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THE COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF MENTAL HEALTH
OFFICE OF FACILITIES MANAGEMENT

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PROJECT # DMH2021-078C

DMH TRAINING AREAS
GIFFORD BUILDING
AT
TAUNTON STATE HOSPITAL
60 HODGES AVENUE
TAUNTON, MA. 02780

ADDENDUM # 2
05/19/21

THE ATTENTION OF BIDDERS SUBMITTING PROPOSALS FOR THE ABOVE-MENTIONED PROJECT IS HEREBY CALLED TO THE FOLLOWING ADDENDUM. THE ITEMS SET FORTH HEREIN, WHETHER OF OMISSION, ADDITION, SUBSTITUTION OR CLARIFICATION ARE TO BE INCLUDED IN, AND FORM A PART OF THE PROPOSAL SUBMITTED.

THE NUMBER OF THIS ADDENDUM (#2) MUST BE ACKNOWLEDGED ON THE PROPOSAL FORM:

Please note the following change(s):

BIDDING INFORMATION

1. Bid Date has been changed from May 27, 2021 to June 3, 2021. The bids continue to be are due at 2:00PM

2. Questions regarding the project may be submitted from May 12 through May 26, 2021 with DMH responses to questions being provided on or before May 28, 2021

3. Pre-Bid site visits may be scheduled as per the Instructions to Bidders but three additional days have been added for site visits. These additional days are Monday May 24, 2021, Tuesday May 25, 2021, and Wednesday May 26, 2021. Site visits are not mandatory and can be arranged in accordance with the original Instruction to Bidders.

SPECIFICATIONS

1. **SECTION 092116 - WALLBOARD ASSEMBLIES**: Add the following:

   2.10 SLEEVES AND PENETRATIONS

   A. Piping penetrations through fire rated construction shall comply with a listed fire rated assembly as detailed in the UL Fire Resistance Directory. Pipe sleeves through floors, exterior walls and fire-rated construction shall be galvanized Schedule 40 steel pipe. Pipe sleeves through non-fire-rated partitions shall be 26 gauge-galvanized steel.

      1. Annular Space Requirements: Sleeves shall be sized to provide a total clearance of approximately 1 inch around pipe including insulation cover. Annular space around fire-rated through penetrations assemblies shall follow the Listed Assembly.
      2 Packing between the pipe and sleeve in fire rated construction shall be a combination of listed insulation and fireproof caulk.

2. **Sections 22001, 238126, and 260001 replace in their entity with the attached.**

3. **ATTACHMENT A is attached.**

DRAWINGS

1. Replace existing drawings with attached.

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ATTACHMENTS

******END OF TABLE OF CONTENTS******

SECTION 220001
PLUMBING

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 1 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

B. Equality of material, article, assembly or system other than those named or described in this Section shall be determined in accordance with the provisions of the CONTRACT and GENERAL CONDITIONS.

1.2 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Demolition of designated piping
2. Domestic cold-water system to two areas and connecting to each fixture and piece of equipment requiring domestic cold water.
3. Domestic hot water system to two areas connecting to each fixture and piece of equipment requiring domestic hot water.
4. Sanitary waste and vent system to two areas connecting to each fixture and piece of equipment requiring sanitary drainage.
5. Valves.
6. Insulation.
7. Hangers, supports and attachments.
8. Sundries.
9. Core drilling for the Work of this Section.

B. Items To Be Installed Only: Install the following items as furnished by the designated Sections:

1. Section 102813 - TOILET ACCESSORIES:
   a. Toilet room accessories.

C. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 061000 - ROUGH CARPENTRY for blocking for toilet accessories.
2. Section 092116 – GYPSUM BOARD ASSEMBLIES for coordination with gypsum walls for toilet accessories.
3. Section 095113 – DROP CEILING for coordination with drop ceilings installation.

D. Perform work and provide material and equipment as shown on Drawings and as specified or indicated in this Section of the Specifications. Completely coordinate work of this Section with work of other trades and provide a complete and fully functional installation.

E. Drawings and Specifications form complimentary requirements; provide work specified and not shown, and work shown and not specified as though explicitly required by both. Although work is not specifically shown or specified, provide supplementary or miscellaneous items, appurtenances, devices and materials obviously necessary for a sound, secure and complete installation.

F. Give notices, file plans, obtain permits and licenses, pay fees and back charges, and obtain necessary approvals from authorities that have jurisdiction as required to perform work in accordance with all legal requirements and with Specifications, Drawings, Addenda and Change Orders, all of which are part of Contract Documents.

1.3 SUBMITTALS

A. Material and equipment requiring Shop Drawing Submittals shall include but not be limited to:

1. Plumbing fixtures and trim.
2. Piping.
3. Fittings, unions, flanges, and couplings.
4. Insulation.
5. Water hammer arrestors.
6. No-hub couplings.
7. Hangers, plates, and inserts.

1.4 CONTRACT DOCUMENTS

A. Listing of Drawings does not limit responsibility of determining full extent of work required by Contract Documents. Refer to Architectural, HVAC, Electrical, and other Drawings and other Sections that indicate types of construction in which work shall be installed and work of other trades with which work of this Section must be coordinated.

B. Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any item, in the drawings or specifications or both, carries with it the instruction to furnish and install the item, regardless of whether or not this instruction is explicitly stated as part of the indication or description.

C. Items referred to in singular number in Contract Documents shall be provided in quantities necessary to complete work.

D. Drawings are diagrammatic. They are not intended to be precise; they are not intended to specify or to show every offset, fitting, and component. The purpose of the drawings is to indicate a systems concept, the main components of the systems, and the approximate geometrical relationships. Based on the systems concept, the main components, and the approximate geometrical relationships, the contractor shall provide all other components and materials necessary to make the systems fully complete and operational.

E. Information and components shown on riser diagrams but not shown on plans, and vice versa, shall apply or be provided as if expressly required on both.

F. Data that may be furnished electronically by the Designer. Such electronically furnished information is subject to the same limitation of precision as heretofore described. If furnished, such data is for convenience and generalized reference, and shall not substitute for Designer's sealed or stamped construction documents.

1.5 DISCREPANCIES IN DOCUMENTS

A. Where Drawings or Specifications conflict or are unclear, advise Designer in writing before Award of Contract. Otherwise, Designer's interpretation of Contract Documents shall be final, and no additional compensation shall be permitted due to discrepancies or unclarities thus resolved.

B. Where Drawings or Specifications do not coincide with manufacturers' recommendations, or with applicable codes and standards, alert Designer in writing before installation. Otherwise, make changes in installed work as Designer requires within Contract Price.

C. If the required material, installation, or work can be interpreted differently from drawing to drawing, or between drawings and specifications, the Contractor shall provide that material, installation, or work which is of the higher standard.

D. It is the intent of these contract documents to have the Contractor provide systems and components that are fully complete and operational and fully suitable for the intended use. There may be situations in the documents where insufficient information exists to precisely describe a certain component or subsystem, or the routing of a component. In cases such as this, where the Contractor has failed to notify the Designer of the situation in accordance with the paragraph above, the contractor shall provide the specific component or subsystem with all parts necessary for the intended use, fully complete and operational, and installed in workmanlike manner either concealed or exposed per the design intent.

E. In cases covered by the paragraph above, where the Contractor believes he needs engineering guidance, he shall submit a sketch identifying his proposed solution and the Designer shall review, note if necessary, and approve the sketch.

1.6 MODIFICATIONS IN LAYOUT

A. HVAC, Plumbing, and Electrical Drawings are diagrammatic. They indicate general arrangements of mechanical and electrical systems and other work. They do not show all offsets required for coordination nor do they show the exact routings and locations needed to coordinate with structure and other trades and to meet architectural requirements.

B. In all spaces, prior to installation of visible material and equipment, including access panels, review Drawings for exact locations and where not definitely indicated, request information from Designer.

C. Check Contract Drawings as well as Shop Drawings of all subcontractors to verify and coordinate spaces in which work of this Section will be installed.

D. Maintain maximum headroom at all locations. All piping and associated components to be as tight to underside of structure as possible.

E. Make reasonable modifications in layout and components needed to prevent conflict with work of other trades and to coordinate according to Paragraphs A, B, C, D above. Systems shall be run in a rectilinear fashion.

F. Where conflicts or potential conflicts exist and engineering guidance is desired, submit sketch of proposed resolution to Designer for review and approval.

1.8 EXISTING CONDITIONS AND PREPARATORY WORK

A. Before starting work in an area of the project, visit site and examine conditions under which work must be performed including preparatory work done under other Sections or Contracts or

by DMH. Report conditions that might affect work adversely in writing through Contractor to Designer. Do not proceed with work until defects have been corrected and conditions are satisfactory. Commencement of work shall be construed as complete acceptance of existing conditions and preparatory work.

1.9 CODES, STANDARDS, AUTHORITIES AND PERMITS

A. Perform work strictly as required by rules, regulations, standards, codes, ordinances, and laws of local, state, and Federal governments, and other authorities that have legal jurisdiction over the site. Materials and equipment shall be manufactured, installed and tested as specified in latest editions of applicable publications, standards, rulings and determinations of:

1. Local and state building, plumbing, mechanical, electrical, fire and health department codes.
2. National Fire Protection Association (NFPA).
3. American Insurance Association (A.I.A.) (formerly National Board of Fire Underwriters).
4. American Society of Mechanical Engineers (ASME).
5. Occupational Safety and Health Act (OSHA).
6. Underwriters' Laboratories (UL).
7. American National Standards Institute (ANSI).

B. Material and equipment shall be listed by Underwriters' Laboratories (UL), and approved by ASME for intended service.

C. When requirements cited in this Specification conflict with each other or with Contract Documents, most stringent shall govern work. Designer may relax this requirement when such relaxation does not violate ruling of authorities that have jurisdiction. Approval for such relaxation shall be obtained in writing.

1.9 RECORD DRAWINGS

A. Drawings shall show record condition of details, sections, riser diagrams, control changes and corrections to schedules. Schedules shall show actual manufacturer and make and model numbers of final equipment installation.

1.10 COORDINATION DRAWINGS

A. Coordination Drawings include but are not necessarily limited to:

1. Structure.
2. Partition/room layout.
3. Ceiling tile and grid.
4. Light fixtures.
5. All heating piping and valves.
6. Soil, waste and vent piping.
7. Major water.
8. Major electrical conduit and branch conduit.
9. Above ceiling miscellaneous metal.

PART 2 - PRODUCTS

2.1 PIPING, FITTINGS AND JOINTS

A. General:

1. Pipe and fittings shall conform to the latest ANSI, ASTM, NFPA and AWWA Standards including latest amendments.
2. Each length of pipe, each pipe fitting, material and/or device used in the respective system shall have cast, stamped or indelibly marked on it, the maker's name or mark, weight and quality of the product when such marking is required by the approved standard that applies.
3. Piping and fittings shall be factory coated.
4. Pro-press type piping and fittings may be used, but shall be limited to domestic water lines, 2 inches or less in diameter.

B. Sanitary Drainage Piping (Soil, Waste, and Vent)

1. Piping shall be no-hub service weight cast iron soil pipe except and cleanouts and joints which shall be service weight hub and spigot with lead and oakum joints.
2. Couplings for joining no-hub cast iron soil pipe: Couplings shall have a shield constructed of corrugated 304 stainless steel and provide a shield thickness of 0.16 inches or greater. Shield shall be a minimum width of 3 inches for pipe sizes 1-1/2 inch through 4 inch. Couplings with at least 4 sealing bands shall require 80-inch pounds of torque per band. Tightening screws shall be 3/8-inch hexagon head. Couplings with only 2 sealing bands on sizes 1-1/2 inch through 4 inches shall require 125-inch pound of torque per band. Gaskets shall be neoprene rubber conforming to ASTM C-564.

C. Water Piping (Domestic)

1. Piping shall be hard drawn Type L copper with push-to- connect fittings. Fittings shall be ASME B16.18 cast copper alloy or ASME B16.22 wrought copper with stainless steel teeth and EPDM synthetic rubber o-ring seal in each end (UL classified in accordance with NSF-61 for hot (+180°F) and cold (+86°F) potable water service) with push-to-connect ends instead of solder-joint ends.
2. Joints in copper tubing except as otherwise specified herein shall be made according to manufacturer's specifications using sweat fitting and lead-free solder and noncorrosive flux.
3. Provide galvanized malleable iron unions, with bronze facings conforming to ANSI B16.39 for sizes 2 inch and smaller.
4. Provide steel flanges conforming to ANSI B16.5, standard or welding neck pattern.

D. Unions and Flanges

1. Unless otherwise specified herein, unions for copper piping two inches and smaller in diameter shall be 125 SWP, bronze body brass ground joint type.

2.2 VALVES AND SUNDRIES

A. General

1. Manufacturer: Subject to compliance with requirements, provide products from one of the manufacturers listed.

2. Pressure and Temperature Ratings: As scheduled and required to suit system pressures and temperatures.
3. Sizes: Same size as upstream pipe, unless otherwise indicated.
4. Bypass and Drain Connections: Comply with MSS SP-45 bypass and drain connections.
5. End Connections: As indicated in the valve specifications.
a. Threads: Comply with ANSI B1.20.1.
b. Flanges: Comply with ANSI B15.1 for cast iron, ANSI B16.5 for steel, and ANSI B16.24 for bronze valves.
c. Grooved: Comply with ANSI/AWWA C606.
d. Solder-Joint: Comply with ANSI B16.18.
1) Caution: Where soldered end connections are used, use solder having a melting point below 840 deg. F for gate, globe, and check valves; below 421 deg F for ball valves.

B. Valves in the interior domestic water piping systems (cold water and hot water):

1. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
   a. Apollo.
   b. Nibco.
   c. Victaulic.
   d. Watts.
2. Ball Valves
   a. Ball Valves, 1-1/4 Inch and Smaller: Rated for 200 psi cold water pressure, two-piece construction; with forged brass body, full port, chrome-plated brass ball and brass stem, PTFE seat ring and packing, lever handle, push-to-connect ends for domestic hot and cold water service. Victaulic PermaLynx 300 Series or approved equal.

2.3 HANGERS AND ACCESSORIES

A. General

1. Provide pipe stands, supports, hangers and other supporting appliances as necessary to support work required by Contract Documents. All components of the hanger support system shall comply with the standards set forth in MSS-SP58 and MSS-SP69 (Manufacturers Standardization Society) latest publication.
2. Manufacturers: Subject to compliance with requirements, provide hangers and supports of Carpenter and Patterson, Inc, ITT Grinnel Corp., Elecen Metal Products or approved equal.

B. Secure vertical piping to building construction to prevent sagging or swinging.

C. Hangers for uncovered (uninsulated) copper or brass piping 2 in. and smaller shall be Carpenter & Patterson Figure 1ACT steel, copper plated band type.

D. Hangers for uncovered (uninsulated) cast iron piping 2 in. and smaller shall be Carpenter & Patterson Figure 1A steel band type.

E. Hangers for all insulated piping shall be Carpenter & Patterson Figure 100 steel clevis type with insulation shield specified below.

F. Hanger rods for other installations shall be sized in accordance with the recommended load capacities of ASTM Specifications Designation A 107, latest amendment.

G. Insulation protectors (shields) for horizontal piping shall be constructed of galvanized steel formed to a 180-degree arc and 12 inches long, equal to Carpenter & Patterson Figure 265P, 18-gauge type H for hangers 5 inches in size and smaller.

H. Exposed rods, clamps and hangers shall be electrogalvanized coated.

I. Installation of hangers which permit wide lateral motions of any pipe will not be acceptable.

2.4 INSERTS AND ESCUTCHEONS

A. Inserts shall be individual or strip type of pressed steel construction with accommodation for removable nuts and threaded rods up to 3/4-inch diameter, permitting lateral adjustment. Individual inserts shall have an opening at the top to allow reinforcing rods up to 2-inch diameter to be passed through the insert body. Strip inserts shall have attached rods with hooked ends to allow fastening to reinforcing rods.

B. Unless otherwise specified herein, escutcheons shall be cast brass chrome plated type and provided with a set screw to properly hold escutcheon in place.

2.5 PIPE COVERING

A. General

1. The pipe covering specified herein for piping system shall be provided to strict accordance with the manufacturer's printed instructions, the best practice of the trade and to the full intent of this Specification.

B. Interior Cold and Hot Water Systems:

1. 1 in. thickness fiberglass piping insulation:
   a. ASTM E-547, Class I
2. Encase piping fittings insulation with one piece premolded PVC fitting covers, fastened as per manufacturer's recommendations.
3. Staples, Bands, Wires, and Cement: As recommended by insulation manufacturer for applications indicated.

2.6 CLEANOUTS

A. Cleanouts shall be Jay R. Smith, Josam, Zurn or approved equal.

B. Bodies of cleanout ferules in no hub piping shall be standard pipe size conforming in thickness to that required for pipe and fittings and shall extend not less than 3/4 inch above the hub of the pipe. The cleanout plug shall be of cast brass and shall be provided with a raised nut 3/4 inch high.

C. Wall cleanouts shall consist of cleanout tee and square frame and cover and shall be equal to Jay R. Smith Series 4558.

2.7 PLUMBING FIXTURES

A. In general, the work of this Article shall include, but not be limited to:

1. Plumbing fixtures and trim.

2. Faucets and flushometers.
3. Stops and supplies.
4. Traps and tailpieces.
5. Drain outlets.
6. Carriers and supports.
7. Lavatory insulators.

B. Fixtures and Trim

1. Acceptable Manufacturers: Submit manufacturers not listed below for review and approval as specified for substitutions in Article Quality Assurance in this Section.
   2. Vitreous China: American Standard, Crane or Kohler.
   3. Faucets: Chicago Faucet Co., Kohler or T & S Brass.
   4. Self Closing Faucets: Chicago Faucet Co., Kohler or Symmons.
   5. Sensor Faucets: Chicago Faucet Co., Hydrotek or Sloan.
   6. Carriers and Supports: Jay R. Smith, Wade, or Zur.
   7. Flush Valves: Sloan, Delany, or Zurn.
   8. Stops and Supplies: Chicago Faucet Co., Kohler or McGuire.
   9. P-Traps: McGuire, Sanitary-Dash, or Jameco.
   10. Handicap Lavatory Insulators: McGuire, TCI Products or Truebro.
2. Fixture Trim and Accessories: Provide fixtures complete with floor mounted fixture carrier supports; faucets, flushometers; drain outlets, tailpieces, P-traps and stops and supplies.
   2. Color and Finish: All trim exposed to view shall be polished chrome plated, and all fixtures and toilet seats shall be white unless specified otherwise.
   3. Drain Outlets: Provide drain outlet of the same manufacturer as the fixture or faucet trim with chrome plated 17-gauge minimum weight tailpiece.
      1.) Provide 1-1/4-inch tailpiece on lavatories.
      2.) Provide 1-1/2-inch tailpiece on sinks.
      3.) Provide offset drain outlets on handicapped use lavatories and sinks.
3. P-Traps: Cast brass adjustable P-trap with cleanout plug, ground joint and 17 gage minimum weight extension with escutcheon.
   2. Provide McGuire No. 8090 1-1/4 inch by 1-1/2 inch on lavatories.
   3. Provide McGuire No. 8089 1-1/2 inch by 1-1/2 inch on sinks.
4. Stops and Supplies: Provide stops and supplies of the same manufacturer as the fixture or faucet trim or provide McGuire Model 170-LK loose key angle stop with 5-inch-long 2-inch nominal copper sweat extension, bell escutcheon, and 3/8-inch O.D. by 12-inch flexible riser.
5. Sinks: Seamlessly drawn, self-rimming minimum 18-gauge, type 302 (18-8) nickel bearing stainless steel with 1-3/4-inch minimum rounded corners, satin finish, and fully undercoated.
6. Faucets: Chrome plated cast brass with stainless steel seats and monel stems. Gooseneck spouts shall be interchangeable and convertible rigid/swing type. Handles shall be interchangeable with square handle broachings.
7. Flushometers: Diaphragm operated, cast-brass body, brass or copper pipe or tubing inlet with wall flange and tailpiece with spud, screwdriver check stop, vacuum breaker, and brass lever handle actuation except where other variations are specified.
8. Water Conservation: Provide water conserving fixtures and trim incompliance with the following maximum water use requirements. Provide Omni or equal variable pressure flow controls on showers, sinks, and lavatory faucets.
   2. Public lavatories: 0.5 gpm

3. Sinks: 1.5 gpm
4. Water Closets: less than 1.6 gallons per flush.

9. Fixture Supports: Provide floor mounted fixture support carriers for wall mounted fixtures including but not limited to water closets and lavatories.
10. Fixture carriers shall support at least 250 pounds on the front rim of the fixture for 5 minutes.
    2. Water Closets: Jay R. Smith Series 200-Y
    3. Lavatories: Jay R. Smith 700-M31.
    4. Wheel Chair Lavatories: Jay R. Smith 700-27-M31.
11. Toilet Seats: Provide extra heavy-duty, commercial/industrial type, elongated, open front, solid white injection molded plastic with integral bumpers; and self-sustaining stainless steel check hinges.
    2. Acceptable Manufacturers: Bemis, Beneke, or Church.
12. Handicap Lavatory and Sink Insulators: Shall be provided on water supplies and waste piping below handicapped use lavatories and sinks.
    2. Acceptable Manufacturers: McGuire, TCI Products or Truebro.

PART 3- EXECUTION

3.1 BASIC REQUIREMENTS

A. Work should be executed in workmanlike manner and shall present neat, rectilinear and mechanical appearance when completed. Maintain maximum head room at all times. Materials and equipment shall be new and installed according to the manufacturer's recommended best practice so that the completed installation shall operate safely and efficiently.

B. The Contractor shall review installation details of all plumbing equipment with the Designer and cooperate fully with the Designer in this regard. Any work installed which is not reviewed with and approved by the Designer is subject to re-work at no increase in contract price.

C. All workmanship shall be of the highest quality, as determined by the Designer. The Contractor will be required to repair or replace all work which is not of the highest quality and workmanship.

D. All equipment and components shall be installed in strict compliance with the manufacturer's installation manuals.

3.2 CONTITUITY OF SERVICES

A. Do not interrupt existing services without the Project Manager's approval.

B. Schedule interruptions in advance, according to the Project Manager's instructions. Submit, in writing, with request for interruption, methods proposed to minimize length of interruption.

C. Interruptions shall be scheduled at such times of day and work so that they have minimal impact on DMH's operations.

3.3 DEMOLITION

E. Demolish the existing system to allow installation of the new systems. No components, items, or materials are to be reused. Demolition material shall become the property of the Contractor, for his lawful disposal.

3.4 CROSS CONNECTION PROTECTION AND APPROVALS

A. Protect potable water piping outlets and connections to equipment or machinery against backflow with an airgap or approved backflow preventer.

B. Prior to installation, the Contractor shall submit through the Project Manager, a design data sheet, with plans showing the method of protecting the water system, and secure approval from the (cross connection control division) local water authority, or its designee. This shall not be done until the Contractor has secured the plumbing permit for the work, by the Inspector of Plumbing, and shop drawings have been reviewed.

C. Three (3) copies of each application and all subsequent correspondence, including the final permit, shall be forwarded to the Designer for record. Availability of final approval or permits shall be prerequisite to scheduling a final inspection of the plumbing work.

3.5 DISINFECTION, CLEANING AND ADJUSTING

A. Disinfection

1. Each potable water system (cold and hot water) shall be cleaned and disinfected by this Contractor. Cleaning and disinfection shall be performed after all pipes, valves, fixtures and other components of the systems are installed, tested and ready for operation.
2. All hot and cold-water piping shall be thoroughly flushed with clean potable water, prior to disinfection, to remove dirt and other contaminants. Screens of faucets shall be removed before flushing and re installed after completion of disinfection.
3. Disinfection shall be done using sodium hypochlorite in the following manner:
    a. A service cock shall be provided and located at the water service entrance. The disinfecting agent shall be injected into and through the system from this cock only.
    b. The disinfecting agent shall be injected by a proportioning pump or device through the service cock slowly and continuously at an even rate. During disinfection, flow of disinfecting agent into main water supply is not permitted.
    c. All sectional valves shall be opened during disinfection. All outlets shall be fully opened at least twice during injection and the residual checked with orthotolidin solution.
    d. When the chlorine residual concentration, calculated on the volume of water the piping will contain indicated not less than 50 ppm (parts per million) at all outlets, then all valves shall be closed and secured.
    e. The residual chlorine shall be retained in the piping systems for a period of not less than 24 hours.
    f. After the retention, the residual shall be not less than five parts per million. If less, then the process shall be repeated as described above.
    g. If satisfactory, then all fixtures shall be flushed with clean potable water until residual chlorine by orthotolidin tests shall be not greater than the incoming water supply. (This may be zero.)

4. All work and certification of performance shall be performed by approved applicators or qualified personnel with chemical and laboratory experience. Certification of performance shall indicate:
   a. Name and location of the job and date when disinfection was performed.
   b. Material used for disinfection.
   c. Retention period of disinfectant in piping system.
   d. ppm chlorine during retention.
   e. ppm chlorine after flushing.
   f. Statement that disinfection was performed as specified.
   g. Signature and address of company or person performing disinfection.
5. Upon completion of final flushing (after retention period) the plumbing subcontractor shall obtain a minimum of one water sample from each hot and cold-water line and submit samples to a State approved laboratory. Samples shall be taken from faucets located at highest floor and furthest from meter or main water supply. The laboratory report shall show the following:
   a. Name and address of approved laboratory testing the samples.
   b. Name and location of job and date the samples were obtained.
   c. The coliform organism count. (An acceptable test shall show the absence of coliform organisms.)
6. If analysis does not satisfy the above minimum requirements, the disinfection procedure shall be repeated.
7. Before acceptance of the systems, this Contractor shall submit to the Project Manager for his review, three (3) copies of Certification of Performance as specified above.
8. Under no circumstances shall this contractor permit the use of any portion of domestic water systems until properly disinfected, flushed and certified.

B. Cleaning and Adjusting

1. At the completion of the work, all parts of the installation shall be thoroughly cleaned. All equipment, pipe, valves and fittings shall be cleaned of grease, metal cuttings and sludge which may have accumulated by operation of the system for testing.
2. Any stoppage or discoloration or other damage to parts of the building, its finish, or furnishings due to the Plumbing subcontractor's failure to properly clean the piping system shall be repaired by this Contractor at no increase in Contract costs.
3. At the completion of the work, all water systems shall be adjusted for quiet operation.
4. All automatic control devices shall be adjusted for proper operation.
5. All plumbing fixtures and exposed metal work shall be cleaned and polished. Floor drain strainers and traps shall be cleaned of all debris.
6. All items of equipment shall be thoroughly inspected. Any items dented, scratched or otherwise damaged in any manner shall be replaced or repaired and painted to match the original finish. All items so repaired and refinished shall be brought to the attention of the Designer and Project Manager for inspection and approval.

3.6 SYSTEMS

A. Sanitary Waste System

1. The Plumbing subcontractor shall be responsible for checking each pipe for alignment, center line elevation and invert grade for underground installations.
2. At times when work is not in progress, open ends of pipe and fittings shall be securely closed to the satisfaction of the Project Manager so that no trench water, earth or other

substance will enter the pipe or fittings. Any section of a building drainage system that is found defective in material, alignment, grade or joints before acceptance shall be corrected to the satisfaction of the Project Manager.

3. The sanitary (soil, waste and vent), storm and basement drainage piping three inches and smaller in diameter shall pitch a minimum of 1/4 inch per foot. Piping four inches and larger in diameter shall pitch a minimum of 1/8 inch per foot.
4. The soil, waste and vent stacks shall be connected as shown and extended through the roof a minimum of 18 inches. Soil, waste and vent pipes shall be concealed unless otherwise noted.
5. Branch connections to each drainage system shall be made with "Wye" and long turn "Tee Wye" fittings. Installation of short radius 1/4 bends, common off sets, double hub fittings and saddles will not be approved. Installation of short "Tee Wye" fittings will be permitted for vertical piping only, and only where space conditions will not permit the use of long turn fittings. Only fittings conforming to the Code shall be installed.
6. The changes in direction of each drainage system shall be made with "Wye" branches and 1/8 bends. Provide long sweep bends at bottom of stacks with a vertical cleanout just above the floor at places where a "Wye" and 1/8 bends and end cleanouts cannot be installed.
7. Every fixture shall be separately trapped, and the traps must be vented unless an approved battery vented system is being installed. Floor drains shall be considered as a fixture.
8. Vents shall be connected to the discharge of each trap in the sanitary system, thence carried individually to a point above the flood level of the fixture before connecting with any other vent pipes. Pitch the branch vents back to the fixture.
9. Collect individual vent pipes together in branch vent lines and connect to vent stacks. Wherever possible, vent stack offsets shall be made with 45-degree fittings. The vents passing through the roof shall be a minimum size of four inches in diameter.
10. Cleanouts shall be provided in drainage piping at changes in directions, at foot of stacks or other required points accessible for cleaning or rodding out.
11. Cleanouts shall be of the same size as the pipe installed in up to four inches in diameter and not less than four inches in diameter for piping larger than four inches in diameter.
12. Traps on sanitary piping not integral with fixtures and in accessible locations shall be provided with a brass trap screw protected by the water seal and will be regarded as a cleanout.
13. Test tees with brass cleanout plugs shall be provided at the foot of all vertical soil, waste and storm drainage stacks and at each floor. Wherever cleanouts on vertical lines occur concealed behind finished walls, they shall be extended to back of finished wall, and a wall plate shall be provided.

B. Cold and Hot Water Piping

1. Branch lines from water service or main lines shall be taken off the top or bottom of main, using such crossover fittings as may be required by structural or installation conditions. All water service pipes, fittings, and valves shall be kept a sufficient distance from other work to permit finished covering to be not less than 1.5 inches from other work and not less than 1.5 inches between coverings on the different services.
2. Provide shock absorbers at special equipment, tops of the risers, at each individual or each group of fixtures.
3. Water piping shall be run parallel and graded evenly to the drainage points. There shall be a 2-inch drain valve provided for each low point in the piping so that all parts of each water system can be drawn off.

4. Provide suitable means of thermal expansion for the hot water piping using swing joints, expansion loops and long turn offsets as required to suit building conditions.
5. Piping connections to equipment shall be provided with unions or flanges to permit convenient disassembly for alterations and repairs.
6. No piping shall be installed in a manner to permit back siphonage or any flow of water from sanitary or drainage systems into the water systems or their distribution piping under any conditions.
7. Air gaps, open end of funnel drains, and approved vacuum breaking devices shall be provided as specified or as indicated on the Drawings. Piping to hose end faucets or hose end fittings, or any fixtures where water supply outlet is below the fixture overflow rim shall have vacuum breakers.
8. Where flanges are installed in the water systems, red rubber gaskets shall be installed between each pair of flanges.
9. Heating or bending of copper tubing to eliminate the installation of fittings will not be permitted.
10. Piping systems shall be kept clean during all phases of work. Open ends of incomplete piping shall be protected to prevent the entrance of foreign materials.
11. Pipe shall be cut accurately to measurements established at the site and shall be worked into place without springing or forcing.
12. Provide copper plated friction clamps on the old water supplies to each water closet and urinal flushometer. Friction clamp shall be firmly clamped to the pipe and shall be firmly attached to the adjacent wall structure.

3.7 GENERAL INSTALLATION REQUIREMENTS

A. Piping Installation

1. Install piping approximately as shown on the Drawings and as directed during installation by the Designer's representative.
2. Piping shall be installed as straight and direct as possible, forming right angles or parallel lines with building walls, other piping and be neatly spaced.
3. The horizontal runs of piping, except where concealed in partitions, shall be installed as high as possible.
4. Piping or other apparatus shall not be installed in such a manner as to interfere with the full swing of the doors and access to other equipment.
5. The arrangement, positions and connections of pipes, fixtures, drains, valves, and the like, indicated on the Drawings shall be followed as closely as possible.
6. It shall be possible to drain the water from all sections of each cold and hot water piping system. Pitch piping back to drain valves.
7. Screwed piping of brass or chrome plated brass shall be made up with special care to avoid marring or damaging pipe and fitting exterior and interior surfaces.
8. Small fittings shall be taper thread. Lampwick, cord, wool or any other similar material shall not be used to make up thread joints.
9. Screwed pipe and copper tubing shall be reamed smooth before installation.
10. All exposed piping in connection with fixtures shall be chrome plated. Where chrome plated piping is installed, cut and thread pipe so that no unplated pipe threads are visible when work is completed.
11. Reducing fittings, unless otherwise approved in special cases, shall be provided in making reduction in size of pipe. Bushings will not be allowed unless specifically approved.

12. Remove and replace with new materials, any copper or brass piping (chrome plated or unplated) showing visible tool marks.
13. Vertical risers shall be firmly supported by riser clamps, properly installed to relieve all weight from the fittings.
14. Any piece of pipe six inches or less in length shall be considered as a nipple.
15. All water service piping shall be kept a sufficient distance from other work to permit finished covering to be not less than 1.5 inches from other work and not less than 1.5 inches between the coverings (insulation) on the different services.
16. Push-To-Connect Joints: Install in accordance with the manufacturer's latest recommendations. Follow the latest published literature as provided by Victaulic or approved equal by Grinnell or Anvil Gruvlok . Pipe ends shall be cleaned, free from indentations, projections, burrs, and foreign matter. Use a tube preparation tool as supplied by Victaulic or approved equal by Grinnell or Anvil Gruvlok to clean. Apply installation mark in accordance with Victaulic or approved equal by Grinnell or Anvil Gruvlok instructions. Push copper tube into fittings to installation depth mark, per Victaulic or approved equal by Grinnell or Anvil Gruvlok installation instructions. Keep fittings free of dirt and oil; use only on potable water or oil-free compressed air systems.

B. Hanger Installation

1. All piping shall be supported from the building structure by means of approved hangers and supports, to maintain proper grading and pitching of lines, to prevent vibration and to secure piping in place, and shall be so arranged as to provide for expansion and contraction.
   a. Maximum spacing of hangers on soil pipe shall be five feet and hangers shall be provided at all changes in direction. Vertical hanger rods to support piping from the structure or supplementary steel shall not exceed four feet in total length. Where pipe support assemblies exceed four feet in total length vertically, this Contractor shall provide factory fabricated channels and all associated accessories.
   b. Friction clamps shall be installed at the base of the plumbing risers and at each floor (above or below floor slabs). Friction clamps installed above floor slabs shall not be supported from or rest on floor sleeves.
   c. Provide hangers at a maximum distance of two feet from all changes in direction (horizontal and vertical) and on both sides of concentrated loads independent of the piping.
   d. Hangers, in general, for all horizontal piping shall be Clevis type hangers. These hangers shall be sized to fit the outside diameter of the pipe insulation and insulation protectors (sheet metal shields) specified herein.
   e. All vertical drops and runouts including insulated pipes shall be supported by split ring hangers with extension rods and wall plates. These hangers shall be copper plated when used on uncovered copper tubing. Supports on insulated vertical piping shall be sized to fit the outside diameter of the pipe insulation with 360 degrees insulation protector.
   f. Provide on each horizontal insulated line, pipe covering protectors (shields) at each hanger. Each protector shall be sized to fit the outside diameter of the pipe insulation.
   g. Retaining straps shall be provided with all beam clamps.
   h. All supplementary steel, including factory fabricated channels, associated accessories, and 12 inch long sheet metal shields, throughout the project for this

Section of the Specifications, both suspended and floor mounted, shall be provided by this Contractor and shall be subject to the approval of the Designer.

i. Hangers shall not pierce the insulation on any insulated pipe.
j. Wire, tape or wood fastenings for shims or support of any pipe or tubing shall not be used.
k. Remove all rust from the ferrous hanger equipment (hangers, rods, and bolts) and apply one coat of red lead immediately after erection.
l. All piping shall be independently supported from the building structure and not from the piping, ductwork, conduit or ceiling suspension systems of other systems.
m. Installation of hangers which permit wide lateral motions of any pipe will not be acceptable.
n. "C" clamps installed with pipe hangers or equipment hangers will not be permitted unless provided with retaining straps.

C. Pipe Covering Installation

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

D. Installation of Sleeves, Inserts and Escutcheons

1. Sleeves in floors shall be set 1 inch above the finished floor surface or as indicated on the Drawings.
2. Sleeves through interior masonry or non masonry walls or partitions shall be set flush with the finished surfaces of the wall or partition.
3. Field drilling for inserts required for work under this Section of the Specifications shall be provided by this Contractor.
4. Each interior wall or partition sleeve shall be packed with foam or glass wool to within one inch of each face of wall, and the remaining portion of each end of sleeve to be sealed with U.L. listed fireproof caulking compound equal to the rating of the partition.

5. Escutcheons shall be installed around all exposed insulated or bare pipe, except water closet starts or bends passing through a finished floor, wall or ceiling. Escutcheons shall fit snugly around the bare pipe or insulated pipe.

E. Valve Installation

1. Location of Valves: There shall be valves where indicated on the Drawings and where specified as follows:
   a. Branches to groups of fixtures, branches to separate fixtures,
   b. Each fixture supply shall have a separate angle stop or straight stop finished like the pipe it services.
   c. Each piece of equipment shall have isolation valves for each service connected.
   d. Valves shall be located to permit easy operation, replacement or repair.

F. Installation of Cleanouts and Ferrules

1. Test Tees: Each vertical soil, waste, and vent which connects to horizontal drain piping below ground shall be fitted with a test tee above the lowest floor or ground. Where accessible, test tee may be installed in the horizontal pipe at the base of the riser.
2. Cover Plates: Where cleanouts or test tees occur on concealed pipes in finished rooms, they shall be provided with a 1/8-inch-thick, machine finished, brass cover plate of sufficient diameter to cover the opening in the finished wall or partition. The cleanout plug shall have a solid head, tapped for a 1/4-inch brass screw to secure the cover plate. Where cleanout plugs extend beyond the wall finish, the cover plates shall be of machine finished brass and shall be only of sufficient depth to fit against the wall to cover plug. Cleanout cover plates shall be painted to match adjacent wall finish.
3. Cleanout Plugs For Hub and Spigot Fittings: Cleanout plugs for hub and spigot fittings shall be screwed into ferrules caulked into the fitting. Ferrules and plugs shall be in accordance with ANSI B16.12, except that plugs required to be flush with the floor shall have square countersunk heads in lieu of raised heads.

G. Installation of Plumbing Fixtures

1. General:
   a. Refer to Drawings for locations and mounting heights of all plumbing fixtures.
   b. Provide with all plumbing fixtures, all trim, supports, fittings, connections and all incidentals necessary to make a complete installation in accordance with plumbing codes and the Contract Documents.
   c. All visible hanger nuts and all escutcheons shall likewise be chrome plated over nickel plate.
2. Examination:
   a. Examine roughing-in for potable cold water and hot water supplies and soil, waste, and vent piping systems to verify actual locations of piping connections prior to installing fixtures.
   b. Examine walls, and floors for suitable conditions where fixtures are to be installed.
   c. Do not proceed until unsatisfactory conditions have been corrected.
3. Fixture Roughings
   a. Install rough plumbing including fixture carriers and supports, valves and water hammer arrestors within chase tolerances. Supply roughing through finish walls shall be secure and free of movement. Locate valves and water hammer arrestors within 12 inches of approved access panel location.

b. Align exposed waste and supply pipe roughings with fixture connections within 1 inch tolerance. Provide flush valves in alignment with the fixture, without vertical or horizontal offsets. Obtain fixture manufacturer roughing data sheets for recommended roughing dimensions.

c. Secure fixture supports to floor slab construction with lag bolts and metal expansion shields to support at least 250 pounds on the front rim of the fixture for 5 minutes.

d. Mounting Heights:
   1.) Water Closets: 17 inches to rim.
   2,) Handicapped Use Water Closets: 17 inches to rim.
   3.) Lavatories: 31 inches to rim.
   4.) Handicapped Use Lavatories: 34 inches maximum to rim with at least 29 inches from finish floor to bottom of apron.

e. Provide fixture rough-in piping connections sizes in accordance with the following schedule:

	HW	CW	S or W
Water Closets	-	1 inch	4 inches
Lavatories	2 inch	2 inch	12 inches

4. Fixture Supports
   a. All fixtures shall be supported and fastened to the building structure. The method of support for each type fixture shall be specified herein, except when the fixture designations on the Contract Drawings indicate modifications.
   b. Wall hung water closets shall be generally supported on combination drainage fittings and chair carriers and with foot supports fastened to the floor slab with expansion lag screws.
   c. Installations shall be complete with all necessary bolts, nuts and washers, iron or brass connecting nipples between fixtures and piping system of the proper length and graphite non-asbestos gaskets for closet connections.
   d. Where wall hung fixtures are secured to masonry walls or partitions, they shall be fastened with 1/4 inch through bolts provided with nuts and washers at back. Bolt heads and nuts shall be hexagon and exposed bolts, nuts, washers and screws shall be chromium plated brass.

5. Installation of Fixtures
   a. Mount fixtures level at elevations shown on the Drawings. Refer to toilet room elevations.
   b. Install handicapped use fixtures in accordance with the requirements to the Architectural Access Board Code and ANSI A117.1. Insulate hot water supply and waste piping under lavatories.
   c. Grout wall and floor mounted fixtures watertight where the fixtures are in contact with walls and floors.
   d. Caulk deck-mounted trim at the time of assembly, including fixture and casework mounted. Caulk self-rimming sinks installed in casework.

6. Fixture Trim:
   a. All materials specified to be chromium plated shall be thoroughly cleaned and polished before plating, and plate shall be heavily, thoroughly and evenly applied, guaranteed not to strip or peel.

b. Where escutcheons are not furnished with plumbing fixtures, the Contractor shall supply them. Escutcheons shall be the type and material specified herein.
c. Each fixture shall be separately trapped using the type and size of trap specified herein and required by the Plumbing Code.
d. Unless otherwise specified, faucets and all exposed fittings shall be chromium plated. Chromium plating for brass shall be applied on a first plating of nickel.
e. All fixtures requiring hot and cold water shall have the cold water faucet on the right hand side of the fixture and the hot water faucet on the left hand side of the fixture.
f. All brass shall conform to brass tubing and shall be not less than No. 17 gauge.

7. Adjustments and Cleaning
   a. After completion of the installation work and equipment start-ups, perform the necessary adjustments to systems installed under this Section. Submit verification that systems are operating at the specified temperatures and pressures.
   b. Operate and adjust faucets and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.
   c. Adjust water pressure at faucets and flushometers having controls, to provide proper flow and stream.
   d. Replace washers of leaking and dripping faucets and stops.
   e. Adjust flush valves, open fixture stops, and clean faucet aerators.
   f. Adjust metering faucets to deliver a maximum of 1/4 gallon of hot water at a rate of 2 gpm and operate for at least 10 seconds upon activation.
   g. Temperature adjustments: Adjust metering faucets in public toilet rooms to provide a maximum temperature of 110 degrees F.
   h. Clean fixtures, fittings, and spout and drain strainers with manufacturers' recommended cleaning methods and materials.
8. Protection
   a. Provide protective covering for installed fixtures and fittings.
   b. Do not allow use of fixtures for temporary facilities, except when approved in writing by the Project Manager.

3.8 INSPECTION AND TESTS

A. General

1. All labor, materials, instruments, devices and power required for testing shall be provided by the Plumbing Subcontractor. The tests shall be performed in the presence and to the satisfaction of the Designer and the Project Manager and such other parties as may have legal jurisdiction. No piping in any location shall be closed, furred in, or covered before testing and approval by the Local Plumbing Inspector and the Project Manager.
2. Where portions of piping systems are to be covered or concealed before completion of the project, those portions shall be tested separately in the manner specified herein for the respective entire system.
3. Any piping or equipment that has been left unprotected and subject to mechanical or other injury in the opinion of the Project Manager shall be retested in part or in whole as directed.
4. Repair, or if directed by Designer or the Project Manager, replace any defective work with new work without extra cost to DMH. Repeat tests as directed, until the work is proven to meet the requirements specified herein.

5. Restore to its finished condition any work, provided by other Contractors, damaged or disturbed by tests. The Plumbing Subcontractor shall engage the original Contractor to do the work of restoration to the damaged or disturbed work.
6. The fixtures shall be tested for stability of support and satisfactory operation. The piping shall be tested when directed by the Designer, Local Plumbing Inspector or the Project Manager for stability of support.
7. After the fixtures are set and connected, and the piping systems to same have been tested, the Plumbing Subcontractor shall turn water on to the fixtures, equipment, fill the traps, etc., and the proper operation of all items shall be demonstrated by him in the presence of and to the satisfaction of the Designer, the Project Manager, Plumbing Inspector, or their designated representative.
8. Caulking of screwed joints or holes in piping will not be acceptable.
9. The Plumbing Subcontractor shall notify the Designer, the Project Manager and all inspectors having jurisdiction, a minimum of 48 hours in advance of making any required tests so that arrangements may be made for their presence to witness scheduled tests.

B. Specific

1. Sanitary Piping Systems:
   a. Before the installation of fixtures, equipment and insulation, each system including vents shall have all necessary openings plugged to permit the entire system to be tested in accordance with the State Plumbing Code. Each system shall hold this water without a drop in water level. Test to be witnessed by Local Plumbing Inspector and the Project Manager.
   b. Where a portion of the system is to be tested, the test shall be accomplished with a vertical stack ten feet above the highest horizontal line to be tested may be installed and filled with water to maintain sufficient pressure. A pump may be used to supply the required pressure. The pressure shall be maintained for a minimum of four hours for sufficient time to permit inspection of all joints.
2. Cold and Hot Water Piping System:
   a. Upon completion of the roughing in and before setting fixtures and final connections to all equipment, all water piping systems shall be tested to a hydrostatic pressure of 150 pounds per square inch.
   b. Each systems test shall be maintained for eight hours without a drop in pressure. These tests to be witnessed by Local Plumbing Inspector and the Project Manager.
   c. After testing, provide complete adjustment of all parts of each water system until design distribution or balancing is obtained throughout.

3.10 SPECIAL RESPONSIBILITIES

A. Installation Only Items

1. Where this contractor is required to install items which it does not purchase, it shall coordinate their delivery and be responsible for their unloading from delivery vehicles and for their safe handling and field storage up to the time of installation. This trade shall be responsible for:
   a. Any necessary field assembly and internal connections, as well as mounting in place of the items, including the purchase and installation of all dunnage

supporting members and fastenings necessary to adapt them to architectural and structural conditions.

b. Their connection to building systems including the purchase and installation of all terminating fittings necessary to adapt and connect them to the building systems.

2. This Contractor shall carefully examine such items upon delivery. Claims that any of these items have been received in such condition that their installation will require procedures beyond the reasonable scope of work of this contractor will be considered only if presented in writing within one week of their date of delivery. Unless such claims have been submitted this contractor shall be fully responsible for the complete reconditioning or replacement of the damaged items.

B. Maintenance of equipment and systems: Maintain HVAC and Plumbing equipment and systems until Final Acceptance. Ensure adequate protection of equipment and material during delivery, storage, installation and shutdown and during delays pending final test of systems and equipment because of seasonal conditions.

C. Surveys and measurements:

1. Base measurements, both horizontal and vertical, on reference points established by Contractor and be responsible for correct laying out of work.
2. In event of discrepancy between actual measurements and those indicated, notify Designer in writing and do not proceed with work until written instructions have been issued by Designer.

3.11 MATERIALS AND WORKMANSHIP

A. Work shall be neat and rectilinear. Piping shall run concealed. Install material as required by manufacturers. Installation shall operate safely and without leakage, undue wear, noise, vibration, corrosion or water hammer. Work shall be properly and effectively protected, and pipe openings shall be temporarily closed to prevent obstruction and damage before completion.

B. Except as specified otherwise, material shall be new. Provide supplies, appliances and connections necessary for complete and operational installation. Provide components required or recommended by OSHA and applicable NFPA documents.

C. References to manufacturers and to catalog designation, are intended to establish standards of quality for materials and performance but imply no further limitation of competitive bidding.

D. Finish of materials, components and equipment shall be as approved by Designer and shall be resistant to corrosion and weather as necessary.

E. DMH will not be responsible for material before testing and acceptance.

3.12 ANCHORS AND INSERTS

A. Inserts shall be iron or steel of type to receive machine bolt head or nut after installation. Inserts shall permit adjustment of bolt in one horizontal direction and shall develop strength of bolt when installed in properly cured concrete.

B. Provide anchors as necessary for attachment of equipment supports and hangars.

3.13 PAINTING

A. Equipment shall have shop coat of non lead gray paint. Hangers and supports shall have one coat of non lead red primer. Note requirement for Designer's approval invoked under Part 3 article, MATERIALS AND WORKMANSHIP regarding finish of material and equipment which are visible or subject to corrosive or atmospheric conditions.

3.14 CLEANING

A. Piping

1. Furnish pipe cleaning chemicals, chemical feed equipment, materials and labor necessary to clean piping.
2. Permanently install necessary chemical injection fittings complete with stop valves.
3. After chilled water, heating hot water, condenser water, steam and condensate piping have been pressure tested and approved for tightness, clean and flush piping specified under WATER TREATMENT Paragraph.
4. Maintain continuous blow down and make up, as required during flushing operation.

3.15 SYSTEM SHUTDOWNS

A. Coordination shutdowns of existing systems with the Project Manager and submit a written request at least three business days in advance. Minimize system shutdowns as much as possible. Submit a list of all affected areas, the proposed work to be performed, and the expected length of the shut-down including time for retesting.

B. Provide temporary services to maintain active system during extended shutdowns as required for demolition and construction phasing.

3.16 CORE DRILLING

A. Perform all core drilling required for the proper installation of this Section. Locate all required openings and prior to coring. Coordinate the opening with the other Trades and obtain approval from the Designer.

B. Thoroughly investigate the existing conditions in the vicinity of the required opening prior to cutting. Take care so as not to disturb the existing building systems. Damage to existing conditions incurred during core drilling shall be corrected to the Project Manager's satisfaction with no additional expense to the DMH.

******END OF SECTION******

SECTION 238126
MINI SPLIT- UNIT SYSTEMS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS that are hereby made a part of this Section of the Specifications.

B. Equality of material, article, assembly or system other than those named or described in this Section shall be determined in accordance with the provisions of the CONTRACT and GENERAL CONDITIONS

1.2 RELATED WORK:

A. The following items are not included in this Section and will be performed under the designated Sections:

1. Section 015000 - TEMPORARY FACILITIES AND CONTROLS:
    1. Maintenance of access, cleaning during construction, dust and noise control.
2. Section 220001 –PLUMBING:
    1. Installation of refrigerant line
3. Section 260001 – ELECTRICAL:
    1. Installation of wiring from Panel NPB1 to the Split unit compressor and evaporator fan units.

1.3 DESCRIPTION OF WORK

A. This Section covers the furnishing of all labor, materials, equipment, services, and permits necessary to provide and install a mini split unit heating and cooling system in the designated room and area of the SITE. The mini-split unit system shall consist of separate evaporator-fan and compressor-condenser components. Each system shall be ductless with matching air-cooled condensing units, evaporator-fan units, piping, controls, wiring, and other accessories and appurtenances necessary to have fully automatically functioning systems. Deviations from this Specification must be approved in writing by the Project Manager prior to the Contractor beginning work.

1. All materials and equipment shall comply, at a minimum, with all sections of this specification, applicable federal, state, and local codes, and industry standards.

1.4 SUBMITTALS

A. Product Data: Provide performance data in terms of capacities, outlet velocities, static pressure, sound power characteristics, motor requirements, and electrical characteristics.

B. Operation and Maintenance data.

C. Installation Manual from Manufacturer

D. Operation and Maintenance manual from Manufacturer

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2004, Section 5 – "Systems and Equipment" and Section 7 – "Construction and Startup.

C. ASHRAE/IESNA 90.1-2004 Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2004, Section 6 – "Heating, Ventilating, and Air Conditioning."

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which the manufacturer agrees to repair or replace split-system units that fail in materials and workmanship within five years from date of substantial completion.

PART 2 - MATERIALS

2.1 GENERAL

A. Manufacturers: Subject to the requirements below, provide systems by one of the following:
1. Daiken
2. Mitsubishi
3. Lennox
4. LG
5. Or equivalent

2.2 EVAPORATOR-FAN UNIT

A. The Contractor shall provide three evaporator-fan units meeting the requirements specified below:

Quantity	2	1
Indoor Unit Type	Wall Mount	Wall Mount
Energy Star Rating	Yes	Yes
Cooling BTU Output Range	12,000	24,000
Indoor Noise Level (max)	39 dB	42 dB
WIFI Compatible	yes	yes
Min Air Flow (CFM)	150	350

B. Concealed unit chassis: Galvanized steel with flanged edges, removal panels for servicing, and insulation on back of panel.

1. Insulation: Faced, glass-fiber duct liner.
2. Drain Pans: Galvanized steel, with connection for drains: insulated and complying

with ASHRAE 62.1-2004.

3. Airstream Surfaces: Surfaces in contact with airs team shall comply with requirements in ASHRAE 62.1-2004.

C. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI210/240, and with thermal expansion valve.

D. Evaporator Fan: Forward-curved double width wheel of galvanized steel' directly connected to motor.

E. Fan Motor: Multispeed

F. Filters: One (1) thick, in fiberboard frames with ASHRAE 52.2 MERV rating of 11 or higher.

2.3 AIR-COOLED COMPRESSOR-CONDENSER UNIT

A. The Contractor shall provide one air-cooled compressor-condenser unit meeting the requirements specified below:

Unit Type	Wall Mount
Zones	3 min.
Energy Star Rating	Yes
EER	12.4
SEER	21.0
Cooling BTU Output Range	36,000
Outdoor Unit Noise Level (max)	55 dB
Voltage	208/230
Circuit Breaker Size (Amps)	25
Maximum Pipe Length	246 ft
Min. Outdoor Temp for Heat F	-4 F
Min. Outdoor Temp for Cooling F	14 F

B. Casing: Steel, finished with baked enamel, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service values, fittings, and gage ports on exterior of casing.

C. Compressor: Hermetically sealed reciprocating type with crankcase heater and mounted on vibration isolation. Compressor motor shall have thermal- and current-sensitive overload devices, starter capacitor, relay, and contactor.

1. Refrigerant: R-410A

D. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI210/240, and with liquid subcooler.

E. Heat Pump Components: Reversing valve and low temperature air cut-off thermostat.

F. Fan: Aluminum-propeller type, directly connected to motor.

G. Motor: Permanently lubricated with integral thermal-overload protection.

H. Mounting Base: Polyethylene

2.4 MOUNT AND SUPPORTING SYSTEM

A. Wall Bracket capable of supporting 300 pounds

2.5 ACCESSORIES

A. Thermostat: Low voltage with subbase to control compressor and evaporator fan.

B. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines, factory cleaned, dried, pressurized, and sealed. Factory-insulated suction line with flared fittings at both ends.

1. Minimum Insulation Thickness: 1/2 inch thick

PART 3 – EXECUTION

3.1 COORDINATION AND SCHEDULING

A. The Contractor shall coordinate all work with the Project Manager.

3.2 INSTALLATION

A. Install evaporator-fin components using manufacturing standard mounting device securely fastened to building structure.

B. Install, compressor-condenser components on wall brackets securely fastened to concrete wall at the location shown on the Drawings

C. Install compressor-condenser components on restrained spring isolators with a minimum static deflection of 1 inch.

3.3 CONNECTIONS

A. Connect precharged refrigerant tubing to components' quick connect fittings. Install tubing to allow access to unit.

B. Connect supply and return water coil with shut off-duty valve and union or flange on the supply connection and with throttling-duty value and union or flange on the return connection.

C. Connect supply and return condenser connections with shut off-duty valve and union or flange on the supply connection and with throttling-duty value and union or flange on the return connection.

D. Install piping adjacent to unit to allow service and maintenance.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Leak test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

C. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Remove malfunctioning units, replace with new components and retest.

D. Test and adjust controls and safeties. Replace damaged and manufacturing controls and equipment

******END OF SECTION******

SECTION 240001
ELECTRICAL WORK

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

B. Equality of material, article, assembly or system other than those named or described in this Section shall be determined in accordance with the provisions of Article V of the GENERAL CONDITIONS OF THE CONTRACT.

1.2 DESCRIPTION OF WORK

A. The intent of the Section is to install a complete lighting system for the DMH Training Areas; provide power to the mini-split heating and cooling system; and the installation of electrical receptacles recessed in new gypsum wallboard assemblies.

B. Work Included to meet the intent an provide a completely operational system: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Provide a power distribution system from Electrical Panel (NPB1) to new exterior mini-split heating and cooling condenser located as shown on the Drawing. The distribution system shall include, conduit, fittings, wiring, junction and junction boxes, and all other components required for complete electrical distribution system.
2. Provide a power distribution system from Electrical Panel (NPB1) to new three interior air handlers located as shown on the Drawings. The distribution system shall include, conduit, fittings, wiring, junction and junction boxes, and all other components required for complete electrical distribution system.
3. Provide a lighting distribution system from Electrical Panel (NPB1) to the locations shown on the Drawings. The distribution system shall include, conduit, fittings, wiring, junction and junction boxes, and all other components required for complete electrical lighting system.
4. Provide and install 4 new 20-amp electrical receptacles.
5. Provide and install light fixtures.
6. Provide all grounding and bonding of electrical systems and equipment.
7. Perform testing of all electrical systems and ensure the electrical inspector accepts the completed project.
8. Leave ready an electrical system in perfect operating condition.
9. Core drilling for the Work of this Section.
10. Coordination drawings and record drawings and similar requirements.

C. Except for the receptacles, all wiring should be surface mounted.

D. Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any electrical item in the Drawings or Specifications carries

with it the instruction to furnish, install and connect the item as part of the electrical work, regardless of whether or not this instruction is explicitly stated.

E. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 092116 – GYPSUM WALLBOARD ASSEMBLY for installation of the walls.
2. Section 095113 – DROP CEILING for installation of drop ceiling and suspension system.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

B. Shop Drawing: Submittals shall include but not be limited to:

1 Light fixtures
2 Wiring layout
3 Conduit and associated fittings, supports, etc.
4 Boxes and fittings.
5 Connections of junction boxes and conduit to the interior and exterior of the Gifford Building.

C. Material Certificates: For each of the following, signed by manufacturers:

1. Repair materials.

D. Field quality-control test and inspection reports.

1.4 REGULATORY REQUIREMENTS

A. Comply with all applicable federal and state laws, and all local codes, by-laws and ordinances.

B. Give necessary notices, obtain permits and pay government, city, town, and state sales taxes, fees, and other costs in connection with work, file necessary approvals of departments having jurisdiction, obtain required certificates of inspection for work.

C. Where provisions of the Contract Documents conflict with any codes, rules or regulations, the latter shall govern. Where the contract requirements are in excess of applicable codes, rules or regulations, the contract provisions shall govern unless the Designer rules otherwise.

D. Request inspections from authorities having jurisdiction, obtain all permits and pay for all feed and inspection certificates as applicable and/or required. All permits and certificates shall be turned over to the Project Manager s at the completion of the work. Copies of permits shall be given to the Project Manager prior to the start of work.

E. Unless otherwise specified or indicated, materials and workmanship and equipment performance shall conform to the latest edition of the following standards, codes, specifications, requirements and regulations:

1 Massachusetts State Building Code, 9th edition
2 Massachusetts State Electrical Code
3 National Fire Protection Association (NFPA) 70 & 110
4 City of Taunton's Regulations
5 Underwriter's Laboratories, Inc. (UL)
6 National Electrical Manufacturer's Association (NEMA)
7 American National Standards Institute (ANSI)

F. All electrical work shall meet or exceed any other state and local codes and/or authorities having jurisdiction including all other standards indicated herein.

1.5 COORDINATION

A. Electrical Drawings are diagrammatic. They indicate the general arrangements of electrical systems and other work and indicates the minimum requirements of the work. They do not show all offsets required for coordination nor do they show the exact routings and locations needed to coordinate with other trades. Conditions at the Site including actual measurements shall determine the details of the installation. All work shall be laid out and installed to require the least amount of cutting and patching.

B. Work shall be performed in cooperation with other trades on the project and so scheduled as to allow speedy and efficient completion of the work.

C. Furnish to other trades advance information on locations and sizes of all boxes, sleeves and openings needed for their work, and furnish information and shop drawings necessary to permit trades affected by the work to install same properly and without delay.

D. In all spaces, prior to installation of visible material and equipment, including boxes, review Drawings for exact locations and where not definitely indicated, request information from the Designer. Where the electrical work shall interfere with the work of other trades, assist in working out the space conditions to make satisfactory adjustments before installation. Without extra cost to DMH, make reasonable modifications to the work as required by normal structural interferences.

E. If any electrical work has been installed before coordination with other trades to cause interference with the work of such trades, all necessary adjustments and corrections shall be made by the electrical trades involved without extra cost to DMH.

F. Where conflicts or potential conflicts exist and engineering guidance is desired, submit sketch of proposed resolution to the Designer for review and approval.

G. Protect all materials and work of other trades from damage which may be caused by the electrical work and repair all damages without extra cost to DMH.

1.8 INSTALLATION REQUIREMENTS

A. Check the Drawings and Specifications before ordering any material and equipment. Any discrepancies shall be brought to the attention of the Designer for his determination prior to proceeding with the work.

1.9 TYPICAL DETAILS

A. Typical details where shown on the drawings shall apply to each item of the project where such items are applicable. They are not repeated in full on the drawings, which in many cases are diagrammatic only, but with the intention that such details shall be incorporated in full. Any alternate method proposed for use by the Contractor shall have the prior approval of the Designer.

1.10 ACCESSIBILITY

A. Install all work such that parts requiring periodic inspection, operation, maintenance and repair are readily accessible.

1.11 PORTABLE AND DETACHABLE PARTS

A. Contractor shall retain in their possession all portable and/or detachable parts and portions of materials, devices, equipment etc. necessary for the proper operation and maintenance of the mechanical and electrical systems until final completion of the work, at which time they shall be handed over to the Project Manager.

1.12 SERVICE CHARACTERISTICS

A. All equipment and wiring shall be suitable for the applied voltage.

1.13 QUALITY ASSURANCE

A. The requirements of the State Building Code and local regulations establish the minimum acceptable quality of workmanship and materials, and all work shall conform thereto unless more stringent requirements are indicated or specified herein.

B. All work shall comply with the latest editions of the codes as referenced herein.

C. Follow manufacturer's directions for articles furnished, in addition to directions shown on drawings or specified herein.

D. Protect all work, materials, and equipment from damage during process of work. Replace all damaged or defective work, materials and equipment without additional cost to DMH.

E. All equipment and materials for permanent installation shall be the products of recognized manufacturers and shall be new.

F. Equipment and materials shall:

1. Where normally subject to Underwriters Laboratory Inc. listing or labeling services, be so listed or labeled.
2. Be without blemish or defect.
3. Not be used for temporary light and power purposes.
4. Be in accordance with the latest applicable NEMA standards.

5. Be products which will meet with the acceptance of all authorities having jurisdiction over the work. Where such acceptance is contingent upon having the products examined, tested and certified by Underwriters or other recognized testing laboratory, the product shall b so examined, tested and certified.

G. Except for conduit, conduit fittings, circuit breakers, boxes, and wire, all items of equipment or material of one generic type shall be the product of one manufacturer throughout.

PART 2 - PRODUCTS

2.1 GENERAL

A. Product furnished shall be designed and approved for the intended use; shall meet all requirements of the Massachusetts Electrical Code (MEC), and local codes; shall be manufactured in accordance with the standard indicated; and shall meet the requirements of the Contract Documents. Materials and equipment shall be listed by a nationally recognized testing laboratory.

B. All material incorporated into this work shall be new and unused. Samples of any materials shall be furnished upon request of the Designer, prior to approval.

C. All Products shall be rated for and approved for use in the application shown, regardless of any notations on the Drawings. Equipment located outside shall be weatherproof, and or enclosed in suitably rated enclosures. All equipment shall be rated for the current, voltage, and phases at which they are applied.

D. All workmanship shall be of the highest quality, as determined by the Designer. The Contractor shall be required to repair or replace all Work which is not of the highest quality and workmanship.

E. All equipment and components shall be installed in strict compliance with manufacturer's recommendation. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc. before beginning system installation.

F. It is the intent of the Specification that one manufacturer be selected, not a combination, for all classification of material. For example, all wire of one manufacturer, all switches of one manufacturer, etc.

G. Where materials, equipment, apparatus or other products are specified by manufacturer, brand name, type of catalog number, such designation is to establish standards of performance, quality, type, and style.

H. The Contractor shall be responsible for ordering and furnishing the correct quantity of material required. Routing and equipment arrangements shown on the drawings are approximate only and are not warranted to be accurate.

I. Devices and equipment shall not require batteries to operate, unless expressively specified.

2.2 LIGHT FIXTURES

A. Provide light fixtures, equipment, and components where shown on the Drawings, and as specified wired and assembled. Provide connectors, fittings, and other appurtenances as required.

B. Provide all fixtures with light source as scheduled. Scheduled fixtures indicate the type, finish and quality required. Lamps shall be as scheduled and manufactured by Philips, Osram,or GE.

C. LED lighting shall be Energy Star compliant designed in accordance with ANDIC78.377. Provide UL recognized LED drivers designed to UL8750 standard.

D. Electronic ballasts, LED lamps, modules, and drivers shall be designated to NEMA 410 standard.

E. Fixture shall be complete with light source of the type noted in schedules and shall have metal parts, glassware, plastic diffusers, etc., free from scratches, cracks, and other defects. Any items damaged during shipment, handling, or installation shall be replaced without cost to DMH.

F. Lighting Controls
   1. Lighting controls shall be Lutron, WattStopper, or SensorSwitch. Controls shall be hardwired. Battery operated devices are not acceptable.
   2. Power Packs
      a. Power pack shall be self-contained transformer and relay module with dry contact capable of switching 20 amp ballast load, 13 amp incandescent, 1hp @120 VAC, 60 Hz, 20 amp ballast @277 VAC, 60 Hz.
      b. Power packs shall provide a 24 VDC, 150 mA output and 0-10VDC output.

2.3 WIRING DEVICES

A. Switches

   1. Single pole, two or three way as required, 207A, 120/277-volt, heavy duty, quite commercial specification grade and self grounding with green ground screw.
   2. 120/277-volt 1200-watt 0-10-volt dimmable wall mounted switch shall be provided with all required switches and light fixtures served.
   3. Line voltage wall mounted occupancy sensor switch shall be dimmable and provided with manual override switch and used adjustable timeout from 1 to 20 minutes.
   4. Switches shall be colored as selected by the Designer.

B. Receptacles

   1. Specifications grade NEMA 5-20R 20A for 20 ampere protected branch circuits, NEMA 5-15R for 15 ampere protected circuits, 125 side-wired self grounding.
   2. Receptacles shall be colored as selected by the designer, with matching color plate.
   3. Ground Fault Circuit Interrupter
   4. Receptacles installed in exterior, damp, or wet locations shall be listed as weather resistant.
   5. Receptacles located in exterior locations shall be GFI type.
   6. All 125-volt 20 ampere receptacles shall be listed as tamper resistant.

C. Device Plates
   1. Device Plates shall be brushed stainless steel, one piece, single or multi-gang type selected to match the device or combination of devices. So-called "goof" plates are not allowed.
   2. Weatherproof receptacle plates shall be metallic, pad-lockable rated "weatherproof while in use".

2.4 FIRE STOPPING

A. Provide all materials and labor to penetrate or remove and re-install existing fire blocking or reroute wiring to avoid fire blocking.

B. Provide fire stopping for all electrical conduits which enter or pass through fire-rated walls. Materials and methods of fire stopping shall be approved by UL. Fire seal fittings shall be used around cable, in sleeves, and in core drilled holes passing through fire-rated walls and floors. Fire stopping shall be T&B Fire-Seal, O.Z. Gedney, 3M, or approved equal.

2.5 CONDUIT AND FITTINGS

A. Rigid metal conduit conforming to, and installed in accordance with NFPA 70 shall be heavy wall zinc coated steel conforming to American Standard Specifications C80-1 and shall be used for exterior work

B. Thin-wall conduit (EMT), conforming to and installed in accordance with NFPA 70 shall be zinc-coated steel conforming to industry standards shall be used for interior work.

C. Fittings and Supports:

   1. Interior conduit, interior fitting surfaces and all threads shall all be protected by a two-part 2 mil urethane coating.
   2. Provide insulated bushings on all raceways 1-inch diameter or larger.
   3. Manufacturer's standard fittings shall be used for raceway supports.
   4. Expansion Fittings: Expansion fittings shall be used here structural and concrete expansion joints occur and shall include a ground strap.
   5. Couplings for rigid metal conduit shall be threaded type.
   6. Threadless fittings for EMT shall be watertight compression type. Set-screw type fittings are not acceptable. All fittings shall be concrete tight. No diecast fittings allowed except for raceways larger than 1-inch diameter.
   7. Cable supports in vertical raceways shall be of the split wedge type. Armored cable supports for vertical runs to be of wire mesh basket design.
   8. Wall entrance seals shall be equal to O.Z. Gedney type "WSK".
   9. Couplings, elbows and other fittings used with rigid nonmetallic raceways shall be of the solvent cemented type to secure a waterproof installation.

2.6 WIRING MATERIALS

A. Wire shall be constructed of annealed copper, 98% conductivity, Case B stranding, except for No.10 AWG or smaller diameter may be solid.

B. Conductors for power, lighting, grounding shall be No. 14 AWG through No. 8 AWG and shall be NEC type THWN/THHN. Conductors for feeders shall be XHHW.

C. Conductors for controls shall be No. 14 AWG wire sizes.

D. Exterior of wires shall bear repetitive markings along their entire length indicating conductor size, insulation type and voltage rating.

E. Wiring materials shall be manufactured by Triangle, Republic, Anaconda, General Cable, or equal.

2.7 WIRE CONNECTORS AND DEVICES

A. Wire and Cable Connectors and devices shall meet all requirements of UL 486.

B. Ground conductors of #14, 12, and 10 AWG shall be made up using only green wire nuts with grounding pigtail provisions.

2.8 BOXES

A. Outlet Boxes shall be UL Listed, NEMA OS1, with marked volume. Size boxes in accordance with volume requirements of MEC.

B. Outlet boxes shall be specifically designed for the construction encountered, with suitable supports and attachments.
   1. Outlet boxes shall be metallic, in gangs and configurations to suit the applicable application, with suitable wire/cable clamps as required. Outlet boxes shall be flush mounted on the west wall of Room 007; all other boxes may be surfaced mounted.
   2. Ceiling mounted outlet boxes shall be listed and supported for light fixtures up to 50 pounds.
   2. Surface mounted outlet boxes shall be specifically designed for the construction encountered, with suitable supports and configurations to suit the application.
   3. Boxes shall be provided appropriately sized corrosion resistant screws.

C. Where required or shown, locate outlet boxes flush with casework. Provide blank plate to finish opening. The Contractor shall make cutout in casework as required for outlet box.

D Where required, provide outlet box extensions to bring front of outlet box flush with mounting surface, per MEC. 314.22

E. Junction boxes shall be the size and type to accommodate (1) structural conditions, (2) size and number of conductors entering, splices, and devices for fixtures for which required.

F. In finished spaces, spaces, rings, extensions, and adapters shall be finish appearance type approved by the Designer.

2.10 MOLDED CASE CIRCUIT BREAKERS

A. Molded case type circuit breakers shall consist of manually operated quick make quick break mechanically trip free operating mechanisms for simultaneous operation of all poles, with contacts, arc interrupters and trip elements for each pole, all enclosed in molded phenolic plastic cases.

1. Their tripping units shall be of the "thermal magnetic" type having bimetallic elements for time delay overload protection and magnetic elements for short circuit protection.
2. They shall be manually operable by means of toggle type operating handles having "tripped" position midway between the "on off" position.
3. They shall each be contained in an individual case enclosing only the number of poles required for the particular breaker.
4. They shall be of the "bolted in" type.
5. Where necessary, to accommodate other requirements, their frame sizes shall be increased to conform to such requirements, frame sizes being indicated only as a reference to the minimum acceptable interrupting ratings noted above.
6. Where single pole in trip sizes' 20 amps or less, they shall be rated for switching duty.
7. They shall be equipped with 5 milliamp sensitivity ground fault interrupting features where so indicated.

B. They shall be manufactured by Square D, Cutler Hammer, or General Electric.

PART 3 EXECUTION

3.1 BASIC REQUIREMENTS

E. Work should be executed in workmanlike manner and shall present neat, rectilinear and mechanical appearance when completed. Maintain maximum head room at all times. Materials and equipment shall be new and installed according to the manufacturer's recommended best practice so that the completed installation shall operate safely and efficiently.

F. The Contractor shall review installation details of all electrical equipment with the Designer and cooperate fully with the Designer in this regard. Any work installed which is not reviewed with and approved by the Designer is subject to re-work at no increase in contract price.

G. All workmanship shall be of the highest quality, as determined by the Designer. The Contractor will be required to repair or replace all work which is not of the highest quality and workmanship.

H. All equipment and components shall be installed in strict compliance with the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc. before beginning system installation.

I. Conductor fasteners shall be tightened with a torque tool in good condition to factory specifications. At time of inspection, torque tool(s) shall be available to demonstrate proper torque.

3.2 CONTITUITY OF SERVICES

A. Do not interrupt existing services without the Project Manager's approval.

C. Schedule interruptions in advance, according to the Project Manager's instructions. Submit, in writing, with request for interruption, methods proposed to minimize length of interruption.

D. Interruptions shall be scheduled at such times of day and work so that they have minimal impact on DMH's operations.

3.3 DEMOLITION

A. Demolish the existing system to allow installation of the new systems. No components, items, or materials are to be reused. Demolition material shall become the property of the Contractor, for his lawful disposal.

3.4 TESTING, INSPECTION, AND CLEANING REQUIREMENTS

A. The Contractor shall provide supervision, labor, materials, tools, test instruments and all other equipment or services and expenses required to test, adjust, set, calibrate, and operationally check work and components of the electrical systems and circuitry throughout the work.

B. The Contractor shall pay for all tests specified in this Section, including expenses incident to retests occasioned by defects and failures of equipment to meet specifications, at no additional cost to DMH. Any defects or deficiencies discovered in any of the electrical work shall be corrected.

C. Test wirings and connections for continuity and grounds before fixtures are connected: demonstrate insulation resistance by megger test as required. Insulation resistance between conductors and grounds for secondary distribution systems to point of use. test secondary voltages at load centers and other locations on distribution systems as necessary. test secondary voltages under no-load and full load conditions.

D. Verify and correct as necessary specified; voltages, tap settings, trip settings, and phasing on equipment from secondary distribution system to points of use. test secondary voltages under no load and full load conditions.

E. Test lighting fixtures with specified lamps in place for 10 hours. Do not operate lamps other than for testing before final inspection by Designer. Replace lamps that fail within 90 days after acceptance by Designer within Contract Price.

F. Provide necessary testing equipment and testing.

G. Failure or defects in workmanship or materials revealed by tests or inspections shall be corrected promptly and retested until satisfactory results are achieved. Replace defective material.

H. Clean panels and other equipment. Panelboard interiors shall be cleaned and vacuumed. Equipment with damage to painted finish shall be repaired to Designer's satisfaction.

I. After completion of project, clean the exterior surface of equipment included in this section.

3.5 WIRING METHODS

A. Install wire and cable in approved raceways as specified and as approved by authorities that have jurisdiction.

B. Wiring methods shall be as follow:

1. Interior, finished dry locations -EMT or Type MC Cable.
2. Exterior - RGS.

C. Only the best possible workmanship for type MC cable installation

D. Install wiring methods in accordance with requirements for an assembly use group for such areas.

E. Provide flexible conduits for connections to electrical equipment and to equipment that are subject to movement, vibration or misalignment; where equipment connections dictate and where noise transmissions must be eliminated or reduced.

F. All wiring may be run in surface-mounted conduit except for new receptacles in Room 007.

G. All wiring shall be new. Remove all existing wiring and raceways to the maximum extent possible. Cut back and abandon concealed wiring and raceways.

H. Splices shall be made only at device outlet boxes.

I. All conductors shall be neatly arranged and bundled, without excess cable at any point, but with reasonable slack to allow insulation and removal of device.

J. Bundle wiring passing through junction boxes with plastic cable ties. Cable ties all by Ty-Raps as manufactured by Thomas & Betts, Holub Industries Inc., Quick Wrap, Bundy Unirap or equal.

K. Identification for wires and cables shall be by means of wrap around "brady" type labels.

3.6 REQUIREMENTS GOVERNING ELECTRICAL WORK IN DAMP OR WET LOCATIONS

A. The finish of threaded steel conduit shall be galvanized only.

B. Wires for pulling into raceways for lighting branch circuitry shall be limited to "THWN".

C. Final connections of flexible conduit shall be neoprene sheathed.

D. Apply one layer of half looped plastic electric insulating tape over wire nuts used for joining the conductors of wires.

E. Enclosures, junction boxes, wiring troughs and the like, shall be fabricated of galvanized sheet metal, shall conform to the following:

1. They shall be constructed with continuously welded joints and seams.
2. Their edges and weld spots shall be factory treated with cold galvanizing compound.
3. Their connection to circuitry shall be by means of watertight hub connectors with sealing

F. Enclosures for individually mounted switching and overcurrent device shall be NEMA Class IV weatherproof construction.

G. The covers, doors and plates and trims used in conjunction with all enclosures, pull boxes, outlet boxes, junction boxes, cabinets and the like shall be equipped with gaskets.

H. Spaces defined as wet or damp locations by article 100 of the National Electric Code.

3.7 REQUIREMENTS FOR THE INSTALLATION OF JUNCTION BOXES

A. Locate all boxes so that their removable covers are accessible without necessitating the removal of parts of permanent building structure, including piping, ductwork, and other permanent mechanical elements.

B. Apply junction boxes in accordance with the following:

1. Include junction boxes in straight runs of conduits assure that cables are not damaged when they are pulled.
2. Include junction boxes to assure a neat and workmanlike installation of conduits.
3. Include junction boxes to fulfill requirements pertaining to the limitations to the number of bends permitted in conduit between wire access points, the accessibility of wire splices, and the application of wire supports.
4. Include all required junction boxes regardless of indications on the Drawings (which, due to symbolic methods of notation, may omit to show some of them).

C Install junction boxes in accordance with the following:

1. Exclude unused circuitry openings in junction boxes. In larger boxes each such opening shall be closed with a galvanized sheet steel plate fastened with a continuous weld all around. In small outlet type boxes, utilize plugs as specified for such boxes.
2. Close up all unused circuitry openings in outlet boxes. Unused openings in cast boxes shall be closed with approved cast metal threaded plugs. Unused openings in sheet metal boxes shall be closed with sheet metal knock out plugs.

D. Barriers injunction boxes of outlet size shall be of the same metal as the box.

E. Barriers in junction boxes which are larger than outlet size shall be of the polyester resin fiberglass of adequate thickness for mechanical strength, but in no case less than 1 /4" thick. Each barrier shall be mounted, without fastenings, between angle iron guides so that they may be readily removed.

3.8 INSTALLING CIRCUITRY

A. Install wire and cable in approved raceways as specified and as approved by authorities that have jurisdiction.

B. Surface mounted in runs of conduit including flexible limit the number of bends between wire access points to a total which does not exceed the maximum specified for the system. Where no such maximum is specified, limit the number to four right angle bends or the equivalent thereof.

C. Circuitry shall be arranged such that conductors of one feeder or circuitry carrying "going" current are not separated from conductors of the same feeder or circuitry carrying "return" current by any ferrous or other metal. Where not within raceways, all "going" and "return"

current conductors of one feeder or circuit shall be laces together to minimize induction heating of adjacent metal components.

D. Sleeves used where circuitry is to penetrate waterproof walls, shall be of a type selected to suite the water condition encountered in the field.

3.9 GROUNDING

A. Bond and ground equipment and systems connected under this Section in accordance with standards of MEC and other applicable regulations. Provide approved means for terminating and connecting grounding conductors such as lugs, crimp-on terminals. green ground screws, grounding wirenuts, etc.

B. Conduit systems shall be electronically continuous throughout. Equipment frames, enclosures, boxes, etc. shall be grounded by use of green colored equipment conductor sized per Table 250.122 of MEC. Raceway ground alone will not be accepted.

C. Green bonding jumper shall be installed in flexible conduits.

3.10 WIRING DEVICES

A. Mount all wiring devices plumb in device outlet boxes. Center devices on boxes and set true within the device plate. Set device plates so all edges contact surface and conceal box edge.

B. Side-wire devices only. Back wiring will not be acceptable.

C. Provide neutral conductor to each switch location in accordance with MEC.

D. Provide GFCI protection for all 15A and 20A, 125V receptacles located in the following locations:
   1. Outdoors
   2. Rooms 009 and 011.

3.11 LIGHTING FIXTURES

A. Verify mounting constructions, and provide fixtures, ballasts, frames, rings, mounting boards, and other accessories suitable for construction encountered.

B. Coordinate installation of fixtures with installation of casework materials and mounting system. Coordinate wiring stub out location, to maintain wiring to light fixtures effectively concealed.

C. Investigate lighting locations and supports to ensure that no interface exists between lighting fixture, supports and other equipment. Correct interface as directed by Designer.

3.12 CIRCUIT BREAKERS

A. Install circuit breakers in panelboards. Mark panel schedule accordingly. Panel markings shall be printed by typewriter, printer, or other suitable means. Handwriting will not acceptable. Utilize circuits shall be marked in ink. Spare or spaces shall be marked in pencil; and may be marked by hand. No circuit shall be described in a manner that depends on transient conditions of occupancy.

3.13 CORE DRILLING AND SEALING

A. Core drill all penetrations as necessary for the work called out.

B. Seal all penetrations around new conduits.

C. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application.

D. Install fill materials for systems by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to have water-tight and vapor-tight seals.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.14 DISPOSAL

A. Disposal: Remove surplus wiring and electrical materials, including trash, and debris, and legally dispose of it off the DMH's property in accordance with all applicable local, state and federal regulations.

******END OF SECTION******

ATTACHMENT A

COVID-19 SCREENING PROCEDURES

The Commonwealth of Massachusetts
Executive Office of Health and Human Services
Department of Public Health
250 Washington Street, Boston, MA 02108-4619

CHARLES D. BAKER
Governor

KARYN E. POLITO
Lieutenant Governor

MARYLOU SUDDERS
Secretary

MONICA BHAREL, MD, MPH
Commissioner

To: Public Health and Mental Health Hospitals System
From: Monica Bharel, MD, MPH, Commissioner, Department of Public Health
Joan Mikula, Commissioner, Department of Mental Health
Date: March 19, 2020
Re: Amended Visitor Access Implementation Protocols and Procedures for DMH and DPH Hospitals During COVID-19

PURPOSE

The Massachusetts Department of Public Health (DPH) and Department of Mental Health (DMH) continue to work with state, federal and local partners on the outbreak of novel Coronavirus 2019 (COVID-19), caused by the virus SARS-CoV-2. This memorandum amends the Visitor Policy for Public Health and Mental Health hospitals which was developed in accordance with the DPH Policies and Procedures for Patient Visitors in Hospitals during the COVID-19 Outbreak Memorandum that was previously issued on March 16, 2020.

All DMH and DPH hospitals are directed to implement the following visitation policy, effective March 19, 2020, to protect the health and safety of patients and staff during the 2019 Coronavirus (COVID-19) outbreak. This is a difficult but necessary step to protect our patients and our staff, as well as our visitors, to be able to deliver care safely.

POLICY/PROTOCOL

Until further notice, NO visitors will be allowed in the hospital due to the COVID-19 pandemic, with very limited exceptions. Any approved visitor with obvious signs of illness – such as fever, cough or sore throat –must be asked to leave.

- For those rare exceptions in which visitation is allowed, visitors must be screened according to hospital policy.

- Each facility must reduce access to the hospital to one Single Point of Entry (SPE).

- Special Visitors to the DMH or other units (attorneys, judges, etc.) must be screened according to hospital policy and only in compliance with all guidance for courts as written and available at
  https://www.mass.gov/guides/court-system-response-to-covid-19

- All Special Visitors excepted by the courts' guidance must be escorted by staff to their destination in the hospital. Hospitals may also institute escort procedures for other excepted visitors/contractors.

- In the event any patient tests positive for COVID-19, all excepted visitation to that patient must be prohibited until the patient is no longer contagious in the clinical judgment of the patient's attending physician.

- At the SPE, a staff member must be assigned to conduct screening for every excepted individual seeking entry to the building.

- Screening must consist of a series of health-related questions (appended hereto) and a non-intrusive health check for fever. Health check questionnaires and individual temperature check results must be recorded at SPE and records must be maintained in accordance with HIPAA. Multiple entries by excepted visitors in one day must be retained in a central database and available at SPE for screeners to review.

- Proper Personal Protective Equipment (PPE) should be assigned to SPE staff as required by clinical leadership in accordance with CDC guidelines.

- If the answers to entrance questionnaires by excepted visitors meet predetermined criteria for possibly being infected with COVID-19, they will be denied access to the hospital at SPE.

- In compassionate care situations, such as end-of-life-situations, decisions about visitation should be made on a case-by-case basis.

- Every possible accommodation should be made to allow for a parent or legal guardian to visit their minor children, in consultation with facility staff.

STANDARD PROCEDURE

1. All individuals seeking entrance to the hospital must be screened per policy/protocols as described above.

2. Badge access to all points of entry other than the one designated SPE hospital entrance will be deactivated.

3. Use of additional access, such as loading docks, DOC sally ports etc., will require supervisory staff presence and monitoring, preferably with campus police officer's presence throughout the period of time the access point is unsecured. No delivery staff will be allowed through this point of entry.

4. Anyone found to be providing unauthorized access to the hospital from within will be subject to appropriate disciplinary action and potential criminal charges.

5. Hospitals are expected to notify potential visitors that visitation is prohibited within limited exceptions noted in this memorandum until further notice. Such notification can be achieved through signage, calls, letters or other identified, appropriate forms of communication.

6. If an excepted visitor or contractor refuses to leave upon screening staff assessment, campus police should be notified, and the staff should isolate the visitor/contractor in a private area and contact the facility administrator to determine if an exception should be made. These decisions should be documented in the screening database. In all circumstances, request for reconsideration should occur in a private area.

7. Hospitals are also directed to restrict any non-essential personnel who do not provide direct care, such as sales representatives, from entering the facility.

8. Hospitals are directed to suspend any communal food services in their cafeteria, such as salad bars and offer foods in packaging only. Hospitals should take appropriate measures to limit the number of individuals eating in their cafeteria so that social distancing (maintaining a minimum of 6 feet between people) measures can be observed.

9. All efforts shall be made utilizing onsite and remote on-line capabilities to provide patients with remote visit ability to mitigate any social isolation impacts to the patients, their families and friends at the request of patients subject to clinical judgment of attending physicians or appropriate DMH and DOC staff.

REFERENCES:

- CMS website: https://www.cms.gov/About-CMS/Agency-Information/Emergency/EPRO/Current-Emergencies/Current-Emergencies-page
- CDC website: https://www.cdc.gov/coronavirus/2019-ncov/healthcare-facilities/index.html

Additionally, please visit DPH's website that provides up-to-date information on COVID-19 in Massachusetts: **https://www.mass.gov/covid19**

The Commonwealth of Massachusetts
Executive Office of Health and Human Services
Department of Public Health
250 Washington Street, Boston, MA 02108-4619

CHARLES D. BAKER
Governor

KARYN E. POLITO
Lieutenant Governor

MARYLOU SUDDERS
Secretary

MONICA BHAREL, MD, MPH
Commissioner

FRANCIS J. DOYLE, ESQ
Assistant Commissioner
Public Health Hospitals System

MDPH Public Health Hospitals System
Screening Questions for **ALL** Entry to the Hospitals

Name: _____

Employee/Visitor/Vendor/Other: (Please circle one) If other, please identify: _____

Affiliation: _____

Date of Visit: _____ Time: _____

1. Have you had a fever, cold symptoms or flu symptoms in the last 14 days?

   Yes No

2. Have you traveled to or through any countries with a current CDC COVID-19 travel advisory in the last 30 days? (*See* https://www.cdc.gov/coronavirus/2019-ncov/travelers/index.html for the most updated list of countries)

   Yes No

3. Have you been in close contact with anyone who traveled to or through any countries on the CDC COVID-19 travel advisory list or have you been in close contact with anyone who has tested positive for COVID-19 in the last 30 days?

   Yes No

4. If you have answered **YES** to question 2 or 3, you **must** provide evidence that you have been previously cleared by your physician.

Temperature Reading: _____ (No entry if greater than 99.9 F)

Allowed to Enter: Yes/No **Denied Entry:** Yes/No

Referred for Further Screening: Yes/No If yes, please add location: _____

Screened By: _____