SUDBURY WATER DISTRICT

EAST STREET WATER TREATMENT PLANT (WTP) PFAS TREATMENT

DWSRF-11383

ADDENDUM NO. 3

To be considered as part of the contract drawings and specifications for the East Street WTP PFAS Treatment Project, DWSRF-11383.

NOTIFICATIONS

1. The Filed Sub-bid opening has been rescheduled to Thursday, February 29, 2024 at 1 PM at 199 Raymond Road, Sudbury, MA 01776.

SPECIFICATIONS

1. SECTION 00 21 13 Instructions to Bidders

   DELETE: "31. Building American, Buy America (BABA) Requirements
   This project is subject to the Building American, Buy America (BABA) Requirements."

2. SECTION 09 90 00 PAINTING

   See replacement specification, 09 90 00, PAINTING, in its entirety.

3. SECTION 22 00 50 BASIC PLUMBING REQUIRMENTS

See replacement specification, 22 00 50 BASIC PLUMBING REQUIRMENTS, in its entirety.

DRAWINGS

1. **REPLACE** DRAWING E002 ELECTRICAL SITE POWER PLAN

QUESTIONS AND ANSWERS

Q1: Can you please confirm if Building American, Buy America (BABA) is applicable to this project?
A1: The BABA requirements are waived for this Project based on EPA's Decision Memorandum titled Amended Public Interest Waiver of Section 70914(a) of P.L. 117-58, Build America, Buy America Act, 2021 for State Revolving Fund and Water Infrastructure Projects that have Initiated Design Planning prior to May 14, 2022 issued November 13, 2023.

Q2: Please advise who is to carry the utility company back charges – electrical FSB or GC? Please reference discrepancy between E001 Note 13 "Contractor" and 26 00 50 1.7D.
A2: See response to Q9 below.

Q3: Please advise who is responsible for the diagram 3 on E502 and the providing and wiring of PFAS-CP. Please reference I003 Note 6 as well as 26 00 50 1.1 E.
A3: The electrical file sub-bid contractor is responsible for furnishing, installing and terminating all conduit and wiring as indicated on diagram 3. Please note that there is not a sheet I003, but it seems reference above should be to Sheet I001, Note 6.

Q4: Are the drawing details 1 (chemical metering pump) and 2 (chemical transfer pump) typical for both the existing WTP as well as the new PFAS WTP?
A4: Yes, the details are typical for all metering and transfer pumps.

Q5: Is exposed PVC raceway permitted as suggested by chemical metering and transfer pump details (1), and (2) on drawing E502?
A5: The use of PVC conduit is allowed within the chemical room only.

Q6: Is the building ground grid suggested on contract drawing E501 "(Building) Service Grounding Detail (1)" required for this project?
A6: Yes, the building ground grid is required for this project.

Q7: Will type MC cable wiring be allowed for the light fixture branch installation, with there being no ceiling concealment offered?
A7: No, MC cable will not be allowed.

Q8: Do utility back charges apply to this project and if so, what are the costs and who is carrying in their estimate?
A8: The contractor shall carry an allowance of $30,000.00 for the utility company back charge as it is unavailable at this time. Funds shall be paid and or credited based on the actual utility back charge when received from the utility company.

Q9: What is the NEMA rating for Filter Room 101? Specification allows NEMA 1 in clean, dry interior areas and panelboard PPL1 is scheduled as NEMA 1. Please confirm the remaining distribution equipment in this area is also NEMA 1.
A9: NEMA 1 rating is acceptable for the Filter Room 101 and Mechanical Room 102 Chemical Storage Room 103 shall be NEMA 4X rated.

Q10: If bid alternate A is accepted, is the PV system shown on DWGs PV001 & PV601 to be installed and left as-is, in ready condition? Who is responsible for utility back charges associated with the grid side of this system, the time and cost to apply for utility interconnection/grid tie, misc. fees, etc.?
A10: If Bid Alternate A is accepted, the PV system as shown on DWGs PV001 & PV601 shall be completely installed with all on site (Customer side) electrical connections in ready operating condition. Typically, the Owner is responsible for utility back charges. If the project interconnection hasn't been applied for yet, either the Owner can start the process with the utility, or the responsibility can be placed on the contractor, with the Owner paying the bill for the utility.

Q11: Please confirm that the pre-filed electrical contractor is responsible for the conduit and wire for all of the work shown on drawings I001, I 100 and I 101
A11: The electrical filed sub bid contractor is responsible for all wiring show on the electrical drawings. Drawings I001, I100 AND I101 should be considered for coordination.

Q12: The Control System Network Diagram shown on Drawing I100 calls for new fiber optic cables from Well 3A to the existing Treatment Plant and then to the New PFAS Building and that it is by DIV 40. Please answer the following questions.
A12: See responses to Q15 thru Q20 below.

Q13: Are the conduits existing? None are shown on the drawings.
A13: The conduits are new and are indicated on the attached revised addendum 3 drawing E002.

Q14: Who installs the Fiber optic cables?
A14: The Fiber Optic cable will be furnished under div 40 and installed by the electrical filed sub-bid contractor.

Q15: Who terminates the fiber optic cables?
A15: fiber optic cable terminations will be by div 40.

Q16: What are the distances from each of the terminations?
A16: See the attached revised addendum 3 drawing E002 for routing and distances.

Q17: If new buried conduits are required who excavates and installs them?
A17: excavation will be by the general contractor conduit installation is by the electrical contractor.

Q18: If new conduits are required in the building who installs them?
A18: The electrical filed sub bid contractor will run the conduits between the panels indicated on the revised addendum 3 drawing E002 including within the buildings.

Q19: Please confirm Section 099000 Painting is a filed sub-bid. The bid section Part 1 General does not mention it is part of the project as a filed sub-bid.
A19: Section 09 90 00 is a filed sub-bid.

Q20: In Section 099000 1.02 Related work, the following sections are called out, however we do not see them in the bid documents. They are as follows:

Section 096623	Seamless Flooring
Section 099656	Protective Coating
Section 099713.33	Surface Prep and Shop prime painting
Section 099713.43	Painting Steel Water Storage tanks
Section 099713.43	Field Coating and Painting of Riveted Steel Water Storage tanks

A20: This question has been answered in this addendum under the Specifications section.

Q21: In Chemical Storage 103 is there any secondary containment coatings or floor coatings required in the NaOCl or NaF areas?
A21: Yes. Paint chemical containment and curbs per Section 09 90 00 – 2.01 A and B.

Q22: Section 466180 Granular Activated Carbon Adsorption Vessel System 2.03 Equipment A Adsorber vessels has notes 3, 4, and 5 for the preparation, the interior lined coating, and the exterior painted coating happening in shop under that section. Please confirm that is accurate and there is no field painting by the filed sub bidder for these GAC vessels.
A22: There is no field painting by the filed sub bidder for the GAC vessels.

Q23: Section 134200 Pre-Engineered Metal Building has the primary, secondary, & Supplemental Structural steel as hot dip galvanized/ The room finish scheduled for Room 101 does not state to paint the ceiling. Please confirm there is no requirement for field painting the Pre-engineered metal building components.
A23: There is no requirement to paint pre-engineered metal building items. The intent is to leave this item as is.

Q24: Please confirm there is no painting of fiberglass doors or frames per door schedule on drawing A801.
A24: There is no painting of fiberglass doors or frames. These items shall come pre-painted as specified.

Q25: Could you please confirm that the filed subcontractors are responsible for cleaning up after themselves including removal of their own debris from the site? Their sections state Filed Subcontract with reference to all work, but under cleanup only state "contractor".
A25: Yes, subcontractors are responsible for cleaning up after their work is complete.

Q26: There is a spec section for Dimensional Letter Signage for the exterior of the building, but I do not see anywhere what you want the letters to say.
A26: Refer to drawing, 3 / G101 for the cast to be mounted to the exterior metal panel siding.

Q27: Please confirm that we are not supposed to concrete encase the under- slab piping.
A27: Correct

Q28: On E – 501 there is a typical detail for communication ductbank, yet I don't see any communication duct bank on the plans. Please confirm.
A28: The ductbank detail is intended to indicate typical spacing of conduits within a ductbank, with 7.5" between power conduits and 12" between power and communications conduits as applicable.

Q29: In addenda #1 you state that the permit fees are NOT waived. In the permit section of the specification, it states that the permits with be either waived OR paid for by the owner. I would like to confirm whether the owner will be paying for the permit fees and that we need not carry these in our bid price.
A29: Permit fees will not be waived. Prices for permits shall be included within the bidder's price.

Q30: Are the bollards part of the misc. metals Filed Sub Bid? It doesn't list them under the items required, yet they are listed under the submittal section.

A30: Yes. See information below regarding the bollards to be added to specification 05 50 00, METAL FABRICATIONS. Please add Drawing C503 to 05 00 01 – Part 1.01, D.

Part 2 - Products

2.16 METAL BOLLARDS

A. Fabricate metal bollards from steel shapes, as indicated.

1. Where bollards are indicated to receive controls for door operators, provide cutouts for controls and holes for wire.
2. Where bollards are indicated to receive light fixtures, provide cutouts for fixtures and holes for wire.

B. Prime steel bollards with zinc-rich primer.

Part 3 - EXECUTION

3.05 INSTALLATION OF METAL BOLLARDS

A. Fill metal-capped bollards solidly with concrete and allow concrete to cure seven days before installing.

1. Do not fill removable bollards with concrete.

B. Anchor bollards to existing construction with expansion anchors. Provide four 3/4-inch bolts at each bollard unless otherwise indicated.

1. Embed anchor bolts at least 4 inches in concrete.

C. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.

D. Fill bollards solidly with concrete, mounding top surface to shed water.

1. Do not fill removable bollards with concrete.

Q31: Addendum 2 has an addendum 1 title in the upper right corner. Please clarify
A31: This was a typo.

Q32**:** Is it the intent that the gray epoxy paint applied to the GAC vessels and piping under 46 61 80 will not require field color code painting by the painting sub bidder?
A32: Correct. GAC vessels and piping specified under 46 61 80 will be painted in the shop. Field painting will not be required by the sub bidder.

Q33: Is it the intent to field paint the exposed galvanized structural steel girts and purlins in the filter area?

A33: No these will be shop painted.

Q34: Is it the intent to apply containment coating under 09 90 00 in Room 100 Chemical Storage?
A34: Refer to A22.

Q35: Which HVAC sub bid specification is the correct one to use? There are two identical forms (page 944 and 1214). One has three categories of subs, and one has 4 categories.
A35: The specs include two versions of the DIV 23 specifications. The second set of DIV 23 specifications shall not be used and shall be removed from the set.

Q36: Is Section 23 09 00 Building Management System (BMS) part of the scope? It is not listed in the table of contents and I don't think it belongs in the spec. Plan H701 doesn't appear to indicate a BMS. Please advise.
A36: 230900 is not included in the specifications that should be referenced, see Q35 above.

SECTION 09 90 00

PAINTING
(FILED SUB-BID REQUIRED)

PART 1 - GENERAL

1.01 GENERAL PROVISIONS:

A. The BIDDING REQUIREMENTS, CONTRACT FORMS, and CONTRACT CONDITIONS as listed in the Table of Contents, and Division 1 - GENERAL REQUIREMENTS, shall be included in and made a part of this Section.

B. Work of this Section requires Filed Sub-Bids and is governed by the provisions of the Massachusetts General Laws (MGL), Public Bidding Law - Chapter 149, Sections 44A to 44J inclusive, as amended, and applicable Sections of the MGL, Public Contract Law - Chapter 30.

C. The work to be completed by the Filed Subcontractor for the work of this Section is shown on the following listed Drawings:

General: G000, G101

Civil: C001, C101, C503

Structural: S001, S002, S003, S004, S101, S102, S302,

Architectural: A011, A101, A401, A501, A602, A801

Plumbing: P000, P100, P101, P501

Mechanical (PROCESS):M001, M100, M101, M301, M501, M502, M503

HVAC: H001, H101, H102, H201, H202, H501, H502

Electrical: E001, E101, E201, E501

D. Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the Work of this Filed Subcontract.

E. Sub-Bids for work under this Section shall be for the complete work and shall be filed in a sealed envelope with the Awarding Authority at a time and place as stipulated in INVITATION FOR BID AND INSTRUCTIONS TO BIDDERS.

1. The following shall appear on the upper left-hand corner of the envelope:

NAME OF SUB-BIDDER: _____
SUB-BID FOR TRADE: PAINTING

2. Each Sub-Bid submittal for work under this Section shall be on forms furnished by Awarding Authority, as bound herein, accompanied with the required bid deposit in compliance with MGL Chapter 149 Section 44B in the amount of 5 percent of Filed Sub-Bid.

F. Sub Sub-Bid Requirements: NONE REQUIRED UNDER THIS SECTION

1.02 EXAMINATION OF SITE AND DOCUMENTS:

A. Bidders are expected to examine and to be thoroughly familiar with all contract documents and with the conditions under which work will be carried out. The Awarding Authority (Owner) will not be responsible for errors, omissions and/or charges for extra work arising from General Contractor's or Filed-Subcontractor's failure to familiarize themselves with the Contract Documents or existing conditions. By submitting a bid, the Bidder agrees and warrants that he has had the opportunity to examine the site and the Contract Documents, that he is familiar with the conditions and requirements of both and where they require, in any part of the work a given result to be produced, that the Contract Documents are adequate and that he will produce the required results.

B. Pre-Bid Conference: Bidders are strongly encouraged to attend the Pre-Bid conference; refer to INVITATION TO BID for time and date.

1.03 SEQUENCING:

A. Coordinate work of this Filed-Subcontract with that of other trades, affecting or affected by this work, and cooperate with the other trades as is necessary to assure the steady progress of work.

B. Do not order or deliver any materials until all submittals, required in the listed Specification Sections included as part of this Filed-Subcontract, have been received and approved by the Engineer.

C. Before proceeding with installation work, inspect all project conditions and all work of other trades to assure that all such conditions and work are suitable to satisfactorily receive the work of this Section and notify the Engineer in writing of any which are not. Do not proceed further until corrective work has been completed or waived.

1.04 SCAFFOLDS AND STAGING:

A. General: Filed Sub-contractors shall obtain required permits for, and provide scaffolds, staging, and other similar raised platforms, required to access their Work as specified in Section 01 52 13 - TEMPORARY FACILITIES and herein.

1. Scaffolding and staging required for use by this Filed Sub-contractor pursuant to requirements of Section 01 52 13 - TEMPORARY FACILITIES shall be furnished, erected, maintained in a safe condition, and dismantled when no longer required, by this Filed Sub-trade requiring such scaffolding.
2. Each Filed Sub-contractor is responsible to provide, maintain and remove at dismantling, all tarpaulins and similar protective measures necessary to cover scaffolding for inclement weather conditions other than those required to be provided, maintained and removed by the General Contractor pursuant to MGL (Refer to Section 01 52 13 - TEMPORARY FACILITIES and as additionally required for dust control).
3. Furnishing portable ladders and mobile platforms of all required heights, which may be necessary to perform the work of this trade, are the responsibility of this Filed Sub-contractor.
4. Enclose all exterior scaffolding outside of the construction fence with 8-foot high plywood enclosure at end of each workday to prohibit access to the scaffolding by unauthorized individuals.

1.05 HOISTING MACHINERY AND EQUIPMENT:

A. All hoisting equipment, rigging equipment, crane services and lift machinery required for the work by this Filed-Sub Contractor shall be furnished, installed, operated and maintained in safe conditions by this Filed-Sub Contractor, as referenced under Section 01 52 13 - TEMPORARY FACILITIES.

1.06 DAILY CLEANUP:

A. The Contractor shall clean up, at least daily, all refuse, rubbish, scrap and surplus material, debris and unneeded construction equipment resulting from the construction operations and sweep the area. The site of the work and the adjacent areas affected thereby shall at all times present a neat, orderly and workmanlike appearance.

1.07 WORK INCLUDED:

A. This Section covers field painting and coating of surfaces, complete. Shop painting of metal items is specified under the applicable item.

B. A schedule listing the various types of surfaces to be painted and the types of paints to be applied is included herein.

C. Unless otherwise indicated, the following items shall not be painted:

1. Labels on equipment, such as Underwriters' Laboratories and Factory Mutual, equipment identification, performance rating, and name or nomenclature plates.

2. Moving parts of operating units, exposed bolt threads, mechanical and electrical parts, such as valve and damper operators, linkages, sensing devices, motor and fan shafts.

3. Electrical conduit unless mounted on painted or finished surfaces or exposed in a finished room.

4. Structural steel not exposed to view, and other parts of buildings also not exposed to view.

5. Stainless steel.

6. Concrete.

7. Plumbing fixtures.

8. Fiberglass and polyethylene storage tanks.

9. Uninsulated PVC piping (to be banded only)

* 10. Factory prefinished architectural components.

* 11. Electrical panels and cabinets factory finish painted.

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* Except for touch-up painting when required

1.08 RELATED WORK:

A. Section 04 20 00, UNIT MASONRY

B. DIVISION 05, METALS

C. DIVISION 06, WOOD, PLASTICS, AND COMPOSITES

D. DIVISION 07, THERMAL AND MOISTURE PROTECTION

E. DIVISION 08, OPENINGS

F. DIVISION 09, FINISHES

G. DIVISION 22, PLUMBING

H. DIVISION 23, HVAC

I DIVISION 26, ELECTRICAL

J. DIVISION 28, ELECTRONIC SAFETY AND SECURITY

K. DIVISION 40, PROCESS INTERCONNECTIONS

L. DIVISION 43 PROCESS GAS AND LIQUID HANDLING, PURIFICATION AND STORAGE EQUIPMENT

M. DIVISION 46, WATER AND WASTEWATER EQUIPMENT

1.09 SYSTEM DESCRIPTION:

A. The term "paint" as used herein includes emulsions, enamels, paints, stains, varnishes, sealers, and other coatings, organic or inorganic, whether used as prime, intermediate, or finish coats.

B. The Contractor shall do a complete painting job throughout the work in accordance with generally approved modern practices for work of high quality. Unless otherwise specified, all materials and surfaces customarily painted shall be given not less than one shop coat and two field coats or one prime coat and two finish coats, regardless of whether or not the surface to be painted is specifically mentioned.

C. Paints containing lead shall not be used.

D. To ensure a satisfactory painting job it is essential that the paints applied in the shop and in the field be mutually compatible. The Contractor shall determine what shop paints have been used and shall verify that field applied paints are compatible therewith.

E. The colors of finish coatings shall be selected by the Engineer from color chips submitted by the Contractor for review. The color selection shall be in the form of a schedule indicating the colors to be used on the various surfaces. The colors used in the final work shall be in accordance with the color schedule and shall match the selected color chips.

F. All coating systems used for potable water applications shall be previously approved by the National Sanitation Foundation (N.S.F.) in accordance with Standard 61. Evidence of such approval shall be an approval letter from N.S.F. listing the submitted materials.

G. Paints submitted shall meet all Federal and State E.P.A. regulations pertaining to volatile organic compounds (VOC) compliance.

1.10 REFERENCES:

A. The following standards form a part of these specifications, and indicate the minimum standards required:

American Society for Testing and Materials (ASTM)

ASTM F1869 Moisture Vapor Emission Rate Using Anhydrous Calcium Chloride

1.11 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01 33 23 SUBMITTALS, SUBMIT THE FOLLOWING:

A. Manufacturer’s literature of proposed paints.

B. Painting schedule.

C. Three (3) sets of color chips for selection of colors.

1.12 DELIVERY AND STORAGE:

A. Paint shall be delivered to the site in the manufacturer's sealed containers. Each container shall bear the manufacturer's label, listing the brand name, type and color of paint, and instructions for thinning. Thinning shall be done only in accordance with directions of the manufacturer. Job mixing or job tinting may be done when approved by the Engineer and for preparing sample colors.

B. Painting materials shall be stored and mixed in a single location designated by the Engineer for this purpose. The Contractor shall not use any plumbing fixture or pipe for mixing or for disposal of any refuse. It shall carry all necessary water to its mixing room and shall dispose of all waste outside of the building in a suitable receptacle. Contractor will be held responsible for any damage done due to failure to observe these precautions.

C. The paint storage area shall be kept clean at all times, and any damage thereto or to its surroundings shall be repaired. Any oily rags, waste, etc., shall be removed from the building every night, and every precaution shall be taken to avoid danger of fire.

D. Heat must be provided in the storage area if paints are to be stored during winter months. The temperature shall be maintained above 40 degrees F. at all times.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. PAINT SCHEDULE:

Except as otherwise indicated, all paint used shall be of the type listed in the schedule below, by Tnemec Company, Inc., or equivalent paints by Sherwin-Williams Company, International Paints, or other approved paint fully equal to paint manufactured by the above named companies. No brand other than those named will be considered for approval unless the brand and type of paint proposed for each item in the following painting schedule are submitted in writing to the Engineer, along with sufficient data supported by certified tests.

PAINT SCHEDULE:

Key		Tnemec	Note 1
AGE	Acryli Gloss Enamel	1029 Enduratone	3.5
APE	Acrylic Polyurethane	73 Endura-Shield Enamel	3.0
ALP	Acrylic Latex Primer	A100 Exterior Latex Wood Primer	3.0
ALHP	Acrylic Latex Satin House & Trim Paint	A100 Exterior Latex Satin House and Trim Paint	4.0
ABF	Cementitious Block Filler	130 Envirofill	80-100 s.f./gal
CEE	Catalyzed Epoxy	L69F Epoxoline II	4.0
CEM	Catalyzed Epoxy Mastic	27 WB Typoxy	Note 3
CEP	Catalyzed Epoxy Primer	L69F Epoxoline	3.0
EMC	Epoxy Modified Cement	218 Mortar-Clad	Fill/Surface
EP	Epoxy-Polyamide (thinned 30% #4 thinner)	FC 22 Pota-pox	25-30
EPW	Water-based Epoxy Primer	151 Elasto-Grip	1.0-1.5
HGV	High Gloss Varnish		Note 2
HSE	High Solids Epoxy (Minimum 69%)	L69 Epoxy	6.0
MA	Modified Acrylic	115 Uni-bond	3.0
MAE	Modified Acrylic Elastomer	156 Envirocrete	6.0-8.0
MCU	Moisture Cured Urethane	Series 1 - Omnithane	2.5-3.0
MPE	Modified Polyamine Epoxy	Series 435 - Permaglaze	15-20 mils
NE	Novolac Epoxy	282 Tneme-Glaze	7.5
PEF	Polyamine Epoxy Finish	280 Tneme-Glaze	6.0-8.0
PEP	Polyamine Epoxy Primer	201 Epoxoprime	6.0-8.0
PVA	PVA Sealer	151 Elasto Grip	0.75-1.5
PWC	Potable Water Coating	Series FC 22 Pota Pox	25-30
SA	Silicone Aluminum	39-1261 (Note 4)	1.5
VB	Vapor Barrier	262 Elasto Shield	50-100
Z	Zinc-Rich Primer	90G-1K97 Tneme-Zinc	2.5

Notes 1: Minimum Dry Film Thickness/Coat (mils)
2: Furnished by reputable manufacturer and acceptable to the Engineer.
3: Shall be used as a tie-coat between incompatible paints @ 3.0-4.0 mils.
4: This paint is suitable for temperatures up to 1200ºF and must be final cured at 400ºF for one hour.

B. PAINTING SCHEDULE:

Paint shall be applied in accordance with the paint key listed on the following schedule and defined in the preceding Paint Schedule:

Item		Field Coats 1st	2nd	3rd
Walls:				
Interior concrete masonry units		ABF	HSE	HSE
Interior concrete designated to be painted, to include top and outside of all concrete containment curbs		HSE	HSE	--
Interior chemical containment curbs on the chemical storage side		PEP	NE	NE
Exterior concrete masonry units (if sprayed, backroll first coat)***		MAE	MAE	--
Plaster & gypsum wallboard		PVA	HSE	HSE
Floors:				
Concrete floors designated to be painted		PEP	PEF	PEF
Concrete floor slab in chemical containment areas including tank pads		PEP	NE	NE
Concrete floor and pads in chemical feed and fluoride rooms		PEP	NE	NE
Ceilings and Walls:				
Exposed galvanized metal deck/bar joists, dry spaces^		MA	--	--
Exposed galvanized metal deck/bar joists, wet spaces^		CEE		
Plaster & gypsum wallboard		PVA	CEE	CEE
Equipment Items:				
With shop prime coat, including machinery and pumps (non-submerged) (submerged)	Interior Exterior Exterior	*CEP *CEP MPE	CEE APE MPE	--
With shop finish coat (when designated to be painted)	Interior Exterior	*CEM *CEM	CEE APE	--
Tanks:				
Steel tanks (interior)		*MCU	CEE	CEE
Steel tanks (exterior)		*MCU	CEE	APE

Potable Water Coatings (immersion service):			
Concrete Tanks (when designated to be brush blasted and painted)	EMC	PWC	
Steel Tanks (SSPC-SP#10 prep. required)	PWC	PWC	--
Equipment and Piping	PWC	PWC	--
Metals:			
Exposed interior structural steel including monorails and supports	*Z	CEE	CEE
Exposed exterior structural steel including monorails and supports	*Z	CEE	APE
Interior miscellaneous galvanized and non-ferrous metals and piping	CEE	CEE	--
Exterior miscellaneous galvanized and non ferrous metals and piping (SP7 required)	CEE	APE	--
Miscellaneous interior ferrous piping, metalwork, ferrous parts or operating devices, valve handles, levers, pumps,	CEP	CEE	--
and ferrous hangers and supports (exterior exposure)	CEP	CEE	APE
Exposed electrical conduit, conduit fittings, outlet boxes	Same as adjacent wall or ceiling		
Hot ferrous metal surface	SA	SA	--
Exterior Carpentry Items:			
Exterior Cellular PVC Trim	ALP	ALHP	ALHP
Mineral Fiber Cement Siding / Shakes (Touch-up only)	ALP	ALHP	ALHP
Piping:			
PVC Piping designated to be painted (SP7 or hand sand)	CEE	CEE	--
Pipe insulation (plastic or metal sheathed paint as scheduled for plastic or metal surface)	PVA	CEE	CEE
Other piping (see metals)			

* Spot Prime

***For existing, painted masonry walls, use EPW primer, followed by two coats of MAE.

^ If galvanized metal is provided with a light top coat sealer, light brush blast surface preparation is required prior to first field coat

B. SPARE PAINT:

1. Furnish to the Owner one unopened gallon of each type and color of paint used on the work.
2. Furnish both components for each type and color of epoxy paints used on the work.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION:

A. Before any surface is painted, it shall be cleaned carefully of all dust, dirt, grease, loose rust, mill scale, old weathered paint, efflorescence, etc. All necessary special preparatory treatment shall then be applied. Where required, imperfections and holes in surfaces to be painted shall be filled in an approved manner.

B. Cleaning and painting shall be so programmed that dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surfaces which have been cleaned, pretreated, or otherwise prepared for painting, shall be painted with the first field coat as soon as practicable after such preparation has been completed, but in any event prior to any deterioration of the prepared surface.

D. Wood shall be sanded to a smooth and even surface and then dusted off. Before priming wood that is to be painted, shellac shall be applied to all knots, pitch and sapwood. After priming or stain coat has been applied, nail holes and cracks shall be thoroughly filled with plastic wood or putty. For natural finish work, putty shall be colored to be imperceptible in the finished work.

E. Exposed nails and other ferrous metal or surfaces to be painted with water-thinned paint shall be spot primed with aluminum.

F. Cracks and holes in masonry and concrete surfaces to be painted shall be filled with patching material recommended by the coatings manufacturer. Surfaces shall be clean and dry before painting. All efflorescence, grease, oil, etc., shall be removed before painting, and all loose, crumbling material shall be removed by vigorous wire brushing over entire surface, followed by removal of all dust. All high areas on masonry and concrete surfaces such as mortar daubs, mortar ridges at joints, and ridges at form joints in concrete shall be removed.

G. All holes in plaster shall be filled with plaster of paris and all cracks shall be cut out and filled. No sandpaper shall be used on plastered surfaces. Prior to painting, surfaces shall be tested with a moisture detecting device, such as Kaydel Plaster Tester, Type CP-48, as manufactured by Hard Moisture Gauges, Inc. No sealer or paint shall be applied when the moisture content of the plaster exceeds 8 percent, as determined by the test. Testing shall be done in the presence of the Engineer's representative, and in as many locations as directed. Plaster shall be thoroughly dry-brushed before painting or sealing.

H. All nonferrous metal surfaces to be painted shall be cleaned of all dirt, grease, oil and other foreign substances uniformly profiled per SSPC SP 7.

I. All galvanized surfaces to be painted shall be brush blasted to create a uniform surface profile per SSPC SP7.

J. Before application of the first full field coat, abraded areas of all non-galvanized ferrous metal items having shop coats shall be touched up with paint of the type indicated on the Painting Schedule.

K. All items of equipment such as motors, pumps, instrumentation panels, electrical switchgear, and similar items, that have been given shop coats, paint filler, enamel or other treatment customary with the manufacturer, shall have, after installation, all scratches and blemishes touch up prior to application of the first field coat. Factory prefinished items not to be field painted shall be touched up with matching paint to repair any areas damaged during installation.

L. All submerged concrete surfaces that are to receive an epoxy coating shall be brush blasted to remove surface laitance and provide a uniform surface profile, reference SSPC SP #13. Surface preparation may commence one week after the concrete has been pronounced cured. The curing period is defined as that length of time during which the concrete is fully hydrated (28 day cure). Patch holes and voids with specified modified epoxy cement prior to coating.

M. Concrete floors that are to receive epoxy coating shall be brush blasted or shot blasted per SSPC SP #13 and ICRI Surface Profile requirements per the coating manufacturer (Blastrack). Check for excessive moisture migration per ASTM F1869, Moisture Vapor Emission Rate Using Anhydrous Calcium Chloride. Test results not to exceed 3 lbs per 1,000 square feet in one 24-hour period.

N. Hardware accessories, machine surfaces, plates, lighting fixtures, and similar items in place prior to cleaning and painting, and not intended to be painted, shall be removed during painting operations and repositioned upon completion of each area or shall otherwise be protected.

O. All PVC pipe to be painted shall be brush blasted per SSPC SP7 or shall be sanded to provide a uniform surface profile.

3.02 APPLICATION:

A. Paint shall be used and applied as recommended by the manufacturer without being extended or modified, and with particular attention to the correct preparation and condition of surfaces to be painted.

B. Paint shall be applied only within the temperature range recommended by the manufacturer. Painting of surfaces when they are exposed to the sun shall be avoided.

C. Paint shall not be applied to wet or damp surfaces and shall not be applied in rain, snow, fog, or mist, or when the relative humidity exceeds 85 percent.

D. No paint shall be applied when it is expected that the relative humidity will exceed 85 percent or that the air temperature will drop below 40ºF within 18 hours after the application of paint. Dew or moisture condensation should be anticipated and if such conditions are prevalent, painting shall be delayed until midmorning to be certain that the surfaces are dry. Further, the days painting should be completed well in advance of the probable time of day when condensation will occur, in order to permit the film an appreciable drying time prior to the formation of moisture.

E. All paint shall be applied under favorable conditions by skilled painters and shall be brushed out carefully to a smooth, even coating without run or sags. Enamel shall be applied evenly and smoothly. Each coat of paint shall be allowed to dry thoroughly, not only on the surface but also throughout the thickness of the paint film before the next coat is applied. Finish surfaces shall be uniform in finish and color, and free from flash spots and brush marks. In all cases, the paint film produced shall be satisfactory in all respects to the Engineer.

F. Exposed nails and other ferrous metal or surfaces to be painted with water-thinned paints shall be spot primed with aluminum paints.

G. In order to provide contrast between successive coats, each coat shall be of such tint as will distinguish it from preceding coats.

H. The Contractor shall not only protect its work at all times, but shall also protect all adjacent work and materials by the use of sufficient drop cloths during the progress of the work. Upon completion of the work, it shall clean up all paint, spots, oil, and stains from floors, glass, hardware, and similar finished items.

I. Paint shall be applied so as to obtain coverage per gallon and the dry film thickness recommended by the manufacturer. Dry film thickness readings shall be taken to insure that required thicknesses have been achieved. The Contractor shall record in a manner satisfactory to the Engineer, the quantities of paint used for successive coats on the various parts of the work.

J. Spraying with adequate apparatus may be substituted for brush application of those paints and in those locations for which spraying is suitable.

K. If paints are thinned for spraying, the film thickness after application shall be the same as though the unthinned paint were applied by brush. That is, the addition of a thinner shall not be used as a means of extending the coverage of the paint, but the area covered shall be no greater than the area that would have been covered with the same quantity of unthinned paint.

L. Blast cleaned metal surfaces shall be coated immediately after cleaning, before any rusting

or other deterioration or contamination of the surface occurs. Blast cleaned surfaces shall be coated not later than 8 hours after cleaning under ideal conditions or sooner if conditions are not ideal.

M. The use of carbon dioxide or carbon monoxide emitting heaters is not permitted during the painting operation. Only indirect hot-air systems shall be permitted.

3.03 PIPING COLOR CODE:

The following Tnemec colors shall be utilized to facilitate identification of piping. Only insulation is to be painted on chemical feed lines.

1. Water Lines

Raw	Olive Green	110GN
Settled or Clarified	Aqua	10GN
Finished or Potable	Dark Blue	11SF

2. Wastewater or Potable Waste Lines

Sewer (sanitary or drain)	Dark Gray	34GR
Backwash Waste	Light Brown	68BR
Sludge	Dark Brown	84BR
Sewage Plant Effluent	Clay	07RD

3. Chemical Lines

Alum or Primary Coagulant	Orange	04SF
Ammonia	White	11WH
Carbon Dioxide (Gas, Liquid and Solution	Light Red	26RD
Carbon Slurry	Black	35GR
Caustic Compounds (NaOH Or KOH)	Yellow with Green Band	02SF/09SF
Chlorine (Gas and Solution)	Yellow	02SF
Chlorine Dioxide	Yellow with Violet Band	02SF/14SF
Ferric Chloride	Orange	04SF
Fluoride Compounds	Light Blue with Red Band	25BL/06SF
Lime Slurry	Light Green	08GN
Ozone	Yellow with Orange Band	02SF/04SF
Phosphate Compounds	Light Green with Red Band	08GN/06SF
Polymers or Coagulant Aids	Orange with Green Band	04SF/09SF

Potassium Permanganate	Violet	14SF
Soda Ash	Light Green with Orange Band	08GN/04SF
Sulfuric Acid	Yellow with Red Band	02SF/06SF
Sulfur Dioxide	Light Green with Yellow Band	08GN/02SF

4. Other

Compressed Air	Dark Green	91GN
Gas or Oil	Red	28RD
Other Lines	Light Gray	32GR

B. In situations where two colors do not have sufficient contrast to easily differentiate between them, a 6-inch band of contrasting color shall be painted on one of the pipes at approximately 30-inch intervals.

C. Piping which is not painted shall be color coded with bands placed at each change in direction and no more than 5 feet apart on straight runs.

3.04 PIPING IDENTIFICATION:

A. After painting, piping shall be identified by stenciling using the same specified paint as used on the pipes. Stenciling shall be of wording and color selected by the Engineer and sized as follows:

Outside Diameter of Pipe or Covering	Size of Legend Letters
3/4-inch to 1-1/4-inch	2-inch
1-1/2-inch to 2-inch	3/4-inch
2-1/2-inch to 6-inch	1-1/4-inch
8-inch to 10-inch	2-1/2-inch
Over 10-inch	3-1/2-inch

B. Arrows shall indicate direction of flows. Where "a" is equal to 3/4 of outside diameter of pipe or covering, the arrow shaft shall be 2 "a" long by 3/8 "a" wide. The arrow head shall be an equilateral triangle with sides equal to "a." Maximum "a" dimension shall be 6-inches.

C. Where pipe passes through a wall, use pipe markers and directional arrows on each side of the wall.

D. Use pipe markers and directional arrows every 50 feet along continuous pipe lines.

E. Use a pipe marker and directional arrow at each rise and "T" joint.

F. When using directional arrows, point arrowhead away from pipe markers and in direction of flow. If flow can be in both directions, use a double-headed directional arrow.

G. The Engineer will assist in determining pipe content and direction of flows.

3.05 PARKING LOT LINE PAINTING:

A. Paint for parking lot lines shall conform to Federal Specification TT-P-115-E Type I. Paint shall be 11-3 PPG Industries, Pittsburgh, PA, Series 6 Tneme-Cryl, Tnemec, St. Louis, MO, or approved equal.

B. Contractor shall prepare the pavement surface according to the recommendations of the paint manufacturer.

C. Applied markings shall have clean-cut edges, true and smooth alignment and uniform film thickness of 15 mils, $\pm$ 1.0.

D. The Contractor shall be responsible for removing, to the satisfaction of the Engineer, tracing marks, and spilled paint applied in an authorized area.

3.06 CLEANUP:

A. The Contractor shall at all times keep the premises free from accumulation of waste material and rubbish caused by its employees or work. At the completion of the painting, it shall remove all tools, scaffolding, surplus materials, and rubbish from and about the buildings and shall leave the work "broom clean" unless more exactly specified.

B. The Contractor shall also, upon completion, remove all paint where it has been spilled, splashed, or splattered on all surfaces, including floors, fixtures, equipment, furniture, glass, hardware, etc., leaving the work ready for inspection.

END OF SECTION

SECTION 22 00 50

BASIC PLUMBING REQUIREMENTS
(FILED SUB-BID REQUIRED AS PART OF SECTION 22 00 01)

PART 1 – GENERAL

1.1 GENERAL PROVISIONS:

A. Sub-Bid Requirements: As provided under Section 22 00 01 - PLUMBING SUB-BID REQUIREMENTS, and supplemented under the Bidding Requirements, Contract Forms, and Conditions of the Contract, and applicable parts of Division 1 – GENERAL REQUIREMENTS.

B. Work of this Filed Sub-Bid includes all individual specification sections listed in Section 22 00 01.

1.2 SUMMARY:

A. The work of Division 22 is governed by the General and Supplementary Conditions of the Contract, and Sections of Division 1 of the Project Manual.

B. Perform work and provide materials and equipment as shown on Drawings and as specified or referenced in this Section of the Specifications. Completely coordinate work of this Section with work of other trades and provide complete and fully functional systems installation.

C. Give notices, file plans, obtain permits and licenses, pay fees and backcharges, and obtain necessary approvals from authorities that have jurisdiction as required to perform work in accordance with all legal requirements and with the Contract Documents.

D. Section Includes: The work of this Section includes the basic requirements common to the PLUMBING Sections of Division 22, including:

1. Definitions.

2. Organization of submittals.

3. Proposed substitutions.

4. Warranty.

5. Manuals and Instructions.

6. Record documents.

7. Sleeves and penetrations.

8. Equipment and piping identification.

9. Core Drilling.

10. Cutting and Patching.

11. Scaffolding, hoisting, rigging and staging.

12. System Startups.

E. Related Sections: Related work specified in other Sections includes, but is not necessarily limited to:

1. Section 01 33 23 – Submittals.

2. Section 01 73 29 – Cutting, Coring and Patching: Openings in masonry, concrete, tile, and other parts of structure, except drilling for hangers, providing holes and openings in metal decks, and core drilling.

3. Section 01 92 13 – Operations and Maintenance Manuals.

4. Section 05 50 00 - Metal Fabrications: Structural supports necessary to distribute loading from equipment to roof, floor, walls or other building structural components.

5. Section 07 62 00 - Sheet Metal Flashing and Trim.

6. Section 07 92 00 – Joint Sealants: Sealing joints between plumbing fixtures and abutting surfaces.

7. Division 09 – Painting: Painting of exposed piping and equipment except as specified in this Section.

8. Division 23 - HVAC

9. Division 26 - Electrical.

10. Division 31 - Earthwork

11. Division 33 - Utilities

1.3 REFERENCES:

A. American National Standards Institute (ANSI)

1. ANSI A13.1 - Scheme for the Identification of piping systems.

B. American Society of Mechanical Engineers (ASME)

1. ASME 2019 Boiler and Pressure Vessel code Section VIII, Rules for Construction of Pressure Vessels.

C. American Society for Testing and Materials International (ASTM)

1. ASTM E119 - Test Methods for Fire Tests of Building Construction and Materials.

2. ASTM E814 - Test Method for Fire Tests of Through-Penetration Fire Stops.

D. Compressed Gas Association (CGA)

1. C-9 - Standard Color Marking of Compressed Gas Cylinders Intended for Medical Use.

E. Construction Specifications Institute. (CSI)

1. Manual of Practice

F. Underwriters Laboratories (UL)

1. Fire Resistance Directory, Vol. I - Beams, Columns, Floors, Roofs, Walls, and Partitions.

2. Fire Resistance Directory, Vol. II, Through Penetration Firestop Systems.

3. ANSI/UL1479 - Fire Tests of Through Penetration Firestops.

G. National Fire Protection Association

1. No. 241-Safeguarding Construction, Alteration, and Demolition Operations.

H. Code of Massachusetts Regulations (CMR)

1. 248 CMR Massachusetts State Fuel Gas and Plumbing Code.

The materials, products, devices, methods, systems, design, and installation of any and all aspects of a plumbing system shall be in conformance with 248 CMR 3.00 through 10, including that all products used in any plumbing or gas fitting system shall be Product - Approved by the board of State Examiners of Plumbing and Gas Fitters.

2. 522 CMR Massachusetts Board of Boiler Rules

3. 527 CMR Massachusetts Board of Fire Protection Regulations.

4. 780 CMR Massachusetts State Building Code.

1.4 DEFINITIONS:

A. General: Words and terminology used throughout the PLUMBING Sections of Division 22 shall be understood in their common usage as defined in a common dictionary, and as further defined in the CSI Manual of Practice, the General and Supplemental Conditions of the Contract, Division 1 of the Project Manual, and the Sections of Division 22.

B. Specification Content: The PLUMBING Specification Sections in Division 22 may use certain conventions regarding the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

1. Abbreviated Language: Language used in Specifications and other Contract Documents maybe of the abbreviated style. Words and meanings shall be interpreted as appropriate. Words implied, but not stated shall be interpolated as the sense requires. Singular words will be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.

2. Streamlined Language: The Specifications generally use the imperative mood and streamlined language. Requirements expressed in the imperative mood shall be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.

A. The words "shall be" are implied where a colon (:) is used within a sentence or phrase.

C. Indicated: The term "indicated" refers to graphic representations, notes, or schedules on the Drawings, or other paragraphs or Schedules in the

Specifications, and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the reader locate the reference. Location is not limited.

D. Directed: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Engineers, requested by the Architect, and similar phrases.

E. Approved: When used in conjunction with the Engineer's action on the Contractor's submittals, applications, and requests, the term "approved," is limited to the Engineer's duties and responsibilities as stated in the Conditions of the Contract.

F. Furnish: Furnish means purchase, delivery and storage at the Project Site for installation under other Sections or by the Owner.

G. Install: Includes operations at the Project Site including the actual unpacking, preparation, assembly, erecting, placing, anchoring, supporting, connecting, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations required for a complete installation ready for the intended use.

H. Provide: Provide means to furnish and install.

I. Project Site: Project Site is the space available to the Contractor for performing construction activities, either exclusively or in conjunction, with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.

J. Testing Agencies: A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

K. Product Data: Product data sheets include the manufacturers standard catalog information with illustrations, standard schedules, diagrams, performance charts, instructions, and brochures that illustrate physical appearance, size, weight, and other general characteristics of materials and equipment for some portion of the work.

L. Shop Drawings: Shop drawings are detailed drawings, diagrams, illustrations, and schedules specifically prepared by the installing contractor or supplier to illustrate some portion of the work.

M. Fabrication Drawings: The installation shop drawings required by the work of the various Sections of the Project Manual, such as sheet metal and sprinkler shop drawings, and normally prepared by the installing sub-contractor.

N. Coordination Drawings: The coordinated installation shop drawings normally prepared by the installing sub-contractors indicating multiple building systems and interdisciplinary work on a single set of coordinated documents.

O. Piping: Includes all necessary piping system components, including pipe, fittings, couplings, gaskets, flanges, unions, valves, strainers, hangers, supports, attachments, insulation, and identification.

P. Substitutions: Substitutions include manufacturers not listed as acceptable within the specifications, or materials, products, systems, or equipment, which differ from the requirements of the Contract Documents.

Q. Regulations: Regulations includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

R. NRTL: Nationally Recognized Testing Laboratory such as Underwriters Laboratory, Inc. or Factory Mutual Research Corporation.

S. Life Safety Systems: Life Safety Systems include all fire protection systems, devices, and equipment used to detect fire, activate alarms, suppress or control fire and smoke, or any combination thereof.

1.5 SUBMITTALS:

A. General Requirements: Comply with pertinent Submittals, the Sections of Division 22 – PLUMBING, and the additional requirements of this Section.

B. Materials List: Within 30 calendar days after the Contractor has received the Owner's Notice to proceed, submit a list of the proposed materials to be provided under the work of the PLUMBING Sections of Division 22.

C. Organization of Submittals: Organize submittals into comprehensible packages with related product data sheets and shop drawings organized and identified by Specification Section and Article numbers and titles. Organize submittals into packages in order as specified in the Sections of Division 22. Identify submittal pages to indicate the specific equipment or fixture type the data sheet applies to by Article number and title. Submittals, which are not properly identified, may be returned without review. Submittals can be submitted electronically as detailed in Section 01 33 23, Submittals.

1. Indicate appropriate model numbers in manufacturers' brochures and cross out non-applicable information.

2. Copies of faxed pages are unacceptable.

3. Submit shop drawings for particular systems complete, simultaneously, and organized by system.

D. Submittal Cover Sheet: Provide a completed cover sheet with each submittal package indicating the information on the following sample page:

SUBMITTAL COVER SHEET	
PROJECT:	CONTRACTOR:
SECTION NO.:	ARTICLE NO.:
DESCRIPTION:	
CONTRACT DRAWING REFERENCE NO.:	
EQUIPMENT IDENTIFICATION TAG NUMBER:	
SUBMISSION (CIRCLE ONE): FIRST, SECOND, THIRD, FOURTH	
DATE:	

INFORMATION AND CHECKLIST	REPLY	COMMENTS
1. Contractor's Log #ID		
2. Name, address, and phone number of supplier.		
3. Are all specified or scheduled items included and exactly match scheduled/specified items?	Yes No	
4. Is this item a substitution?	Yes No	
5. Are deviations clearly identified?	Yes No	
6. Does equipment fit space shown on construction documents, coordination drawings, and actual field conditions?	Yes No	
7. Has support, erection, weights, and installation been coordinated with all trades?	Yes No	
8. Does the proposed installation void warranties or violate UL or code requirements?	Yes No	
9. Does this material/equipment add expense to any other trade or project costs?	Yes No	
10. Does equipment require interface with other trades? List sections and specifics requiring coordination?	Yes No	
11. Is control interface coordinated?	Yes No	
12. List electrical characteristics (V/Ph/A)		

E. After approval of the proposed materials list, provide complete submittals as soon as possible and with adequate time for processing in order to not delay the project.

F. Submit for review of all project specific reproducible drawings, one electronic copy in Portable Document Format (PDF). Submit for review pdfs of detailed Shop Drawings and Product Data. Submittals for review shall include complete Specifications, including type of materials, electrical characteristics, capacities, performance and power requirements to determine compliance with Contract Documents. All data submitted including wiring diagrams shall be complete for all equipment and shall apply only to this specific project. All extraneous material shall be deleted or marked out. Items to be supplied shall be specifically indicated using a method that will be visible.

G. Contractor's Review: Review, stamp and certify each submittal prior to submission to the Architect. The certification shall state that the data and details contained on each Shop Drawing, Product Data, layout drawing, catalog data and brochure has been reviewed and that it complies with the Contract Documents in all respects. Shop Drawings, layout drawings, catalog data and brochures will not be reviewed and will be returned unchecked unless they are certified, and all items specifically identified.

H. Multiple submissions: It is intended that Submittal data be complete and accurate at the first submission. If the Submittal is returned marked "Resubmit" only one additional submission will be permitted.

1. If the second submission is not acceptable, or if the submittal is not made within the specified time frame, the right of substitution and selection will be lost. At that time the specified item shall be provided at no additional cost.

I. Required Review Time: A minimum period of **ten** working days, exclusive of transmittal time, will be required in the Engineer's office each time Shop Drawings, Product Data, layout drawings, catalog data and brochures are submitted or resubmitted for review. A minimum period of fifteen working days exclusive of transmittal time will be required for reviewing substitute materials or manufacturer. The required review time, including multiple submission, shall be considered when scheduling the work.

J. Submit Shop Drawings and Product Data sheets in a timely manner sufficiently in advance to give ample time for reviewing, correcting, resubmitting and re-reviewing if necessary. No claim for delay will be granted for failure to comply with this requirement.

K. Equipment shall be of proper size for its allotted space. Equipment may be disassembled as required, where it does not invalidate the manufacturer's

warranty, so that it can be installed through available window, door, or louver openings.

L. Schedule of Shutdowns: After the project construction schedule is developed, submit the following information to the Owner for all required shutdowns of existing systems.

1. Date of proposed shutdown.

2. List of systems to be affected.

3. List of areas affected by the shutdown.

4. Description of work to be performed.

5. Estimated length of the shutdown.

M. Piping Systems Schedule: Prepare and submit a schedule of PLUMBING piping systems to indicate the piping material, joints, and fittings to be used with each system.

N. Insulation Schedule: Prepare and submit a schedule to indicate insulation types and thicknesses to be used on each PLUMBING piping system.

O. UL Through-Penetration Firestop System Schedule: Prepare and submit a schedule to indicate the UL-System number for through-penetration assemblies to be used with all mechanical systems. Coordinate with the work of the Penetrations and Fire Stopping Section in Division 7.

P. Shop Drawings: Submit product data sheets and shop drawings as specified within the PLUMBING Sections of Division 22.

Q. Record Drawings: Prepare record drawings in accordance with the provisions of Division 1 governing - Project Record Documents and the additional requirements of this Section.

R. Valve Tag Charts: Prepare and submit valve tag charts as specified in this Section.

S. Operation and Maintenance Manuals: Prepare and submit copies of the Operation and Maintenance Manuals as specified in the appropriate Section of Division 1 governing - Contract Close-out. and the additional requirements of this Section.

T. Training Seminar Confirmation: Prior to the final completion of the project, submit copies of the training seminar sign in sheets and a letter to the Owner containing the names of training seminar participants, including instructor’s

names, the name of the firms represented and the dates of the instruction seminars.

U. Engineer's Action: Except for items submitted solely for record purposes or information, the Engineer will review each submittal for general compliance with the Contract Documents, as defined in the General Conditions, and return the submittal with comments.

V. Action Stamp: The Engineer will attach a Submittal Review sheet to each submittal package to indicate the status of the submission and the action taken, as follows:

1. Furnish as Submitted: Submission is generally in compliance with the intent of the contract documents and fabrication may be undertaken.

2. Furnish as Noted: Submission is generally in compliance with the contract documents and fabrication may be undertaken with the corrections noted.

3. Revise and Resubmit: Submission is not in compliance with the contract documents and requires substantial corrections. Fabrication work may not be undertaken.

4. Rejected: Submission is not in compliance with the contract documents. Resubmit as specified.

5. Submit Specified Item: Second submission is not in compliance with the contract documents. Submit specified item without deviation.

6. Reviewed for Comment Only: Engineer is not responsible for the approval of the submittal.

1.6 QUALITY ASSURANCE:

A. Qualifications: Use adequate numbers of skilled, licensed workers who are thoroughly trained and experienced and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Standard of Quality: The manufacturers names specified first or scheduled on the drawings are used for the design and to establish the standards of function, dimension, space requirements, appearance, and quality upon which the Contract is based. Acceptable manufacturers names are listed to provide competitive bids with the specified or scheduled manufacturer.

1. Acceptable Manufacturers: The inclusion of a manufacturer's name within the list of acceptable manufacturers does not necessarily mean that the

manufacturer's standard product is equal to the specified or scheduled product without some required modification. The submitted product shall be equal in terms of quality, durability, appearance, space requirements, weight, strength, and design to the product required by the Contract Documents.

C. Contractor's Review: It is solely the Contractor's responsibility to verify that the products of acceptable manufacturers and proposed substitutes meet or exceed the performance of the specified or scheduled product. To be considered acceptable, products must comply with the following for the full possible performance range:

1. Horsepower: Equal or less.
2. Efficiency: Equal or greater.
3. Capacities: Equal or greater.
4. Space/Clearances: Equal or greater.
5. Storage and Recovery: Equal or greater.
6. Warranty: Equal or better.
7. Weight: Equal or less.
8. Noise: Equal or quieter.

D. Substitutions: Substitutions include manufacturers not listed as acceptable within the specifications, or products, systems and methods, which differ from the specified systems.

1. Comply with the provisions of the Instructions to Bidders and pertinent sections in Division 1. Submit list of proposed substitutes for review and approval in compliance with the Instructions to Bidders, AIA Document A701.

2. By the submission of a proposed substitution, the Contractor represents that he has reviewed the proposed substitution and certifies that:

   A. The proposed substitution does not affect dimensions shown on drawings.

   B. Changes to the building design, including A/E design and review time at a rate of 2.6 x DPE, detailing and construction costs caused by the requested substitution will be included in the bid price with no additional cost to the Owner.

   C. The proposed substitution will have no adverse effect on other trades, the construction schedule, or specified warranty requirements.

   D. Maintenance and service parts are available locally.

E. All costs associated with or caused by the use of the proposed substitute will be covered by the Contractor.

E. Codes and Regulations:

1. In addition to complying with the specified requirements, comply with pertinent regulations of governmental agencies and authorities that have jurisdiction.

2. In case of conflict between or among specified requirements and pertinent regulations, the more stringent requirement will govern.

F. Qualifications for Welding and Brazing Work:

1. Qualify welding processes and welding operators in accordance with AWS Standard Qualification Procedure."

2. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.

A. If recertification of welders is required, retesting will be Contractor's responsibility.

G. Standards: Maintain copies of the most recent editions of the following standards at the job site for reference during construction:

1. UL Through Penetration Fire Stop Systems.

1.7 DELIVERY, STORAGE, AND HANDLING:

A. Protection: Use all means necessary to protect materials of the Mechanical Sections before, during and after installation and to protect installed work and materials of all trades and Sections.

B. Replacements: In the event of damage, immediately make all repairs and replacement necessary to the approval of the Engineer at no change in Contract Sum.

1.8 PROJECT CONDITIONS:

A. Comply with Project Specification Section 00 21 13, Instructions to Bidders. Visit the site prior to submission of bids and examine existing conditions to be familiar with the related implications to the Work of the PLUMBING Sections.

1. Questions regarding the Bidding Documents: Submit questions and requests for clarifications in compliance with the Instructions to Bidders.

B. Contract Documents: The Contract Drawings are diagrammatic and do not show every fitting and component and shall be used in conjunction with the specified requirements to provide complete and fully functional systems for the intended use. The drawings and specifications are complimentary, and the requirements indicated on both establish the requirements of the Contract.

1. The Contract Drawings indicate the general locations of equipment and distribution systems throughout the project. The actual installation locations shall be coordinated by the contractor on site based on actual field measurements performed by the contractor.

C. Document Review: Review the complete set of Contract Documents and be familiar with the space requirements and work of other Sections. Thoroughly review building sections, architectural details, space availability phasing requirements and mechanical drawings for a complete understanding of the scope and coordination requirements of the PLUMBING Sections.

D. Scheduled Equipment: Standard manufacturers model numbers scheduled on the drawings shall be modified as specified in the descriptive specification for the scheduled equipment. The drawings generally define quantities, and the specifications further define equipment quality and system components, which may not be included in the standard model number.

E. Pipe sizing notations: Pipe sizing notations run along the pipe from the larger sizes to the smaller size. Sections of pipe, which are not specifically identified with a pipe size, are the continuation of the previous larger pipe size indication. Pipe sizes change only where indicated by a notation change.

F. Existing Conditions: The existing conditions indicated on the contract drawings are taken primarily from existing record drawings provided by the Owner and do not necessarily indicate actual as-built conditions. Preparation work of the mechanical and electrical sections includes the verification of existing conditions before the start of related installation work.

1.9 WARRANTY:

A. Upon completion of the Work and as a condition of its acceptance and final payment, deliver to the Architect two copies of a written Warranty agreeing to replace the work of Division 22, which fails due to defective materials or workmanship within one year after Date of Substantial Completion as that date is determined in accordance with the General Conditions.

B. Failure due to defective materials or workmanship is deemed to include, but is not to be limited to:

1. Failures in operating component or components.

2. Leakage from piping system.

3. Code violations.

C. Obtain written equipment and material warranties offered in manufacturer's published data without exclusion or limitation, in Owner's name.

D. Replace material and equipment that require excessive service during warranty period as defined and as directed by Architect.

E. Warranty shall include 24-hour service of complete system during warranty period at no cost to Owner. Choice of service organization shall be subject to Owner's approval.

F. Include copy of warranty in the Operation and Maintenance Manuals.

G. At end of warranty period, transfer manufacturer's equipment and material warranties still in force to Owner.

H. This Article shall not be interpreted to limit Owner's rights under applicable codes and laws and under this Contract.

1.10 MANUALS AND INSTRUCTIONS:

A. Comply with pertinent provisions of the appropriate Section in Division 1 regarding - Contract Closeout and Operations and Maintenance Manual Submissions.

B. Operation and Maintenance Manuals: Bind Manuals in commercial quality, 8-1/2 x 11 inch three-ring binders with hardback washable, plastic cover, and provide identified dividers with tabs. Indicate appropriate model numbers in manufacturers' brochures and cross out non-applicable information. Review the Manuals with the Owner's maintenance personnel and add additional maintenance data sheets and information as directed by the Owner's Representatives. Copies of faxed pages are unacceptable.

1. Obtain at time of purchase of equipment, three copies of operation, lubrication and maintenance manuals for all items. Assemble literature in coordinated manuals with additional information describing combined operation of field-assembled units, including as-built wiring diagrams.

Manual shall contain names and addresses of manufacturers and local representatives who stock or furnish repair parts for items or equipment.

2. Provide directions for and sequences of operation for Plumbing systems of Division 22. Sequence shall list valves, switches, and other devices used to start, stop and control systems.

3. Lubrication instructions detailing type of lubricant, amount, and intervals recommended by manufacturer for each item of equipment. Include additional instructions necessary for implementation of first-class lubrication program. Include approved summary of lubrication instructions in chart form, where appropriate.

C. Organization of Manuals: Divide manuals with identified tabs to match the mechanical and electrical specification sections numbers and titles. Separate product information within each section by the Article numbers and titles as listed in Part 2 of each specification section. Provide a clear see-through plastic holder on the edge of the binder with a typed card indicating the Project name, the Engineer's name, the Installer's name and the Volume number (e.g., Vol. No. 1 of 2).

D. Manuals shall include the following materials and information for all specified materials and equipment:

1. Table of contents.

2. Emergency instructions with 24-hour phone number to contact a responsible individual for each Section of Work.

3. Subcontractor's warranties.

4. Name and telephone number of local representative and supplier.

5. Manufacturers' maintenance procedures.

6. Record drawings.

7. Equipment warranties and guaranties.

8. Sequence of Operations and Systems Descriptions.

9. Additional requirements specified in other sections.

E. Maintenance Information: Systems which require preventive maintenance to maintain efficient operation shall be furnished with complete necessary maintenance information. Required routine maintenance actions, as specified by

the manufacturer, shall be stated clearly and incorporated on a readily accessible label on the equipment. Such label may be limited to identifying, by title or publication number, the operation and maintenance manual for that particular model and type of product.

1.11 RECORD DOCUMENTS:

A. Prepare record documents for the work of Division 22 as specified in Division 1 for Project Record Documents. The record drawings shall accurately indicate all valve locations and shall clearly show the assigned valve tag number. Record drawings shall include:

1. Piping and equipment location changes from the Contract Documents.

2. Updated schedules to indicate the scheduled characteristics of the actual installed equipment.

3. Valve locations and valve tag numbers.

4. Equipment identification numbers coordinated with the Owner's Facility Management Program.

5. Locations of seismic restraints.

B. Record drawings include ductwork, sprinkler and fabrication drawings required for all other systems and coordination drawings prepared under the work of this contract. Provide reproducible drawings and electronic AutoCAD or Revit drawing files of both the contract drawings and additional fabrication/coordination drawings that indicate mechanical and electrical systems. All electronic files shall be fully bound and submitted on CD format.

1.12 ELECTRONIC DRAWING FILES:

A. Electronic drawing files of floor plans and schedules on AutoCAD or Revit or DXF format will be made available by the engineer for the contractor’s use to prepare fabrication, coordination or record drawings. After the contractor requests the electronic files, a waiver will be provided for the contractor to sign and return to Weston & Sampson Engineers, Inc. A service charge of one hundred dollars ($100.00) per disc will be charged to cover the cost of the Engineer’s time and materials. After Weston & Sampson Engineers, Inc. receives the signed waiver the electronic drawing files will be forwarded to the Contractor.

PART 2 - PRODUCTS

2.1 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. Sleeves Through Foundation Walls: Provide galvanized schedule 40 steel with continuous weld slip on welding flange water stop. Provide waterproof resilient link caulking assembly by Link-Seal or Sure-Seal.

2. In areas where pipe is exposed, install sleeves flush with the finish floor, except in mechanical rooms, and janitor's closets extend sleeves at least 4-inches above finish floor.

3. Annular Space Requirements: Sleeves shall be sized to provide a total clearance of 1-inch around pipe including insulation cover. Annular space around fire-rated through penetrations assemblies shall be in compliance with the Listed Assembly.

4. Packing between the pipe and sleeve in fire rated construction shall be a combination of listed insulation and fire-proof caulk. Coordinate with the work of the Division 7 Section for Penetration Firestopping.

5. Core drilled holes in lieu of sleeves are acceptable except in mechanical rooms, janitor’s closets or floors that can be flooded with water, which require sleeves installed above floors.

B. Through Penetration Assemblies: The combination of materials shall have the same fire rating, in hours, as the wall or floor, as tested in accordance with the code referenced editions of ANSI/UL 1479 (ASTM E-814). The combination of materials shall be classified by UL for the fire rating required and shall be listed as a numbered system in the UL Fire Resistance Directory.

1. Caulking of pipe penetrations through floor slabs, smoke barriers and fire rated partitions shall be performed under the Division 7 Section for Firestopping.

C. Waterproof Pipe Penetrations:

1. Modular mechanical penetrations seals shall be interlocking synthetic rubber links shaped to fill annular space continuously, with galvanized

carbon steel bolts, nuts and pressure plates to expand rubber seal between pipe and sleeve. Sleeve seal shall be water-tight.

2. Prefabricated modular sleeves shall be Mason Industries (SWS) or approved equal stiffened galvanized steel sleeves with preformed closed-cell elastomeric seal (non-fire-rated) or preformed mineral fiber or silicone foam seal (fire-rated).

3. Provide waterproof 1-inch single ring set in silicone and bolted to floor or wall at chipped and drilled penetrations of existing slabs on grade and existing walls below grade.

D. Provide adjustable escutcheons on exposed piping that passes through finished floors, walls, and ceilings. Escutcheons shall be chromium-plated cast brass, sized to cover sleeve opening and to accommodate pipe and insulation.

2.2 PIPING IDENTIFICATION:

A. Piping: Provide clip-on color-coded piping identification markers on plumbing piping systems specified in Division 22. Provide matching flow arrows to indicate direction of flow. Markers shall be equal to Seton Setmark. Pipe marking for outside diameters of 6-inches or greater may be springs or metal bands secured to the corners at each end of the semi-rigid plastic marker to hold each end of the marker firmly against the pipe.

1. Color coding and size of legend letters shall comply with the standards of ANSI A13.1.

2. Provide markers with legend letters sized in compliance with the following schedules:

Outside Diameter (Over Insulation)	Size of Letters:	Length of Color Code:
1-1/4-inch and smaller	½-inch	8-inches
1-1/2-inch to 2-inch	¾-inch	8-inches
2-1/2-inch to 6-inches	1-1/4-inch	12-inches

3. PLUMBING Systems: Provide color-coded identification markers in compliance with the following schedule with contrasting letters.

Service:	Identification:	Color Code: (Background/Lettering)
Potable Cold Water	Domestic Cold Water - Safe	Green/Black
Potable Hot Water	Domestic Hot Water - Safe	Green/Black
Potable Recirculation Water	Domestic Recirculation Water - Safe	Green/Black
Non-Potable Water	Unsafe Water	Yellow/Black
Sanitary Waste	Sanitary	Gray/White
Sanitary Vent	Vent	Gray/White

4. Protection Guards: Provide Armstrong Armaflex 2000 white elastomeric insulation.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Inspect site conditions before starting preparatory work and verify that actual conditions are known and acceptable before starting work. Be familiar with the work of other sections, separate contractors, and the Owner.

B. Inspect areas where piping, conduit, ductwork, fixtures and equipment will be installed and verify adequate space is available for access, service and removal of equipment. Coordinate with the Work of other Sections.

C. Notify the Architect immediately when the removal of existing ceilings, walls, or obstructions reveal conditions substantially different from the Contract Documents.

3.2 PREPARATION:

A. Perform coordination with the work of other Sections and prepare composite coordination drawings as specified in this Section before starting installation work of Division 22.

B. Verify points of connection to existing systems and confirm that required system shutdowns are acceptable with the Owner before proceeding with any related installation work.

3.3 CORE DRILLING:

A. Do not core new concrete structure without written approval from the Engineer.

B. Perform all core drilling required for the proper installation of the work of Division 22. Locate all required openings and prior to coring coordinate the opening with the other Trades and obtain approval from the Engineer.

C. 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 Owners satisfaction with no additional expense to the Owner.

3.4 CUTTING AND PATCHING:

A. Cutting and patching shall be performed under other Sections. Locate all other than cored openings required for the installation of the mechanical piping systems. Coordinate the opening with the work of the other trades so as not to interfere with the work of other Sections. Thoroughly investigate the existing conditions in the vicinity of the required openings as much as possible.

B. Patching of the existing walls around openings shall be performed by the respective trade responsible for the finish material in which the opening is made.

3.5 SLEEVES AND PENETRATIONS:

A. Coordination: Closely Coordinate electrical conduit, mechanical piping and ductwork penetrations through floor slabs and fire rated walls with the other Sections of Division 22 and the requirements of Division 7. Penetrations through fire rated construction shall consist of a complete rated assembly.

1. UL -Listed through Penetration Components: In addition to the fire stop caulking provided under Division 7, the components of a fire-rated through penetration assembly include the piping size and material, annular space, and insulation type, density and thickness.

2. Prepare a schedule of UL Through Penetration System numbers for submission and approval.

B. Set sleeves in position in advance of concrete work. Provide suitable reinforcing around sleeves.

C. Extend sleeves through Mechanical Room and other potentially wet floors at least 4-inches above finished floor level and provide pipe support sleeve.

D. Install cast brass chrome plated escutcheons where piping passes through finished surfaces.

E. Provide vertical flush wall cleanouts on the base of stacks just above the wainscot.

3.6 GENERAL INSTALLATION REQUIREMENTS:

A. General: Coordinate with the work of other trades before starting installation. Install materials and equipment in accordance with the Manufacturers latest printed installation instructions and the product NRTL listing requirements.

1. Install piping straight, plumb and form right angles on parallel lines with building walls. Locate groups of pipes parallel to each other. Provide sufficient spacing for insulation and valve access.

2. Install systems as high as possible to maximize ceiling heights.

3. Pipe shall be free from scale and dirt. Protect open ended pipe ends to prevent debris from entering. All piping shall be reamed free of burrs.

4. Locate valves for easy access and operation. Install valve stems above the horizontal.

5. Piping connections to equipment shall be made with off-sets provided with isolation valves, unions of flanges arranged so that equipment can be serviced or removed without dismantling.

6. Provide for expansion and contraction in all piping systems to prevent undue strains on piping or equipment. Provide double off-sets at risers to take up expansion.

7. Install equipment with care to minimize damage to shop applied finishes. Replace or repair damaged components or finishes incurred during shipping and installation to the Owners satisfaction.

8. Thoroughly clean items before installation. Cap pipe openings to exclude dirt until fixtures are installed and final connections have been made.

9. Cut pipe accurately and work into place without springing or forcing, and properly clearing windows, doors, and other openings.

10. Show no tool marks or threads on exposed plated, polished, or enameled connections from fixtures. Tape all finished surfaces to prevent damage during construction.

11. Make changes in directions with fittings, make changes in main sizes with eccentric reducing fittings. Install water supply and return piping with straight side of eccentric fittings at top of the pipe.

12. Run piping concealed above ceilings and within furred spaces. Take special care to locate stacks and risers within pipe chases as indicated on the Architectural Drawings. Obtain approval from the Architect for piping locations which require furrings not indicated on the Contract Drawings.

13. Install equipment and components to minimize noise and vibration transmission to the structure. Provide vibration isolators and flexible connectors for all vibrating equipment.

14. Provide sufficient swing joints, ball joints, expansion loops, and devices necessary for a flexible piping system.

15. Support piping independently at pumps, tanks and similar locations, so that weight of piping will not be supported by the equipment.

16. Pipe the drains from pump glands, drip pans, relief valves, air vents and similar locations, to spill through an air gap into a floor drain.

17. Securely bolt all equipment, isolators, hangers, and similar items in place.

18. Provide complete dielectric isolation between ferrous and non-ferrous metals.

19. Do not install plastic piping systems when the ambient temperature is below 60 degrees F.

20. Provide Armstrong Armaflex 2000 white insulation on pipe hangers, and to the sharp edges of mechanical systems when located below 6-foot 8-inches above the floor.

21. Insulating Clamps: Provide IPS Corp. Strap-Tite insulating clamps on uninsulated copper piping installed through metal stud perforations.

22. Install escutcheons for piping penetrations of walls, ceilings, and finished floors. Install escutcheons with ID to closely fit around pipe, tube and insulated pipe and with OD that completely covers opening.

23. Install floor plates for piping penetrations of equipment room floors. Install floor plates with ID to closely fit around pipe, tube and insulation of piping and with OD that completely covers opening.

B. Equipment Access for Maintenance and Removal:

1. Install piping, equipment and accessories to permit access for maintenance as specified by the equipment manufacturer. Provide adequate clearance to disconnect equipment for removal. Locate valves and unions so additional piping removal is not necessary to remove equipment. Coordinate piping and equipment locations with all trades to ensure adequate clearance is maintained for equipment maintenance and removal.

2. Relocate items as necessary to provide access for maintenance and removal without additional cost to the Owner.

3.7 IDENTIFICATION OF PIPING AND EQUIPMENT:

A. Piping: Install pipe and conduit identification markers in compliance with ANSI A13.1 on each side of wall penetrations, at each valve, at tee fittings, behind access panels and base of risers. Spacing of markers shall not exceed 20 feet and shall include at least one marker in each room. Ensure that markers are visible from 4-foot 6-inches to 6 feet above the finish floor.

1. Install markers on painted piping only after painting is complete and has been accepted by the Architect. Install marker adjacent to access panels where piping is concealed.

B. Equipment: Stencil equipment such as pumps, water heaters, and tanks with the name of the equipment and equipment number. Coordinate equipment numbers with the Owner's maintenance personnel. Stencils shall be at least 6-inches high and of a color to provide a contrast with the equipment finish.

C. Equipment markings shall be prominently displayed on each normally visible side of equipment. Equipment intended for installation in finished area shall have markings located behind normally used access panels mounted so as to be readily found. Equipment identification designations shall be taken from equipment schedules as indicated on the Drawings.

3.8 SCAFFOLDING, HOISTING, RIGGING AND STAGING:

A. Provide scaffolding, hoisting, rigging, conveyance apparatus and staging in as required to perform the work specified in the Plumbing sections of Division 22.

3.9 RECORD DOCUMENTS:

A. Project Progress and Record Drawings: Comply with the appropriate Section of Division 1 governing Project Record Documents and the additional requirements of this Section.

1. Maintain a daily record of the project construction progress by coloring the work completed on the white prints furnished by the Owner at the commencement of the work.

2. Modify the equipment schedules to reflect data consistent with that of the installed equipment. Clearly show all changes to the work as a result of addenda, change orders, clarifications, instructions issued by the Architect or conditions encountered in the field. Accurately indicate the location, size, type and elevation of new work and their relationship to existing work. Provide dimensions from permanent site improvements or column centerlines.

3. The marked up and colored in prints will be used as a guide for determining the progress of the work installed. They shall be inspected weekly and shall be corrected immediately if found inaccurate or incomplete. Requisitions for Payment will not be approved until the Drawings are accurate and up-to-date.

B. At the completion of the work submit one set of the marked-up prints for review and acceptance. After acceptance, these marked up record prints shall be used to prepare the Owner's final Record Drawings.

C. Maintain the established layering, color and pen thickness scheme on modified electronic drawing files.

D. Make all modifications on the AutoCAD or Revit Drawing files indicated on the approved marked up set of Record Drawings. Remove all superseded data to show the completed installation.

E. The final approved AutoCAD or Revit Record Drawing files shall become the property of the Owner.

F. Deliver the completed Record Documents properly titled and dated to the Architect. These Record Documents shall become the property of the Owner.

3.10 SYSTEM START-UPS AND INSTRUCTIONS:

A. Start-Ups: Perform system and equipment start-ups in accordance with the manufacturers' printed start-up instructions in the presence of the manufacturers' representatives.

3.11 CONSTRUCTION CERTIFICATIONS AND AFFIDAVITS:

A. Engineer's Responsibility: During construction the Engineer is responsible for the following services as defined by the Massachusetts State Building Code, 780 CMR Section 107.2:

1. Review, for conformance to the design concept, shop drawings, samples and other submittals, which are submitted by the contractor in accordance with the requirements of the construction documents.

2. Review and approval of the quality control procedures for all code-required controlled materials.

3. Be present at intervals appropriate to the stage of construction to become, generally familiar with the progress and quality of the work and to determine, in general, if the work is being performed in a manner consistent with the construction documents.

B. Contractor's Responsibility: The Contractor is solely responsible for the completion of the work on schedule and in compliance with the Contract Documents and the applicable codes; and for scheduling sufficient time for all required testing and submissions and approvals.

1. Construction Affidavits: If upon the completion of the construction, the Building Official requires Affidavits from a Professional Engineer stating that the Contractor's work is in accordance with the approved construction documents and with applicable local, state and federal statues and regulations as required by 780 CMR 107.3, the Contractor shall retain the services of a qualified Registered Professional Engineer to be on site during construction.

2. Submission Schedule: Allow sufficient time for the initial submission; Architect/Engineer review; resubmission; and final review and approval of all documents required for acceptance of the request for a Certificate of Occupancy in accordance with 780 CMR 111.

3. Testing Schedule: Allow sufficient time for the initial testing, adjustments, and final functional operational testing of all fire protection systems as outlined in the Fire Protection Narrative.

C. Construction Certifications: After the Contractor submits signed Certifications of Compliance as required by the Massachusetts State Building Code, 780 CMR, Section 107.3, and complies with the requirements of 780 CMR 111, the responsible engineers will provide written certifications to confirm that to the best of the engineer's knowledge, information, and belief, the finished work is in compliance with the approved drawings issued for permit.

1. Prior to submission of the final signed Certifications of Compliance, the Contractor shall submit written responses to all punch list items submitted by the design team.

2. The Engineer will not submit certifications until all required certifications of testing, compliance and completion of punch list items have been submitted to the Engineer.

3.12 ADDITIONAL REQUIREMENTS FOR THE COMPLETION OF THE PROJECT

Ninth Edition 780 CMR 107.6 Construction Control Document

Construction Contractor Services Certification Pursuant to Section 107.6.3

Name of Contractor: _____

If a Corporation, name of responsible Corporate Officer:

_____

If a DBA or Partnership, name of individual:

_____

I hereby certify that, to the best of my knowledge and belief, construction performed under permit number _____ issued on _____ has been completed in substantial accord with the approved construction documents, with all pertinent deviations specifically noted per Section 107.6.3 of the Massachusetts State Building Code (780 CMR), 9th Edition Base Volume.

Name of Project: _____

Address of Project: _____

List of Pertinent Deviations:

_____

_____

_____

_____

_____

Print Name: _____

Signature: _____

Date: _____

Notarized by: _____

Standard Notary Statement:
This document shall be submitted to the ***Responsible Registered Design Professional*** (RDP) and, when requested, to the Building Official in accordance with 780 CMR section 107.6.3 (9th edition) at the completion of all construction projects performed pursuant to 780 CMR Section 107.6 ***Control Construction***.

REQUIREMENTS FOR THE ISSUE OF PLUMBING
FINAL CONSTRUCTION AFFIDAVIT
Cover Sheet

All required documents shall be provided as a single submission attached to this sign off sheet.

The Plumbing Contractor shall provide notarized certificates of completion for the work done by the Contractor and each of the sub subs including but not limited to (form attached):			
	Attached (Y, N, NA)	Date	Signature
Signed off and stamped Post Construction Affidavit - Plumbing			
Automatic Temperature Control (BMS/SKADA) as needed			
Eyewash/Shower(s)			
Air Compressor(s)			
Other:			

Minimum documentation required			
	Attached (Y, N, NA)	Date	Signature
Approved pipe pressure test reports			
Approved potable water chlorination report			
Approved emergency eye wash/shower test reports			
Approved As-Builts Signed by Contractor			
Fire chief signature for duct smoke detectors (by electrical)			
Copy of Plumbing Inspector's Certificate of Inspection			
Up to date monetized punch list			
O&M manuals Check Off Sheet (form attached)			
Other:			

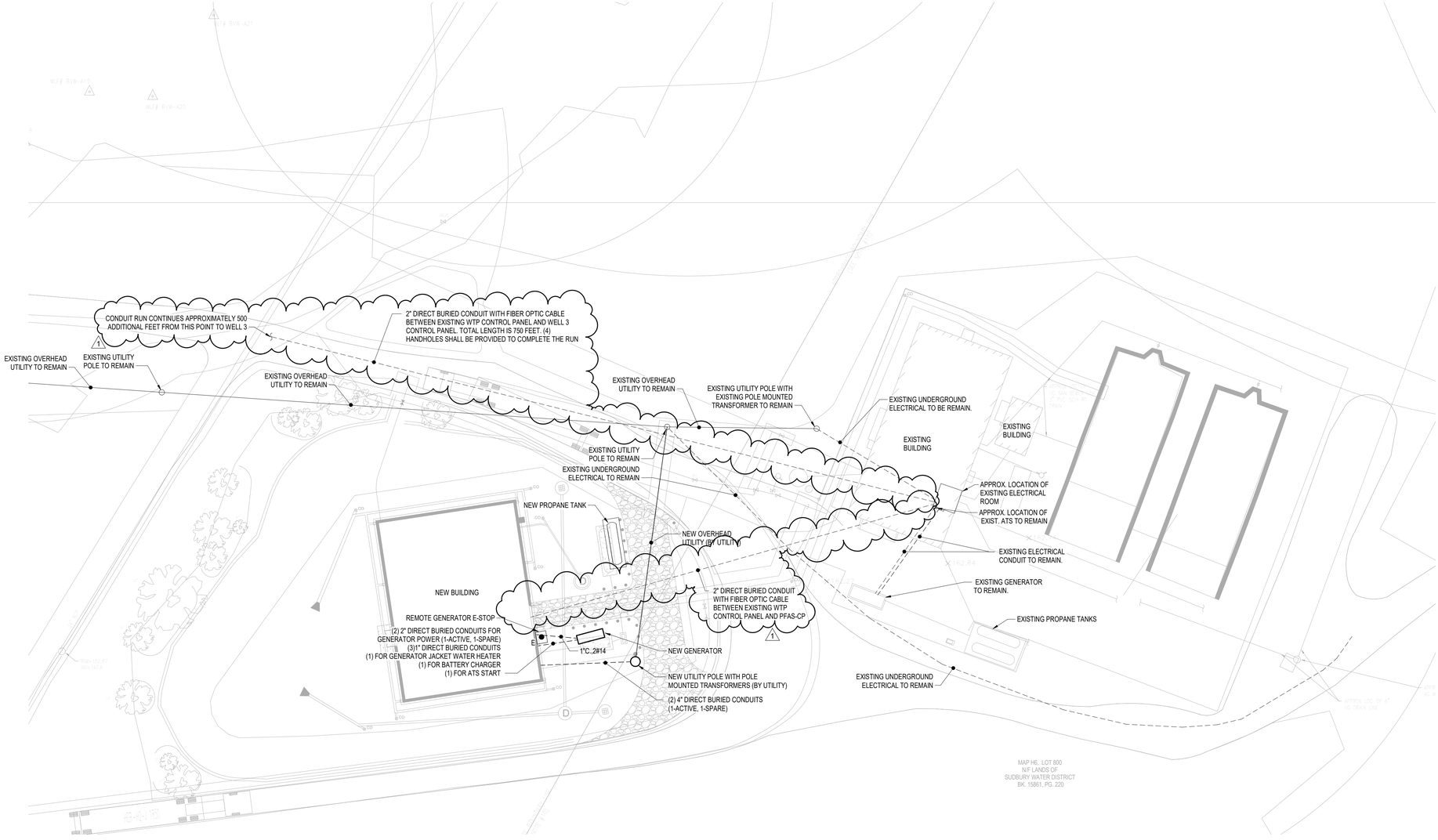
OPERATIONS & MAINTENANCE MANUALS CHECK LIST & SIGN OFF COVER SHEET

	INITIAL
All O&M's shall be assembled with dividers with tabs.	
Dividers for equipment shall be sorted by Section Number.	
O&M manuals shall include the following:	
Table of Contents	
Warranties (including subcontractors)	
Contractor contact list, normal & emergency	
Vendor contact list	
Valve tag chart	
Air Tank inspection (if OWNER's insurance or state requires)	
Hot water inspection (if OWNER's insurance or state requires)	
All equipment in project	
Record drawings including the following:	
All piping and equipment location changes from the contract documents	
Updated schedules of actual equipment installed if different from contract documents	
Valve locations and valve tag numbers	
Equipment identification numbers	
Seismic restraint locations	

END OF SECTION

DRAWING NOTES:

1. REFER TO DRAWING E001 FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES.



1 ELECTRICAL SITE PLAN
1" = 20'-0"

SCALE: 1"=20'

Project:
EAST STREET WTP PFAS TREATMENT
100 EAST STREET
SUDBURY, MA

SUDBURY WATER DISTRICT

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON

www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description
1	02/22/2024	ADDENDUM # 3

COA:

Seal:

Issued For:
BIDDING

Scale: 1" = 20'-0"

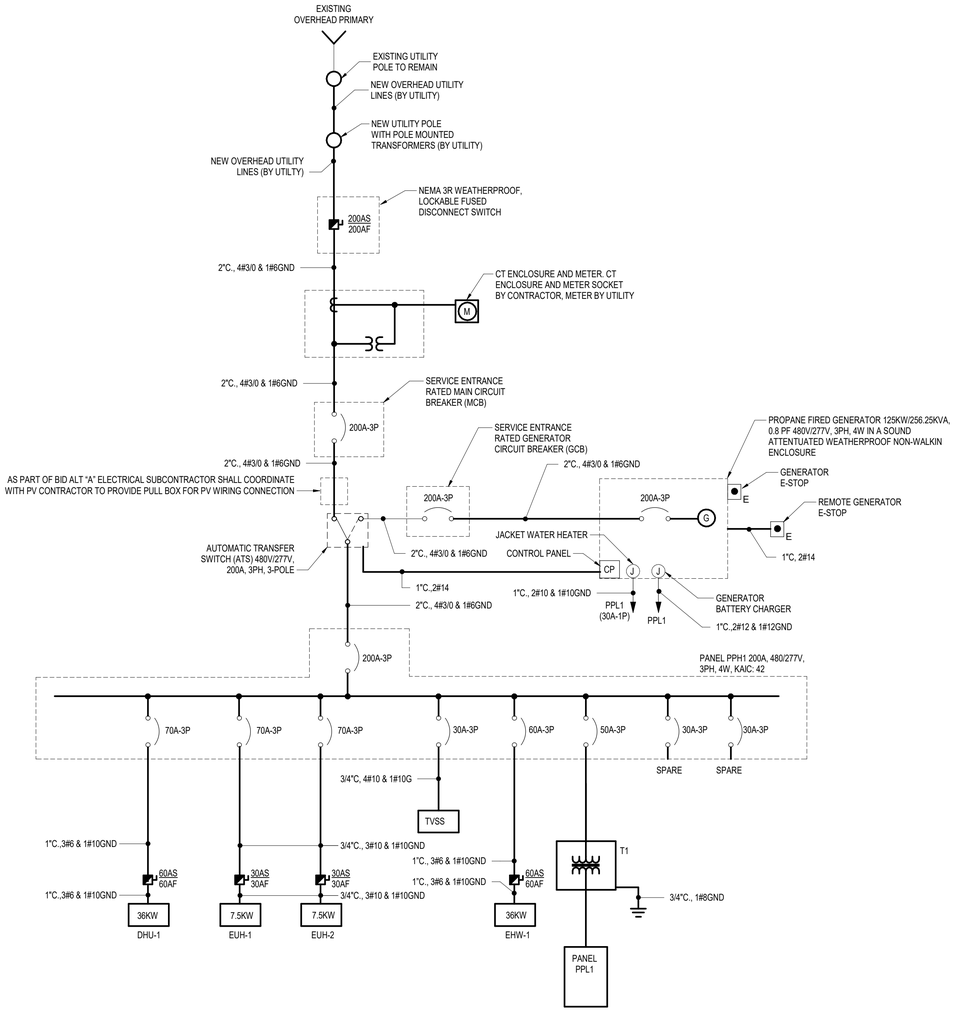
Key Plan:

NORTH

Date:	10/27/2023
Drawn By:	DM
Reviewed By:	RFM
Approved By:	RFM
W&S Project No.:	ENG22-1213
W&S File No.:	XXX

Drawing Title:
ELECTRICAL SITE POWER PLAN

Sheet Number:
E002



1 E601 Electrical One Line
NOT TO SCALE

LIGHTING FIXTURE SCHEDULE

TYPE	DESCRIPTION	MFR	CATALOG NUMBER	LAMP COLOR	LAMP LUMENS	MOUNTING	VOLTAGE	WATT	NOTE
P3	1' X 4' PENDANT MOUNTED ENCLOSED AND GASKETED, VAPORTIGHT LED FIXTURE		---	3500K	11000 lm	PENDANT	120 V	82 W	
P3E	1' X 4' PENDANT MOUNTED ENCLOSED AND GASKETED, VAPORTIGHT LED FIXTURE WITH EMERGENCY LED DRIVER		4VT2-LD5-11-DR-UNV-EL10W-L835-CD 1-WL-U-VT2-CHAIN/SET-U	3500K	11000 lm	PENDANT	120 V	82 W	
S2	1 X 4 ENCLOSED AND GASKETED LED FIXTURE WITH INTEGRAL EMERGENCY LED DRIVER	COOPER LIGHTING	4VT2-LD5-4-DR-UNV-L835-CD1-WL-U	3500K	4000 lm	SURFACE	120 V	56 W	
S2E	1 X 4 ENCLOSED AND GASKETED LED FIXTURE WITH INTEGRAL EMERGENCY LED DRIVER	COOPER LIGHTING	4VT2-LD5-4-DR-UNV-EL10W-L835-CD1 -WL-U	3500K	4000 lm	SURFACE	120 V	56 W	
SW1	WALL MOUNTED LED FIXTURE	COOPER LIGHTING	GLEON-SA1-B-740-U-T3-WM-BZ	4000K	1313 lm	WALL	120 V	44 W	

LIGHTING CONTROL PANEL "LCP1"

RELAY	DESCRIPTION	CIRCUIT	VOLTAGE	Switch ID	NOTE
1	FILTER ROOM	PPL1-1	120 V	a	
1	FILTER ROOM		120 V	d	
4	MECH ROOM	PPL1-2	120 V	d	
5	CHEM STORAGE	PPL1-2	120 V	e	

PANELBOARD: PPL1

LOCATION: FILTER ROOM 101 — **VOLTAGE:** 208Y/120 V. 3 ø 4 W.
MOUNTING: SURFACE NEMA 1 — **A.I.C. RATING:** 10,000 AMPS SYMMETRICAL
MAIN DEVICE: 100 A MAIN CB — **SPECIAL:**
BUS AMPS: 100 AMPS

LOAD DESCRIPTION	BKR	P	CKT	PHASE A kVA		PHASE B kVA		PHASE C kVA		CKT	P	BKR	LOAD DESCRIPTION
LITES FILTER ROOM 101	20 A	1	1	1.0	0.3					2	1	20 A	Lighting Mech Rm, Chem...
Lighting Exterior	20 A	1	3			0.1	0.0			4	1	20 A	RCPT
RCPT FILTER ROOM 101	20 A	1	5					0.0	0.0	6	1	20 A	RCPT MECH ROOM 102
OUTDOOR RECEPT	20 A	1	7	0.0	0.0					8	1	20 A	RCPT FILTER ROOM 101
LITES Space 104	20 A	1	9			0.4	0.2			10	2	20 A	FCU-1 HVAC
FCU-3 HVAC	20 A	2	11					0.2	0.2	12			
			13	0.2	0.2					14	2	20 A	FCU-4 HVAC
EF-2 HVAC CHEM...	20 A	1	15			0.4	0.2			16			
EF-3	20 A	1	17					0.4	0.7	18			
CU-1HVAC FILTER ROOM	40 A	2	19	3.3	0.7					20	3	20 A	CU-2 HVAC MECH ROOM
			21			3.3	0.7			22			
FCU-2 HVAC FILTER ROOM	20 A	2	23					0.2	1.4	24	1	20 A	EF-1 HVAC FILTER ROOM
			25	0.2	0.4					26			
RP-1	20 A	1	27			0.0	0.4			28	3	20 A	ERV-1
AIT-400, 410 & 420	20 A	1	29					0.0	0.4	30			
1			31							32			
			33							34			
			35							36			
			37							38			
			39							40			
			41							42			
	TOTAL LOAD:			6 kVA		6 kVA		4 kVA					
	TOTAL AMPS:			56 A		51 A		29 A					

LOAD CLASSIFICATION	CONNECTED	DEMAND	ESTIMATED	PANEL TOTALS	
HVAC	13877 VA	100.00%	13877 VA		
Other	0 VA	0.00%	0 VA	CONNECTED LOAD:	15716 VA
RCPT	0 VA	0.00%	0 VA	ESTIMATED DEMAND:	16063 VA
LITES	1422 VA	125.00%	1778 VA	CONNECTED CURRENT:	44 A
Lighting	475 VA	100.00%	475 VA	EST. DEMAND CURRENT:	45 A

NOTES:

DRY TYPE TRANSFORMER SCHEDULE 480-120/208V

SIZE	KVA	PRIMARY AMPS	SECONDARY AMPS	480 VOLT OVERCURRENT	208 VOLT OVERCURRENT	480V FEEDER CODE	120/208V FEEDER CODE	GROUND SIZE
T1	30	36	83	50A, 3P	100A, 3P	3/4"C., 3#10 & 1#10GND	1 1/4"C., 4#3 & 1#8GND	#8-3/4"C

HVAC EQUIPMENT SCHEDULE

NO.	DESCRIPTION	LOCATION NAME	LOCATION NUMBER	LOAD HP	LOAD A	LOAD W	VOLT	PHASE	Panel	Circuit Number	CONDUIT & WIRE SIZE	THERMAL MOTOR SWITCH	MOTOR STARTER	VFD	RECEPTACLE	JUNCTION BOX	NON-FUSED DISCONNECT	FUSED DISCONNECT	NOTES
CU-1	HEATING			0.00 hp	32 A	5990 W	208 V	1	PPL1	19,21	3/4"C., 2#8 & 1#10GND							40AS/40AF	1
CU-2	DEHUMIDIFIER			0.00 hp	6 A	1920 W	208 V	3	PPL1	18,20,22	3/4"C., 3#12 & 1#12GND							30AS/20AF	1
EF-1	EXHAUST	FILTER ROOM	101	1.00 hp	12 A	1242 W	120 V	1	PPL1	24	3/4"C., 2#12 & 1#12GND	X		X		X			2
EF-2	EXHAUST	CHEM STORAGE	103	0.25 hp	4 A	378 W	120 V	1	PPL1	15	3/4"C., 2#12 & 1#12GND	X		X		X			2
EF-3	EXHAUST	MECH ROOM	102	0.25 hp	4 A	378 W	120 V	1	PPL1	17	3/4"C., 2#12 & 1#12GND	X		X		X			2
ERV-1	VENTILATION AIR	FILTER ROOM	104	0.52 hp	3 A	960 W	208 V	3	PPL1	26,28,30	3/4"C., 3#12 & 1#12GND							30AS/20AF	2
EWH-1	ELECTRIC WATER HEATER	MECH ROOM	102	0.00 hp	43 A	32398 W	120 V	1			1"C., 3#6 & 1#10GND							60AS/60AS	
FCU-1	HEATING	FILTER ROOM	101	0.00 hp	2 A	399 W	208 V	1	PPL1	10,12	3/4"C., 2#12 & 1#12GND							30AS/20AF	2
FCU-2	HEATING	FILTER ROOM	101	0.00 hp	2 A	399 W	208 V	1	PPL1	23,25	3/4"C., 2#12 & 1#12GND							30AS/20AF	2
FCU-3	HEATING	FILTER ROOM	101	0.00 hp	2 A	399 W	208 V	1	PPL1	11,13	3/4"C., 2#12 & 1#12GND							30AS/20AF	2
FCU-4	HEATING	FILTER ROOM	101	0.00 hp	2 A	399 W	208 V	1	PPL1	14,16	3/4"C., 2#12 & 1#12GND							30AS/20AF	2
RP-1	CARTRIDGE CIRCULATOR	MECH ROOM	102	0.00 hp	0 A	27 W	120 V	1	PPL1	27	3/4"C., 2#12 & 1#12GND								

MECHANICAL EQUIPMENT SCHEDULE NOTES:

1. STARTERS, VFD'S AND DISCONNECT SWITCHES SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR, INSTALLED AND WIRED BY THE ELECTRICAL CONTRACTOR
2. STARTERS, VFD'S AND DISCONNECT SWITCHES SHALL BE FURNISHED AS PART OF THE MECHANICAL EQUIPMENT FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR, WIRED BY THE ELECTRICAL CONTRACTOR.
3. STARTERS, VFD'S AND DISCONNECTS SHALL BE FURNISHED, INSTALLED AND WIRED BY THE ELECTRICAL CONTRACTOR.
4. ELECTRICAL CONTRACTOR SHALL COORDINATE EXACT FUSE SIZE AND OVERCURRENT PROTECTION FOR ALL MECHANICAL EQUIPMENT WITH MANUFACTURERS RECOMMENDATIONS.

Project:
EAST STREET WTP PFAS TREATMENT
100 EAST STREET
SUDBURY, MA

SUDBURY WATER DISTRICT

Weston & Sampson
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description
1	02/22/2024	ADDENDUM # 3

COA:

Seal:

Issued For:
BIDDING

Scale: NTS

Key Plan:

NORTH

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