
5	70	$22.84	$8.20	$15.57	$0.00	$46.61
6	75	$24.47	$8.20	$15.90	$0.00	$48.57
7	80	$26.10	$8.20	$16.23	$0.00	$50.53
8	90	$29.37	$8.20	$16.89	$0.00	$54.46

Effective Date - 01/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$16.47	$8.20	$0.00	$0.00	$24.67
2	55	$18.11	$8.20	$3.80	$0.00	$30.11
3	60	$19.76	$8.20	$4.14	$0.00	$32.10
4	65	$21.40	$8.20	$4.49	$0.00	$34.09
5	70	$23.05	$8.20	$15.78	$0.00	$47.03
6	75	$24.70	$8.20	$16.13	$0.00	$49.03
7	80	$26.34	$8.20	$16.47	$0.00	$51.01
8	90	$29.64	$8.20	$17.16	$0.00	$55.00

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, REPAINT) *PAINTERS LOCAL 35 - ZONE 3*	07/01/2019	$29.95	$8.20	$17.55	$0.00	$55.70
	01/01/2020	$30.25	$8.20	$18.20	$0.00	$56.65
	07/01/2020	$31.35	$8.20	$18.20	$0.00	$57.75
	01/01/2021	$32.45	$8.20	$18.20	$0.00	$58.85

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 Zone 3 - BRUSH REPAINT*

Effective Date - 07/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$14.98	$8.20	$0.00	$0.00	$23.18
2	55	$16.47	$8.20	$3.63	$0.00	$28.30
3	60	$17.97	$8.20	$3.96	$0.00	$30.13
4	65	$19.47	$8.20	$4.29	$0.00	$31.96
5	70	$20.97	$8.20	$15.57	$0.00	$44.74
6	75	$22.46	$8.20	$15.90	$0.00	$46.56
7	80	$23.96	$8.20	$16.23	$0.00	$48.39
8	90	$26.96	$8.20	$16.89	$0.00	$52.05

Effective Date - 01/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$15.13	$8.20	$0.00	$0.00	$23.33
2	55	$16.64	$8.20	$3.80	$0.00	$28.64
3	60	$18.15	$8.20	$4.14	$0.00	$30.49
4	65	$19.66	$8.20	$4.49	$0.00	$32.35
5	70	$21.18	$8.20	$15.78	$0.00	$45.16
6	75	$22.69	$8.20	$16.13	$0.00	$47.02
7	80	$24.20	$8.20	$16.47	$0.00	$48.87
8	90	$27.23	$8.20	$17.16	$0.00	$52.59

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER TRAFFIC MARKINGS (HEAVY/HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2019	$31.50	$7.85	$12.18	$0.00	$51.53
	12/01/2019	$32.29	$7.85	$12.18	$0.00	$52.32
	06/01/2020	$33.10	$7.85	$12.18	$0.00	$53.13
	12/01/2020	$33.91	$7.85	$12.18	$0.00	$53.94
	06/01/2021	$34.75	$7.85	$12.18	$0.00	$54.78
	12/01/2021	$35.58	$7.85	$12.18	$0.00	$55.61
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
PANEL & PICKUP TRUCKS DRIVER *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	06/01/2019	$34.08	$11.91	$12.70	$0.00	$58.69
	08/01/2019	$34.08	$12.41	$12.70	$0.00	$59.19
	12/01/2019	$34.08	$12.41	$13.72	$0.00	$60.21
	06/01/2020	$34.98	$12.41	$13.72	$0.00	$61.11
	08/01/2020	$34.98	$12.91	$13.72	$0.00	$61.61
	12/01/2020	$34.98	$12.91	$14.82	$0.00	$62.71
	06/01/2021	$35.78	$12.91	$14.82	$0.00	$63.51
	08/01/2021	$35.78	$13.41	$14.82	$0.00	$64.01
	12/01/2021	$35.78	$13.41	$16.01	$0.00	$65.20

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK)	08/01/2018	$41.57	$9.90	$21.15	$0.00	$72.62
	08/01/2019	$43.79	$9.90	$21.15	$0.00	$74.84
PILE DRIVER LOCAL 56 (ZONE 3)						
For apprentice rates see "Apprentice- PILE DRIVER"						
PILE DRIVER	08/01/2018	$41.57	$9.90	$21.15	$0.00	$72.62
	08/01/2019	$43.79	$9.90	$21.15	$0.00	$74.84
PILE DRIVER LOCAL 56 (ZONE 3)						

Apprentice - *PILE DRIVER - Local 56 Zone 3*

Effective Date - 08/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	0	$0.00	$0.00	$0.00	$0.00	$0.00

Notes: Apprentice wages shall be no less than the following Steps;
(Same as set in Zone 1)
1$54.34/2$58.99/3$63.65/4$65.98/5$68.31/6$68.31/7$72.96/8$72.96

Apprentice to Journeyworker Ratio:1:5

PIPELAYER	06/03/2019	$31.75	$7.85	$14.22	$0.00	$53.82
	12/02/2019	$32.56	$7.85	$14.22	$0.00	$54.63
LABORERS - ZONE 3 (BUILDING & SITE)						
For apprentice rates see "Apprentice- LABORER"						
PIPELAYER (HEAVY & HIGHWAY)	06/01/2019	$31.75	$7.85	$12.18	$0.00	$51.78
	12/01/2019	$32.54	$7.85	$12.18	$0.00	$52.57
	06/01/2020	$33.35	$7.85	$12.18	$0.00	$53.38
	12/01/2020	$34.16	$7.85	$12.18	$0.00	$54.19
	06/01/2021	$35.00	$7.85	$12.18	$0.00	$55.03
	12/01/2021	$35.83	$7.85	$12.18	$0.00	$55.86
LABORERS - ZONE 3 (HEAVY & HIGHWAY)						
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
PLUMBER & PIPEFITTER	03/17/2019	$40.21	$8.75	$16.35	$0.00	$65.31
PLUMBERS & PIPEFITTERS LOCAL 104						

Apprentice - *PLUMBER/PIPEFITTER - Local 104*

Effective Date - 03/17/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	$18.09	$8.75	$9.60	$0.00	$36.44
2	50	$20.11	$8.75	$9.60	$0.00	$38.46
3	55	$22.12	$8.75	$9.60	$0.00	$40.47
4	60	$24.13	$8.75	$9.60	$0.00	$42.48
5	65	$26.14	$8.75	$9.60	$0.00	$44.49
6	70	$28.15	$8.75	$9.60	$0.00	$46.50
7	75	$30.16	$8.75	$9.60	$0.00	$48.51
8	80	$32.17	$8.75	$9.60	$0.00	$50.52
9	80	$32.17	$8.75	$16.35	$0.00	$57.27
10	80	$32.17	$8.75	$16.35	$0.00	$57.27

Notes: **1:1,2:5,3:9,4:12

Apprentice to Journeyworker Ratio:**

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PNEUMATIC CONTROLS (TEMP.) *PLUMBERS & PIPEFITTERS LOCAL 104*	03/17/2019	$40.21	$8.75	$16.35	$0.00	$65.31
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
PNEUMATIC DRILL/TOOL OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2019	$31.75	$7.85	$12.18	$0.00	$51.78
	12/01/2019	$32.54	$7.85	$12.18	$0.00	$52.57
	06/01/2020	$33.35	$7.85	$12.18	$0.00	$53.38
	12/01/2020	$34.16	$7.85	$12.18	$0.00	$54.19
	06/01/2021	$35.00	$7.85	$12.18	$0.00	$55.03
	12/01/2021	$35.83	$7.85	$12.18	$0.00	$55.86
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
POWDERMAN & BLASTER *LABORERS - ZONE 3 (BUILDING & SITE)*	06/03/2019	$32.50	$7.85	$14.22	$0.00	$54.57
	12/02/2019	$33.31	$7.85	$14.22	$0.00	$55.38
For apprentice rates see "Apprentice- LABORER"						
POWDERMAN & BLASTER (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2019	$32.50	$7.85	$12.18	$0.00	$52.53
	12/01/2019	$33.29	$7.85	$12.18	$0.00	$53.32
	06/01/2020	$34.10	$7.85	$12.18	$0.00	$54.13
	12/01/2020	$34.91	$7.85	$12.18	$0.00	$54.94
	06/01/2021	$35.75	$7.85	$12.18	$0.00	$55.78
	12/01/2021	$36.58	$7.85	$12.18	$0.00	$56.61
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
PUMP OPERATOR (CONCRETE) *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$35.05	$11.69	$14.08	$0.00	$60.82
	12/01/2019	$35.65	$11.69	$14.35	$0.00	$61.69
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER) *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$34.52	$11.69	$14.08	$0.00	$60.29
	12/01/2019	$35.12	$11.69	$14.35	$0.00	$61.16
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
READY-MIX CONCRETE DRIVER *TEAMSTERS LOCAL 404*	05/01/2016	$21.01	$10.23	$9.40	$0.00	$40.64
RIDE-ON MOTORIZED BUGGY OPERATOR *LABORERS - ZONE 3 (BUILDING & SITE)*	06/03/2019	$31.75	$7.85	$14.22	$0.00	$53.82
	12/02/2019	$32.56	$7.85	$14.22	$0.00	$54.63
For apprentice rates see "Apprentice- LABORER"						
ROLLER OPERATOR *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$33.91	$11.69	$14.08	$0.00	$59.68
	12/01/2019	$34.51	$11.69	$14.35	$0.00	$60.55
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
ROOFER (Coal tar pitch) *ROOFERS LOCAL 248*	07/16/2019	$32.66	$10.05	$16.20	$0.00	$58.91
For apprentice rates see "Apprentice- ROOFER"						
ROOFER (Inc.Roofer Waterproofng &Roofer Damproofg) *ROOFERS LOCAL 248*	07/16/2019	$32.16	$10.05	$15.70	$0.00	$57.91

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ROOFER - Local 248*

Effective Date - 07/16/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$19.30	$10.05	$0.00	$0.00	$29.35
2	65	$20.90	$10.05	$15.70	$0.00	$46.65
3	70	$22.51	$10.05	$15.70	$0.00	$48.26
4	75	$24.12	$10.05	$15.70	$0.00	$49.87
5	80	$25.73	$10.05	$15.70	$0.00	$51.48
6	85	$27.34	$10.05	$15.70	$0.00	$53.09
7	90	$28.94	$10.05	$15.70	$0.00	$54.69
8	95	$30.55	$10.05	$15.70	$0.00	$56.30

Notes:

Steps are 750 hrs.Roofer(Tear Off)1:1; Same as above

Apprentice to Journeyworker Ratio:1:3

ROOFER SLATE / TILE / PRECAST CONCRETE *ROOFERS LOCAL 248* For apprentice rates see "Apprentice- ROOFER"	07/16/2019	$32.66	$10.05	$16.20	$0.00	$58.91
SCRAPER *OPERATING ENGINEERS LOCAL 98* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	06/01/2019	$34.52	$11.69	$14.08	$0.00	$60.29
	12/01/2019	$35.12	$11.69	$14.35	$0.00	$61.16
SELF-POWERED ROLLERS AND COMPACTORS (TAMPERS) *OPERATING ENGINEERS LOCAL 98* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	06/01/2019	$33.91	$11.69	$14.08	$0.00	$59.68
	12/01/2019	$34.51	$11.69	$14.35	$0.00	$60.55
SELF-PROPELLED POWER BROOM *OPERATING ENGINEERS LOCAL 98* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	06/01/2019	$31.29	$11.69	$14.08	$0.00	$57.06
	12/01/2019	$31.89	$11.69	$14.35	$0.00	$57.93
SHEETMETAL WORKER *SHEETMETAL WORKERS LOCAL 63*	07/01/2019	$35.74	$10.64	$16.22	$1.77	$64.37
	01/01/2020	$36.99	$10.64	$16.22	$1.77	$65.62

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *SHEET METAL WORKER - Local 63*

Effective Date - 07/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	$16.08	$6.21	$4.67	$0.00	$26.96
2	50	$17.87	$6.55	$5.19	$0.00	$29.61
3	55	$19.66	$6.88	$9.33	$1.08	$36.95
4	60	$21.44	$7.22	$9.33	$1.14	$39.13
5	65	$23.23	$7.55	$9.33	$1.20	$41.31
6	70	$25.02	$7.88	$9.33	$1.27	$43.50
7	75	$26.81	$8.22	$9.33	$1.33	$45.69
8	80	$28.59	$9.30	$15.18	$1.59	$54.66
9	85	$30.38	$9.64	$15.18	$1.66	$56.86
10	90	$32.17	$9.98	$15.18	$1.72	$59.05

Effective Date - 01/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	$16.65	$6.21	$4.67	$0.00	$27.53
2	50	$18.50	$6.55	$5.19	$0.00	$30.24
3	55	$20.34	$6.88	$9.33	$1.08	$37.63
4	60	$22.19	$7.22	$9.33	$1.14	$39.88
5	65	$24.04	$7.55	$9.33	$1.20	$42.12
6	70	$25.89	$7.88	$9.33	$1.27	$44.37
7	75	$27.74	$8.22	$9.33	$1.33	$46.62
8	80	$29.59	$9.30	$15.18	$1.59	$55.66
9	85	$31.44	$9.64	$15.18	$1.66	$57.92
10	90	$33.29	$9.98	$15.18	$1.72	$60.17

Notes:

Apprentice to Journeyworker Ratio:1:3

SPECIALIZED EARTH MOVING EQUIP < 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	06/01/2019	$34.54	$11.91	$12.70	$0.00	$59.15
	08/01/2019	$34.54	$12.41	$12.70	$0.00	$59.65
	12/01/2019	$34.54	$12.41	$13.72	$0.00	$60.67
	06/01/2020	$35.44	$12.41	$13.72	$0.00	$61.57
	08/01/2020	$35.44	$12.91	$13.72	$0.00	$62.07
	12/01/2020	$35.44	$12.91	$14.82	$0.00	$63.17
	06/01/2021	$36.24	$12.91	$14.82	$0.00	$63.97
	08/01/2021	$36.24	$13.41	$14.82	$0.00	$64.47
	12/01/2021	$36.24	$13.41	$16.01	$0.00	$65.66

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
SPECIALIZED EARTH MOVING EQUIP > 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	06/01/2019	$34.83	$11.91	$12.70	$0.00	$59.44
	08/01/2019	$34.83	$12.41	$12.70	$0.00	$59.94
	12/01/2019	$34.83	$12.41	$13.72	$0.00	$60.96
	06/01/2020	$35.73	$12.41	$13.72	$0.00	$61.86
	08/01/2020	$35.73	$12.91	$13.72	$0.00	$62.36
	12/01/2020	$35.73	$12.91	$14.82	$0.00	$63.46
	06/01/2021	$36.53	$12.91	$14.82	$0.00	$64.26
	08/01/2021	$36.53	$13.41	$14.82	$0.00	$64.76
	12/01/2021	$36.53	$13.41	$16.01	$0.00	$65.95
SPRINKLER FITTER *SPRINKLER FITTERS LOCAL 669*	01/01/2019	$41.51	$10.02	$13.08	$0.00	$64.61

Apprentice - *SPRINKLER FITTER - Local 669*

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	$18.68	$7.75	$0.00	$0.00	$26.43
2	50	$20.76	$7.75	$0.00	$0.00	$28.51
3	55	$22.83	$10.02	$7.25	$0.00	$40.10
4	60	$24.91	$10.02	$7.25	$0.00	$42.18
5	65	$26.98	$10.02	$7.50	$0.00	$44.50
6	70	$29.06	$10.02	$7.50	$0.00	$46.58
7	75	$31.13	$10.02	$7.50	$0.00	$48.65
8	80	$33.21	$10.02	$7.50	$0.00	$50.73
9	85	$35.28	$10.02	$7.50	$0.00	$52.80
10	90	$37.36	$10.02	$7.50	$0.00	$54.88

Notes:

Apprentice to Journeyworker Ratio:1:1

TELECOMMUNICATION TECHNICIAN *ELECTRICIANS LOCAL 7*	06/30/2019	$42.66	$10.75	$12.33	$0.00	$65.74
	12/29/2019	$43.41	$11.00	$12.60	$0.00	$67.01

Apprentice - *TELECOMMUNICATION TECHNICIAN - Local 7*

Effective Date - 06/30/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$17.06	$5.85	$0.51	$0.00	$23.42
2	45	$19.20	$5.85	$0.58	$0.00	$25.63
3	50	$21.33	$10.75	$6.94	$0.00	$39.02
4	55	$23.46	$10.75	$7.00	$0.00	$41.21
5	65	$27.73	$10.75	$8.13	$0.00	$46.61
6	70	$29.86	$10.75	$9.20	$0.00	$49.81

Notes:
Steps are 800 hours

Apprentice to Journeyworker Ratio:1:1

TERRAZZO FINISHERS *BRICKLAYERS LOCAL 3 (SPR/PITT) - MARBLE & TILE*	02/01/2019	$52.49	$10.75	$20.66	$0.00	$83.90
	08/01/2019	$53.34	$10.75	$21.30	$0.00	$85.39
	02/01/2020	$53.98	$10.75	$21.30	$0.00	$86.03
	08/01/2020	$55.33	$10.75	$21.45	$0.00	$87.53
	02/01/2021	$55.97	$10.75	$21.45	$0.00	$88.17
	08/01/2021	$57.37	$10.75	$21.61	$0.00	$89.73
	02/01/2022	$57.96	$10.75	$21.61	$0.00	$90.32

Apprentice - *TERRAZZO FINISHER-Local 3 Marble/Tile (Spr/Ptt)*

Effective Date - 02/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.25	$10.75	$20.66	$0.00	$57.66
2	60	$31.49	$10.75	$20.66	$0.00	$62.90
3	70	$36.74	$10.75	$20.66	$0.00	$68.15
4	80	$41.99	$10.75	$20.66	$0.00	$73.40
5	90	$47.24	$10.75	$20.66	$0.00	$78.65

Effective Date - 08/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.67	$10.75	$21.30	$0.00	$58.72
2	60	$32.00	$10.75	$21.30	$0.00	$64.05
3	70	$37.34	$10.75	$21.30	$0.00	$69.39
4	80	$42.67	$10.75	$21.30	$0.00	$74.72
5	90	$48.01	$10.75	$21.30	$0.00	$80.06

Notes:

Apprentice to Journeyworker Ratio:1:5

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TERRAZZO MECHANIC *BRICKLAYERS LOCAL 3 (SPR/PITT) - MARBLE & TILE*	02/01/2019	$53.57	$10.75	$20.66	$0.00	$84.98
	08/01/2019	$54.42	$10.75	$21.30	$0.00	$86.47
	02/01/2020	$55.05	$10.75	$21.30	$0.00	$87.10
	08/01/2020	$56.40	$10.75	$21.45	$0.00	$88.60
	02/01/2021	$57.04	$10.75	$21.45	$0.00	$89.24
	08/01/2021	$58.44	$10.75	$21.61	$0.00	$90.80
	02/01/2022	$59.01	$10.75	$21.61	$0.00	$91.37

Apprentice - *TERRAZZO MECH - Local 3 Marble/Tile (Spr/Pitt)*

Effective Date - 02/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.79	$10.75	$20.66	$0.00	$58.20
2	60	$32.14	$10.75	$20.66	$0.00	$63.55
3	70	$37.50	$10.75	$20.66	$0.00	$68.91
4	80	$42.86	$10.75	$20.66	$0.00	$74.27
5	90	$48.21	$10.75	$20.66	$0.00	$79.62

Effective Date - 08/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$27.21	$10.75	$21.30	$0.00	$59.26
2	60	$32.65	$10.75	$21.30	$0.00	$64.70
3	70	$38.09	$10.75	$21.30	$0.00	$70.14
4	80	$43.54	$10.75	$21.30	$0.00	$75.59
5	90	$48.98	$10.75	$21.30	$0.00	$81.03

Notes:

Apprentice to Journeyworker Ratio:1:5

TEST BORING DRILLER *LABORERS - FOUNDATION AND MARINE*	06/01/2019	$40.50	$7.85	$16.05	$0.00	$64.40
	12/01/2019	$41.50	$7.85	$16.05	$0.00	$65.40
	06/01/2020	$42.49	$7.85	$16.05	$0.00	$66.39
	12/01/2020	$43.47	$7.85	$16.05	$0.00	$67.37
	06/01/2021	$44.49	$7.85	$16.05	$0.00	$68.39
	12/01/2021	$45.50	$7.85	$16.05	$0.00	$69.40

For apprentice rates see "Apprentice- LABORER"

TEST BORING DRILLER HELPER *LABORERS - FOUNDATION AND MARINE*	06/01/2019	$39.22	$7.85	$16.05	$0.00	$63.12
	12/01/2019	$40.22	$7.85	$16.05	$0.00	$64.12
	06/01/2020	$41.21	$7.85	$16.05	$0.00	$65.11
	12/01/2020	$42.19	$7.85	$16.05	$0.00	$66.09
	06/01/2021	$43.21	$7.85	$16.05	$0.00	$67.11
	12/01/2021	$44.22	$7.85	$16.05	$0.00	$68.12

For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TEST BORING LABORER *LABORERS - FOUNDATION AND MARINE*	06/01/2019	$39.10	$7.85	$16.05	$0.00	$63.00
	12/01/2019	$40.10	$7.85	$16.05	$0.00	$64.00
	06/01/2020	$41.09	$7.85	$16.05	$0.00	$64.99
	12/01/2020	$42.07	$7.85	$16.05	$0.00	$65.97
	06/01/2021	$43.09	$7.85	$16.05	$0.00	$66.99
	12/01/2021	$44.10	$7.85	$16.05	$0.00	$68.00
For apprentice rates see "Apprentice- LABORER"						
TRACTORS *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$33.91	$11.69	$14.08	$0.00	$59.68
	12/01/2019	$34.51	$11.69	$14.35	$0.00	$60.55
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TRAILERS FOR EARTH MOVING EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	06/01/2019	$35.12	$11.91	$12.70	$0.00	$59.73
	08/01/2019	$35.12	$12.41	$12.70	$0.00	$60.23
	12/01/2019	$35.12	$12.41	$13.72	$0.00	$61.25
	06/01/2020	$36.02	$12.41	$13.72	$0.00	$62.15
	08/01/2020	$36.02	$12.91	$13.72	$0.00	$62.65
	12/01/2020	$36.02	$12.91	$14.82	$0.00	$63.75
	06/01/2021	$36.82	$12.91	$14.82	$0.00	$64.55
	08/01/2021	$36.82	$13.41	$14.82	$0.00	$65.05
	12/01/2021	$36.82	$13.41	$16.01	$0.00	$66.24
TUNNEL WORK - COMPRESSED AIR *LABORERS (COMPRESSED AIR)*	06/01/2019	$51.38	$7.85	$16.45	$0.00	$75.68
	12/01/2019	$52.38	$7.85	$16.45	$0.00	$76.68
	06/01/2020	$53.37	$7.85	$16.45	$0.00	$77.67
	12/01/2020	$54.35	$7.85	$16.45	$0.00	$78.65
	06/01/2021	$55.37	$7.85	$16.45	$0.00	$79.67
	12/01/2021	$56.38	$7.85	$16.45	$0.00	$80.68
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) *LABORERS (COMPRESSED AIR)*	06/01/2019	$53.38	$7.85	$16.45	$0.00	$77.68
	12/01/2019	$54.38	$7.85	$16.45	$0.00	$78.68
	06/01/2020	$55.37	$7.85	$16.45	$0.00	$79.67
	12/01/2020	$56.35	$7.85	$16.45	$0.00	$80.65
	06/01/2021	$57.37	$7.85	$16.45	$0.00	$81.67
	12/01/2021	$58.38	$7.85	$16.45	$0.00	$82.68
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR *LABORERS (FREE AIR TUNNEL)*	06/01/2019	$43.45	$7.85	$16.45	$0.00	$67.75
	12/01/2019	$44.45	$7.85	$16.45	$0.00	$68.75
	06/01/2020	$45.44	$7.85	$16.45	$0.00	$69.74
	12/01/2020	$46.42	$7.85	$16.45	$0.00	$70.72
	06/01/2021	$47.44	$7.85	$16.45	$0.00	$71.74
	12/01/2021	$48.45	$7.85	$16.45	$0.00	$72.75
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR (HAZ. WASTE) *LABORERS (FREE AIR TUNNEL)*	06/01/2019	$45.45	$7.85	$16.45	$0.00	$69.75
	12/01/2019	$46.45	$7.85	$16.45	$0.00	$70.75
	06/01/2020	$47.44	$7.85	$16.45	$0.00	$71.74
	12/01/2020	$48.42	$7.85	$16.45	$0.00	$72.72
	06/01/2021	$49.44	$7.85	$16.45	$0.00	$73.74
	12/01/2021	$50.45	$7.85	$16.45	$0.00	$74.75
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
VAC-HAUL *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	06/01/2019	$34.54	$11.91	$12.70	$0.00	$59.15
	08/01/2019	$34.54	$12.41	$12.70	$0.00	$59.65
	12/01/2019	$34.54	$12.41	$13.72	$0.00	$60.67
	06/01/2020	$35.44	$12.41	$13.72	$0.00	$61.57
	08/01/2020	$35.44	$12.91	$13.72	$0.00	$62.07
	12/01/2020	$35.44	$12.91	$14.82	$0.00	$63.17
	06/01/2021	$36.24	$12.91	$14.82	$0.00	$63.97
	08/01/2021	$36.24	$13.41	$14.82	$0.00	$64.47
	12/01/2021	$36.24	$13.41	$16.01	$0.00	$65.66
WAGON DRILL OPERATOR *LABORERS - ZONE 3 (BUILDING & SITE)*	06/03/2019	$31.75	$7.85	$14.22	$0.00	$53.82
	12/02/2019	$32.56	$7.85	$14.22	$0.00	$54.63
For apprentice rates see "Apprentice- LABORER"						
WAGON DRILL OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2019	$31.75	$7.85	$12.18	$0.00	$51.78
	12/01/2019	$32.54	$7.85	$12.18	$0.00	$52.57
	06/01/2020	$33.35	$7.85	$12.18	$0.00	$53.38
	12/01/2020	$34.16	$7.85	$12.18	$0.00	$54.19
	06/01/2021	$35.00	$7.85	$12.18	$0.00	$55.03
	12/01/2021	$35.83	$7.85	$12.18	$0.00	$55.86
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
WATER METER INSTALLER *PLUMBERS & PIPEFITTERS LOCAL 104*	03/17/2019	$40.21	$8.75	$16.35	$0.00	$65.31
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						
Outside Electrical - West						
EQUIPMENT OPERATOR *OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42*	09/02/2018	$42.26	$8.00	$12.50	$0.00	$62.76
	09/01/2019	$44.67	$8.00	$12.55	$0.00	$65.22
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN *OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42*	09/02/2018	$28.17	$8.00	$5.41	$0.00	$41.58
	09/01/2019	$30.58	$8.00	$5.48	$0.00	$44.06
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN / TRUCK DRIVER *OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42*	09/02/2018	$37.56	$8.00	$10.89	$0.00	$56.45
	09/01/2019	$39.97	$8.00	$10.96	$0.00	$58.93
For apprentice rates see "Apprentice- LINEMAN"						
HEAVY EQUIPMENT OPERATOR *OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42*	09/02/2018	$44.60	$8.00	$13.15	$0.00	$65.75
	09/01/2019	$47.01	$8.00	$13.22	$0.00	$68.23
For apprentice rates see "Apprentice- LINEMAN"						
JOURNEYMAN LINEMAN *OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42*	09/02/2018	$49.30	$8.00	$15.48	$0.00	$72.78
	09/01/2019	$51.71	$8.00	$15.55	$0.00	$75.26

Apprentice - *LINEMAN (Outside Electrical) - West Local 42*

Effective Date - 09/02/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$29.58	$8.00	$3.39	$0.00	$40.97
2	65	$32.05	$8.00	$3.46	$0.00	$43.51
3	70	$34.51	$8.00	$3.54	$0.00	$46.05
4	75	$36.98	$8.00	$5.11	$0.00	$50.09
5	80	$39.44	$8.00	$5.18	$0.00	$52.62
6	85	$41.91	$8.00	$5.26	$0.00	$55.17
7	90	$44.37	$8.00	$7.33	$0.00	$59.70

Effective Date - 09/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$31.03	$8.00	$3.43	$0.00	$42.46
2	65	$33.61	$8.00	$3.51	$0.00	$45.12
3	70	$36.20	$8.00	$3.59	$0.00	$47.79
4	75	$38.78	$8.00	$5.16	$0.00	$51.94
5	80	$41.37	$8.00	$5.24	$0.00	$54.61
6	85	$43.95	$8.00	$5.32	$0.00	$57.27
7	90	$46.54	$8.00	$7.40	$0.00	$61.94

Notes:

Apprentice to Journeyworker Ratio:1:2

TELEDATA CABLE SPLICER *OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42*	02/04/2019	$30.73	$4.70	$3.17	$0.00	$38.60
TELEDATA LINEMAN/EQUIPMENT OPERATOR *OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42*	02/04/2019	$28.93	$4.70	$3.14	$0.00	$36.77
TELEDATA WIREMAN/INSTALLER/TECHNICIAN *OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42*	02/04/2019	$28.93	$4.70	$3.14	$0.00	$36.77
TRACTOR-TRAILER DRIVER *OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42*	09/02/2018	$42.26	$8.00	$12.50	$0.00	$62.76
	09/01/2019	$44.67	$8.00	$12.55	$0.00	$65.22
TREE TRIMMER *OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42*	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 - WEST LOCAL 42*	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.

Rental of Equipment - West

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
(2 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	06/01/2019	$34.25	$11.91	$0.00	$0.00	$46.16
	08/01/2019	$34.25	$12.41	$0.00	$0.00	$46.66
	12/01/2019	$34.25	$12.41	$0.00	$0.00	$46.66
	06/01/2020	$35.15	$12.41	$0.00	$0.00	$47.56
	08/01/2020	$35.15	$12.91	$0.00	$0.00	$48.06
	12/01/2020	$35.15	$12.91	$0.00	$0.00	$48.06
	06/01/2021	$35.95	$12.91	$0.00	$0.00	$48.86
	08/01/2021	$35.95	$13.41	$0.00	$0.00	$49.36
	12/01/2021	$35.95	$13.41	$0.00	$0.00	$49.36
(3 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	06/01/2019	$34.32	$11.91	$0.00	$0.00	$46.23
	08/01/2019	$34.32	$12.41	$0.00	$0.00	$46.73
	12/01/2019	$34.32	$12.41	$0.00	$0.00	$46.73
	06/01/2020	$35.22	$12.41	$0.00	$0.00	$47.63
	08/01/2020	$35.22	$12.91	$0.00	$0.00	$48.13
	12/01/2020	$35.22	$12.91	$0.00	$0.00	$48.13
	06/01/2021	$36.02	$12.91	$0.00	$0.00	$48.93
	08/01/2021	$36.02	$13.41	$0.00	$0.00	$49.43
	12/01/2021	$36.02	$13.41	$0.00	$0.00	$49.43
(4 & 5 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	06/01/2019	$34.44	$11.91	$0.00	$0.00	$46.35
	08/01/2019	$34.44	$12.41	$0.00	$0.00	$46.85
	12/01/2019	$34.44	$12.41	$0.00	$0.00	$46.85
	06/01/2020	$35.34	$12.41	$0.00	$0.00	$47.75
	08/01/2020	$35.34	$12.91	$0.00	$0.00	$48.25
	12/01/2020	$35.34	$12.91	$0.00	$0.00	$48.25
	06/01/2021	$36.14	$12.91	$0.00	$0.00	$49.05
	08/01/2021	$36.14	$13.41	$0.00	$0.00	$49.55
	12/01/2021	$36.14	$13.41	$0.00	$0.00	$49.55
ADS/SUBMERSIBLE PILOT *PILE DRIVER LOCAL 56 (ZONE 3)*	08/01/2018	$97.80	$9.90	$0.00	$0.00	$107.70
	08/01/2019	$102.78	$9.90	$0.00	$0.00	$112.68
For apprentice rates see "Apprentice- PILE DRIVER"						
BACKHOE/FRONT-END LOADER OPERATOR *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$35.05	$11.69	$0.00	$0.00	$46.74
	12/01/2019	$35.65	$11.69	$0.00	$0.00	$47.34
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BATCH/CEMENT PLANT - ON SITE *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$34.52	$11.69	$0.00	$0.00	$46.21
	12/01/2019	$35.12	$11.69	$0.00	$0.00	$46.81
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BULLDOZER/POWER SHOVEL/TREE SHREDDER /CLAM SHELL*OPERATING ENGINEERS LOCAL 98*	06/01/2019	$35.05	$11.69	$0.00	$0.00	$46.74
	12/01/2019	$35.65	$11.69	$0.00	$0.00	$47.34
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
COMPRESSOR OPERATOR *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$34.52	$11.69	$0.00	$0.00	$46.21
	12/01/2019	$35.12	$11.69	$0.00	$0.00	$46.81
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
CRANE OPERATOR *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$38.55	$11.69	$0.00	$0.00	$50.24
	12/01/2019	$39.15	$11.69	$0.00	$0.00	$50.84
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DIVER *PILE DRIVER LOCAL 56 (ZONE 3)*	08/01/2018	$65.20	$9.90	$0.00	$0.00	$75.10
	08/01/2019	$68.52	$9.90	$0.00	$0.00	$78.42
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER *PILE DRIVER LOCAL 56 (ZONE 3)*	08/01/2018	$46.57	$9.90	$0.00	$0.00	$56.47
	08/01/2019	$48.94	$9.90	$0.00	$0.00	$58.84
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 3)*	08/01/2018	$69.86	$9.90	$0.00	$0.00	$79.76
	08/01/2019	$73.41	$9.90	$0.00	$0.00	$83.31
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER/SLURRY (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 3)*	08/01/2018	$97.80	$9.90	$0.00	$0.00	$107.70
	08/01/2019	$102.78	$9.90	$0.00	$0.00	$112.68
For apprentice rates see "Apprentice- PILE DRIVER"						
FIREMAN *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$34.52	$11.69	$0.00	$0.00	$46.21
	12/01/2019	$35.12	$11.69	$0.00	$0.00	$46.81

Apprentice - *OPERATING ENGINEERS - Local 98 Class 3*

Effective Date - 06/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$20.71	$11.69	$0.00	$0.00	$32.40
2	70	$24.16	$11.69	$0.00	$0.00	$35.85
3	80	$27.62	$11.69	$0.00	$0.00	$39.31
4	90	$31.07	$11.69	$0.00	$0.00	$42.76

Effective Date - 12/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$21.07	$11.69	$0.00	$0.00	$32.76
2	70	$24.58	$11.69	$0.00	$0.00	$36.27
3	80	$28.10	$11.69	$0.00	$0.00	$39.79
4	90	$31.61	$11.69	$0.00	$0.00	$43.30

Notes:
Steps 1-2 are 1000 hrs.; Steps 3-4 are 2000 hrs.

Apprentice to Journeyworker Ratio:1:6

FLAGGER & SIGNALER (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2019	$22.50	$7.85	$0.00	$0.00	$30.35
	12/01/2019	$23.50	$7.85	$0.00	$0.00	$31.35
	06/01/2020	$23.50	$7.85	$0.00	$0.00	$31.35
	12/01/2020	$24.50	$7.85	$0.00	$0.00	$32.35
	06/01/2021	$24.50	$7.85	$0.00	$0.00	$32.35
	12/01/2021	$24.50	$7.85	$0.00	$0.00	$32.35
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
FORK LIFT/CHERRY PICKER 27F WEST*OPERATING ENGINEERS LOCAL 98*	06/01/2019	$34.74	$11.69	$0.00	$0.00	$46.43
	12/01/2019	$35.34	$11.69	$0.00	$0.00	$47.03
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GENERATORS/LIGHTING PLANTS *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$31.29	$11.69	$0.00	$0.00	$42.98
	12/01/2019	$31.89	$11.69	$0.00	$0.00	$43.58
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
GRADER/TRENCHING MACHINE/DERRICK *OPERATING ENGINEERS LOCAL 98* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	06/01/2019	$35.05	$11.69	$0.00	$0.00	$46.74
	12/01/2019	$35.65	$11.69	$0.00	$0.00	$47.34
LABORER *LABORERS - ZONE 3 (BUILDING & SITE)*	06/03/2019	$31.50	$7.85	$0.00	$0.00	$39.35
	12/02/2019	$32.31	$7.85	$0.00	$0.00	$40.16

Apprentice - *LABORER - Zone 3 Building & Site*

Effective Date - 06/03/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$18.90	$7.85	$0.00	$0.00	$26.75
2	70	$22.05	$7.85	$0.00	$0.00	$29.90
3	80	$25.20	$7.85	$0.00	$0.00	$33.05
4	90	$28.35	$7.85	$0.00	$0.00	$36.20

Effective Date - 12/02/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$19.39	$7.85	$0.00	$0.00	$27.24
2	70	$22.62	$7.85	$0.00	$0.00	$30.47
3	80	$25.85	$7.85	$0.00	$0.00	$33.70
4	90	$29.08	$7.85	$0.00	$0.00	$36.93

Notes:

Apprentice to Journeyworker Ratio:1:5

LABORER (HEAVY & HIGHWAY) *LABORERS - ZONE 3 (HEAVY & HIGHWAY)*	06/01/2019	$31.50	$7.85	$0.00	$0.00	$39.35
	12/01/2019	$32.29	$7.85	$0.00	$0.00	$40.14
	06/01/2020	$33.10	$7.85	$0.00	$0.00	$40.95
	12/01/2020	$33.91	$7.85	$0.00	$0.00	$41.76
	06/01/2021	$34.75	$7.85	$0.00	$0.00	$42.60
	12/01/2021	$35.58	$7.85	$0.00	$0.00	$43.43

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *LABORER (Heavy & Highway) - Zone 3*

Effective Date - 06/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$18.90	$7.85	$0.00	$0.00	$26.75
2	70	$22.05	$7.85	$0.00	$0.00	$29.90
3	80	$25.20	$7.85	$0.00	$0.00	$33.05
4	90	$28.35	$7.85	$0.00	$0.00	$36.20

Effective Date - 12/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$19.37	$7.85	$0.00	$0.00	$27.22
2	70	$22.60	$7.85	$0.00	$0.00	$30.45
3	80	$25.83	$7.85	$0.00	$0.00	$33.68
4	90	$29.06	$7.85	$0.00	$0.00	$36.91

Notes:

Apprentice to Journeyworker Ratio:1:5

MECHANIC/WELDER/BOOM TRUCK *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$34.52	$11.69	$0.00	$0.00	$46.21
	12/01/2019	$35.12	$11.69	$0.00	$0.00	$46.81
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OILER *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$30.21	$11.69	$0.00	$0.00	$41.90
	12/01/2019	$30.81	$11.69	$0.00	$0.00	$42.50
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OTHER POWER DRIVEN EQUIPMENT - CLASS VI *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$28.23	$11.69	$0.00	$0.00	$39.92
	12/01/2019	$28.83	$11.69	$0.00	$0.00	$40.52
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PANEL & PICKUP TRUCKS DRIVER *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	06/01/2019	$34.08	$11.91	$0.00	$0.00	$45.99
	08/01/2019	$34.08	$12.41	$0.00	$0.00	$46.49
	12/01/2019	$34.08	$12.41	$0.00	$0.00	$46.49
	06/01/2020	$34.98	$12.41	$0.00	$0.00	$47.39
	08/01/2020	$34.98	$12.91	$0.00	$0.00	$47.89
	12/01/2020	$34.98	$12.91	$0.00	$0.00	$47.89
	06/01/2021	$35.78	$12.91	$0.00	$0.00	$48.69
	08/01/2021	$35.78	$13.41	$0.00	$0.00	$49.19
	12/01/2021	$35.78	$13.41	$0.00	$0.00	$49.19
PUMP OPERATOR (CONCRETE) *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$35.05	$11.69	$0.00	$0.00	$46.74
	12/01/2019	$35.65	$11.69	$0.00	$0.00	$47.34
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER) *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$34.52	$11.69	$0.00	$0.00	$46.21
	12/01/2019	$35.12	$11.69	$0.00	$0.00	$46.81
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
ROLLER OPERATOR *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$33.91	$11.69	$0.00	$0.00	$45.60
	12/01/2019	$34.51	$11.69	$0.00	$0.00	$46.20
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
SCRAPER *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$34.52	$11.69	$0.00	$0.00	$46.21
	12/01/2019	$35.12	$11.69	$0.00	$0.00	$46.81
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
SELF-PROPELLED POWER BROOM *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$31.29	$11.69	$0.00	$0.00	$42.98
	12/01/2019	$31.89	$11.69	$0.00	$0.00	$43.58
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
SPECIALIZED EARTH MOVING EQUIP < 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	06/01/2019	$34.54	$11.91	$0.00	$0.00	$46.45
	08/01/2019	$34.54	$12.41	$0.00	$0.00	$46.95
	12/01/2019	$34.54	$12.41	$0.00	$0.00	$46.95
	06/01/2020	$35.44	$12.41	$0.00	$0.00	$47.85
	08/01/2020	$35.44	$12.91	$0.00	$0.00	$48.35
	12/01/2020	$35.44	$12.91	$0.00	$0.00	$48.35
	06/01/2021	$36.24	$12.91	$0.00	$0.00	$49.15
	08/01/2021	$36.24	$13.41	$0.00	$0.00	$49.65
	12/01/2021	$36.24	$13.41	$0.00	$0.00	$49.65
SPECIALIZED EARTH MOVING EQUIP > 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	06/01/2019	$34.83	$11.91	$0.00	$0.00	$46.74
	08/01/2019	$34.83	$12.41	$0.00	$0.00	$47.24
	12/01/2019	$34.83	$12.41	$0.00	$0.00	$47.24
	06/01/2020	$35.73	$12.41	$0.00	$0.00	$48.14
	08/01/2020	$35.73	$12.91	$0.00	$0.00	$48.64
	12/01/2020	$35.73	$12.91	$0.00	$0.00	$48.64
	06/01/2021	$36.53	$12.91	$0.00	$0.00	$49.44
	08/01/2021	$36.53	$13.41	$0.00	$0.00	$49.94
	12/01/2021	$36.53	$13.41	$0.00	$0.00	$49.94
TRACTORS *OPERATING ENGINEERS LOCAL 98*	06/01/2019	$33.91	$11.69	$0.00	$0.00	$45.60
	12/01/2019	$34.51	$11.69	$0.00	$0.00	$46.20
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TRAILERS FOR EARTH MOVING EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	06/01/2019	$35.12	$11.91	$0.00	$0.00	$47.03
	08/01/2019	$35.12	$12.41	$0.00	$0.00	$47.53
	12/01/2019	$35.12	$12.41	$0.00	$0.00	$47.53
	06/01/2020	$36.02	$12.41	$0.00	$0.00	$48.43
	08/01/2020	$36.02	$12.91	$0.00	$0.00	$48.93
	12/01/2020	$36.02	$12.91	$0.00	$0.00	$48.93
	06/01/2021	$36.82	$12.91	$0.00	$0.00	$49.73
	08/01/2021	$36.82	$13.41	$0.00	$0.00	$50.23
	12/01/2021	$36.82	$13.41	$0.00	$0.00	$50.23
TREE TRIMMER *OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42*	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 - WEST LOCAL 42*	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.						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
VAC-HAUL/CATCH BASIN CLEANING *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	06/01/2019	$34.54	$11.91	$0.00	$0.00	$46.45
	08/01/2019	$34.54	$12.41	$0.00	$0.00	$46.95
	12/01/2019	$34.54	$12.41	$0.00	$0.00	$46.95
	06/01/2020	$35.44	$12.41	$0.00	$0.00	$47.85
	08/01/2020	$35.44	$12.91	$0.00	$0.00	$48.35
	12/01/2020	$35.44	$12.91	$0.00	$0.00	$48.35
	06/01/2021	$36.24	$12.91	$0.00	$0.00	$49.15
	08/01/2021	$36.24	$13.41	$0.00	$0.00	$49.65
	12/01/2021	$36.24	$13.41	$0.00	$0.00	$49.65

Additional Apprentice 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. Apprentice 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 c149, Section 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 has been printed on the next page 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.

In addition, every contractor and subcontractor is required to submit a copy of their weekly payroll records to the awarding authority. This is required to be done on a weekly basis. Once collected, the awarding authority is also required to preserve those records for three years.

In addition, each such contractor, subcontractor or public body shall furnish to the Department of Labor & Industries within fifteen days after completion of its portion of the work a statement, executed by the contractor, subcontractor or public body who supervises the payment of wages, in the following form:

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 _____

DEPARTMENT OF LABOR & INDUSTRIES, 100 CAMBRIDGE STREET, 11TH FL., BOSTON, MA 02202

WEEKLY PAY ROLL REPORT FORM

Company Name: _____

Project Name: _____

Awarding Auth.: _____

Work Week Ending: _____

☐ Final Report

☐ Prime Contractor

☐ Subcontractor

List Prime Contractor: _____

Employer Signature: _____

Print Name & Title: _____

Employee Name & Address	Work Classification	Hours Worked							(A) Tot. Hrs.	(B) Hourly Base Wage	Employer Contributions			(F) [B+C+D+E] Hourly Total Wage (prev. wage)	(G) [A*F] Weekly Total Amount
		S	M	T	W	T	F	S			(C) Health & Welfare	(D) Pension	(E) Supp. Unemp.		

NOTE: Every contractor and subcontractor is required to submit a copy of their weekly payroll records to the awarding authority.

LIST OF DRAWINGS

List of Drawings: NV5, Blueberry Hill School Boiler Replacement. Construction Documents 07-18-2019. Complete Plan Set = 9 pages:

E0.00	Electrical legend, notes and detail
E2.0	Electrical mechanical room part plans
H0.0	HVAC Legend, & notes
H2.0	HVAC mechanical room, new work plan
H8.0	HVAC details and schedules
HD2.0	HVAC Mechanical demo floor plans
P0.00	Plumbing legend and details
P2.0	Plumbing mechanical room new work plan
PD2.0	Plumbing mechanical room demo floor plan