SECTION 22 00 05

PLUMBING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified, and required to furnish and install potable water, sanitary drainage, storm drainage and gas piping systems complete and operational with accessories.

B. Coordination:
   1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before, the plumbing Work.

C. Related Sections:
   1. Section 09 91 00, Painting.
   2. Section 40 05 31, Thermoplastic Process Pipe.

1.2 REFERENCES

A. Standards referenced in this Section are listed below:
   1. ANSI A21.1, Practice Manual, Computation Strength, Thickness.
   2. ANSI A21.4, Cement-Mortar Lining/Cast and Ductile Iron Pipe and Fittings.
   3. ANSI A21.10, Cast-Iron and Ductile Iron Fittings, 2 thru 48 in. Water.
   4. ANSI A21.11, Rubber Gasket Joints Cast and Ductile Iron Pressure Pipe.
   5. ANSI A21.51, Ductile-Iron Pipe Centrifugal Cast, in Metal Molds.
   6. ANSI A112.19.2M, Vitreous China Plumbing Fixtures.
   7. ANSI A117.1, Accessible and Usable Buildings and Facilities.
   8. ANSI B16.9, Factory-Made Wrought Buttwelding Fittings.
   9. ANSI B16.12, Cast-Iron Threaded Drainage Fittings.
   10. ANSI B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
   11. ANSI B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings. (ASME B16.22).
   12. ANSI B16.24, Cast Copper Alloy Pipe Flanges and Flanged Fittings, Class 150 and 300 lbs. (ASME B16.24).
   13. ANSI B16.26, Cast Copper Alloy Fittings for Flared Copper Tubes.
   14. ANSI B16.33, Manually Operated Metallic Gas Valves for Use in Gas Piping Systems Up to 125 PSI (Sizes NPS 1/2 through NPS 2). (ASME B16.33).
   15. ANSI B16.39, Malleable Iron Threaded Pipe Unions.
   16. ANSI B16.42, Ductile Iron Pipe Flanges and Flanged Fittings.

17. ANSI B40.1, Gages-Pressure Indicating Dial Type-Elastic Element.
18. ANSI B125.2, Black and Hot-Dipped Zinc-Coated Welded and Seamless Pipe, (ASTM A 120).
19. ANSI H23.1, Seamless Copper Water Tube, (ASTM B 88).
20. American Society of Sanitary Engineering (ASSE), ASSE 1013, Performance Requirements for Reduced Pressure Principle Backflow Preventers and Reduced Pressure Fire Protection Principle Backflow Preventers.
21. ASTM A 53/A 53M, Specification for Pipe, Steel, Black and Hot Dipped, Zinc-Coated, Welded and Seamless Pipe.
22. ASTM A 74, Specification for Cast-Iron Soil Pipe and Fittings.
23. ASTM A 106/A 106M, Specification for Seamless Carbon Steel Pipe for High-Temperature Service.
24. ASTM A 307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
25. ASTM A 888, Specification for Hubless Cast-Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications.
26. ASTM B 32, Specification for Solder Metal.
27. ASTM B 88, Specification for Seamless Copper Water Tube.
28. ASTM C 564, Specification for Rubber Gaskets for Cast-Iron Soil Pipe and Fittings.
29. ASTM D 1330, Specification for Rubber Sheet Gaskets.
30. AWWA C511, Reduced-Pressure Principle Backflow Prevention Assembly.
31. CISPI 310, Specification for Coupling for use in Connection with Hubless Cast-Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications.
32. CISPI HSN, Specification for Neoprene Rubber Gaskets for Hub and Spigot Cast 300N Soil Pipe and Fittings.
33. FS O-F-506, Flux, Soldering: Paste and Liquid.
34. FS WW-H-171, Hangers and Supports, Pipe.
35. FS QQ-C-40, Calking Lead Wool and Lead Pig.
36. FS WW-P-541/1, Plumbing Fixtures (Water Closet).
37. FS WW-U-516, Unions, Brass or Bronze, Threaded Pipe Connections and Solder-Joint Tube Connections.
38. FS WW-U-531, Unions, Pipe, Steel or Malleable Iron; Threaded Connection.
39. Manufacturers Standardization Society (MSS), MSS SP 69, Pipe Hangers and Supports – Selection and Application.
40. NFPA 54, Nation Fuel Gas Code.

1.3 QUALITY ASSURANCE

A. Installer's Qualifications:
   1. Engage installer regularly engaged in plumbing piping installation and with experience in the installation of the types of materials required; and who agrees to employ only tradesmen with specific skill and experience in this type of Work. Submit name and qualifications to ENGINEER.

2. Engage installers for the entire plumbing piping systems with undivided responsibility for performance and other requirements.

B. Regulatory Requirements: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
   1. National Electrical Code, (NEC).
   2. Local and State Building Codes and Ordinances.
   3. Westchester County Department of Health (WCDOH).
   4. Westchester Joint Water Works (WJWW).

C. Component Supply and Compatibility:
   1. Obtain all equipment included in this Section regardless of the component manufacturer from a single plumbing manufacturer.
   2. The plumbing manufacturer to review and approve or to prepare all Shop Drawings and other submittals for all components furnished under this Section.
   3. All components shall be specifically constructed for the specified service conditions and shall be integrated into the overall assembly by the plumbing manufacturer.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Shop Drawings:
      a. 1/4-inch scale piping layouts, dimensioned to show length of piping runs, pipe sizes, support spacing and expansion provisions.
      b. Details of installation, including piping supports.
      c. Submit pipe schedule with laminate construction, sizes, thickness, vacuum pressure, weight per foot pressure, spans, joint type and flange data.
   2. Product Data:
      a. Manufacturer's literature, illustrations, specifications and engineering data.
      b. Flexible connections.
      c. Additional technical data related to the specified material and equipment as requested by ENGINEER.
      d. Gasket material.

B. Informational Submittals: Submit the following:
   1. Qualifications Statements:
      a. Installer's qualifications.

C. Closeout Submittals: Submit the following:
   1. Operation and Maintenance Data:
      a. Submit operation and maintenance manuals including test reports, maintenance data, and schedules, description of operation, and spare parts information for the backflow preventer and heated enclosure.

b. Provide operation and maintenance manuals per Section 01 78 23, Operations and Maintenance Data.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading:
   1. Deliver materials to the Site to ensure uninterrupted progress of the Work. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete, in ample time to prevent delay of the Work.

B. Storage and Protection:
   1. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.
   2. Store all equipment in covered storage off the ground and prevent condensation and in accordance with the manufacturer's recommendations for long-term storage.

C. Acceptance at Site:
   1. All boxes, crates and packages shall be inspected by CONTRACTOR upon delivery to the Site. CONTRACTOR shall notify ENGINEER, in writing, if any loss or damage exists to equipment or components. Replace lost equipment or components and repair damage to new condition, in accordance with manufacturer's instructions

1.6 GENERAL REQUIREMENTS

A. The Contract Documents show the general arrangement and extent of the Work to be completed. The exact location and arrangement of all parts shall be determined as the Work progresses. The exact location of all parts of the Work must be governed by the general building plans and the actual building conditions.

B. The Drawings show an indication of the arrangement of equipment, ducts, valves, etc., and are as nearly correct as can be determined in advance of the actual construction of the Work. Piping, equipment, ducts, etc., found to interfere with the construction of the building, plumbing apparatus and piping, electrical wiring or other obstructions, etc., must be changed in location to clear such obstructions.

C. The connections shown to the various units are intended as an indication only. The actual connections at the time of installation to be made and arranged to suit the requirements of each case, adequately provide for expansion and perfect circulation and minimize the amount of space required for the same.

D. The Drawings show the general arrangement of all systems. Should local conditions necessitate rearrangement of one or more of the systems,

CONTRACTOR, before proceeding with the Work, shall prepare and submit complete drawings showing all details of the proposed rearrangement for written approval by the ENGINEER.

E. The Drawings do not show all offsets, fittings, accessories and details, which may be required. CONTRACTOR shall carefully examine all of the General Construction, Electrical, Mechanical, Structural and other Drawings and the respective Specifications for conditions which may affect the installation of the Work, and shall arrange the Work accordingly, furnishing all required items to meet such conditions which are not specified as work "by others", to complete the systems to the true extent of the Contract Documents.

PART 2 - PRODUCTS

2.1 HOT AND COLD WATER PIPING

A. Copper Water Tube:
   1. Tube:
      a. Reference: ANSI H23.1, ASTM B 88.
      b. Type: K or L.
      c. Temper: Hard-drawn or soft-annealed.
   2. Fittings:
      a. Reference: ANSI B16.22.
      b. Reference: ANSI B16.26.
      c. Reference: ANSI B16.18.
   3. Joints:
      a. Sweat:
         1) Solder Metal: ASTM B 32, Type 95-5TA.
         2) Flux: FS O-F-506, Type 1.
      b. Flanged:
         1) Flanges: ANSI B16.24, 150 lb. class.
         2) Gaskets: Red rubber, ASTM D 1330, Grade 1, 1/8-inch thick.
         3) Nuts and Bolts: ASTM A 307.
   4. Unions:
      a. Reference: FS WW-U-516.
      b. Material: Bronze.
      c. Rating: 250-pound W.O.G.

B. Dielectric Couplings:
   1. Manufacturers: Provide products of one of the following:
      a. Watts Regulator Company.
      b. Epco Sales, Incorporated.
      c. Or equal.
   2. Type: Union or flange.
   3. Ratings:
      a. Unions: 250 psi, ANSI B16.39.
      b. Flanges: 175 psi, ANSI B16.42 (Iron), ANSI B16.24 (Bronze).

2.2 VALVES AND ACCESSORIES

A. Bronze Body Globe Valves:
   1. Products and Manufacturers: Provide one of the following:
      a. Stockham Valves and Fittings, Fig. No. B-24.
      b. Lunkenheimer Company, Fig. No. 126.
      c. Or equal.
   2. Type: Composition disc, union bonnet.
   3. Materials: Brass and bronze.
   4. Rating: 150 lb. SWP.
   5. End Connections: Solder joint.

B. Bronze Body Check Valves:
   1. Products and Manufacturers: Provide one of the following:
      a. Stockham Valves and Fittings, Fig. No. B-309.
      b. Lunkenheimer Company, Fig. No. 2145.
      c. Or equal.
   2. Type: Swing, regrinding bronze disc, screw-in cap.
   3. Materials: Brass and bronze.
   4. Rating: 150 lb. SWP.
   5. End Connections: Solder joint.

C. Bronze Body Ball Valves:
   1. Products and Manufacturers: Provide one of the following:
      a. Stockham Valves and Fittings, Fig. S-217 BR-R-T.
      b. Lunkenheimer Company, Fig. 707-XLT.
      c. Or equal.
   2. Type: Non-blowout stem, adjustable packing gland, quarter turn, full port ball valve.
   3. Materials:
      a. Body: Cast bronze.
      b. Ball: Chrome plated brass.
      c. Packing and Seats: Teflon.
   4. Rating: 150 lb. SWP.
   5. End Connection: Screwed. Provide screwed to sweat adapters, where required.

D. Lubricated Stop Cocks (Up to 2-inches):
   1. Manufacturers: Provide products of one of the following:
      a. Eclipse Fuel Engineering Company.
      b. A. Y. McDonald Manufacturing Company.
      c. Or equal.
   2. Type: Flat head.
   3. Pressure Rating: 125 lb. W.O.G.
   4. End Connections: Threaded.
   5. Construction: Iron body, bronze plug.

2.3 EQUIPMENT

A. Hose Bibbs, Pipe Drains:
   1. Products and Manufacturers: Provide one of the following:
      a. Woodford Manufacturing Company, Model 24C.
      b. Nibco, Incorporated, Fig. No. 74VB.
      c. Or equal.
   2. Valve:
      a. Type: Indoor/non-freeze area boiler drain globe valve, chrome plated.
      b. Materials: Bronze body, screwed bonnet, renewable composition disc.
      c. End Connections: Hose thread outlet, male pipe thread or sweat inlet.
      d. Rating: 125 lbs. W.O.G.
   3. Vacuum Breaker:
      a. Type: Non-removable, atmospheric.
      b. Materials: Brass body, stainless steel trim, silicone rubber diaphragm and disc.
      c. End Connections: Hose thread inlet and outlet.

B. Pressure Gages:
   1. Manufacturers: Provide products of one of the following:
      a. Weksler Instrument Company.
      b. H.O. Trerice Company.
      c. Or equal.
   2. Reference: ANSI B40.1 for Grade AA gages.
   3. Type: Direct mounted, dial type pressure gage.
   4. Construction:
      a. Case: Six-inch diameter cast aluminum, flangeless with black finish and bottom 1/4-inch N.P.T.
      b. Ring: Chrome plated close type.
      c. Dial: White face, black numbers and graduations.
      d. Window: Glass or clear acrylic plastic.
      e. Pointer: Micrometer type, black finish, red tip.
      f. Movement: Stainless steel, rotary type, delrin sector and bushings.
      g. Bourdon Tube: Seamless phosphor bronze, Grade A over pressured and stress relieved.
      h. Socket and Tip: Forged brass, alloy steel and Type 316 stainless steel.
   5. Accuracy: One percent, minimum.
   6. Gage Cocks: Provide brass tee handle cock before each gage.

C. Backflow Preventers: RPZ-BFP:
   1. Products and Manufacturers: Provide one of the following:
      a. Febco, Model 825.
      b. Watts Regulator Company, Series 919.
      c. Or equal as listed on the List of Approved Backflow Prevention Assemblies generated by the University of Southern California Foundation for Cross Connection Control and Hydraulic Research (FCCCHR).

2. Type: Reduced pressure zone device with two independently acting check valves, together with an automatically operated pressure differential relief valve located between the two check valves.
3. Materials:
    a. Body: Bronze.
    b. Valve Discs: Buna-N rubber.
    c. Diaphragm: Silicone rubber or Buna-N rubber.
    d. Springs: Stainless steel.
    e. Screws: Stainless steel.
4. Maximum Working Pressure: 150 psi.
5. End Connections: Screwed.
6. Accessories:
    a. Air gap drain funnel with threaded outlet and vent elbow furnished by manufacturer minimum two pipe sizes larger than relief drain outlet.
    b. Strainer with blowoff on inlet.
    c. Ball valves on inlet and outlet.
    d. Reduced pressure principle backflow preventer test kit for each unit furnished, provided in molded plastic carrying case with foam inserts.
7. References: ASSE 1013, AWWA C511.

D. Hangers and Supports:
1. Manufacturers: Provide products of one of the following:
    a. ITT Grinnell Corporation.
    b. B-LINE.
    c. Or equal.
2. Type: Clamps, hooks, rods, hangers used to support plumbing piping systems from the structure.
3. Materials: Comply with the requirements of MSS SP 69, FS WW-H-171 latest edition, Underwriters' Laboratory listed and Factory Mutual approved.

E. Heated Enclosure:
1. General: Furnish and install a complete heated enclosure assembly for meters and backflow prevention as shown on the Drawings.
2. Qualifications: Manufacturer shall have a minimum of five years experience producing substantially similar equipment and shall be able to show evidence of at least five installations in satisfactory operation for at least five years.
3. Manufacturers: Provide products of one of the following:
    a. Hox Box® by Hubbell Power Systems, Inc. – Model HF026070045
    b. Or equal.
4. Enclosure:
    a. Provide flip top cover.
    b. Enclosure assembly shall be shipped fully assembled.
    c. Provide lockable enclosure.
    d. Provide drain ports sized for full port backflow discharge and that are designed for one way operation allowancing backflow discharge but not allowing wind, debris, and small animals to enter the enclosure.
    e. Minimum vertical load: 100 lbs/sf.

f. Minimum wind speed: 120 mph.
g. Enclosures to be ASSE 1060 certified.

5. Materials:
   a. Fiberglass Enclosure: Minimum 1/8-inch thick Thixotropic polyester resin reinforced with fiberglass strand. Provide smooth yacht quality finish protected with UV inhibited isophthalic polyester gel coat.
   b. Non molded products will utilize an Industrial exterior texture.
   c. No wood or particle board to be used in the construction.
   d. Insulation shall be 1”-1.5" unicellular, non-wicking, polyisocyanate foam frothed or sprayed in place.
   e. The Insulation shall have the following properties:
      1) R-Value: 8
      2) Dimensional Stability: Less than 2% linear change.
      3) Compressive Strength: 51 psi.
      4) Flame Point: 325 degrees.
      5) Water Adsorption: 0.037 psf.
      6) Porosity: 91%.
6. Heating Equipment:
   a. Provide heating equipment to protect piping and equipment from exterior temperatures of -30 degrees F.
   b. ETL listed thermostatically controlled wall mounted air forced heaters or UL listed self regulating cable(s) shall be furnished and designed by the enclosure manufacturer to maintain the equipment at +40◦F, in accordance with ASSE 1060 1.2.2.1.
   c. Heating equipment shall be mounted to the supplied heater plates and/or a minimum 8” above the slab unless it is UL or ETL certified and NEC approved for submersion.
   d. Power source shall be protected with a GFI receptacle, U.L. 943, NEMA 3R. Mounted a minimum of 8” from the bottom of the receptacle to the top of the slab.
   e. Separate 20 amp circuits (wall mounted) and 15 amp circuits (self regulating cables) are recommended, so in the event a circuit fails all other circuits will remain powered. Installations must be in accordance with the local and national codes.
   f. The heaters shall be UL or ETL listed for wet/damp locations.

2.4 INSULATION

A. Fiberglass Insulation:
   1. Products and Manufacturers: Provide one of the following:
      a. Owens-Corning Fiberglass Corporation, Fiberglass 25ASJ/SSL.
      b. Certain Teed Products Corporation, Certain Teed Snap-On ASJ-SSL.
      c. Or equal.
   2. Type: Heavy-density sectional pipe insulation with vapor barrier with self-sealing lap.
   3. Fire Hazard Classification:
      a. Flame Spread: 25.
      b. Fuel Contributed: 50.

c. Smoke Developed: 50.

4. Density: Three lbs. per cubic foot, minimum.
5. Fittings: Molded fiberglass.
6. Jointing Materials: Manufacturers recommended adhesives and tape.
7. Valve Insulation: Miter cut nesting size covering segments of same thickness as pipeline, for insulation of valves.

B. Calcium Silicate Insulation at Insulation Protection Shields:
   1. Products and Manufacturers: Provide one of the following:
      a. Owens-Corning Fiberglass Corporation, Kaylo 10.
      b. Johns-Manville, Thermo 12.
      c. Or equal.
   2. Type: Calcium silicate pipe insulation.
   3. Fire Hazard Classification:
      a. Flame Spread: 0.
      b. Smoke Developed: 0.
   4. Density: Fourteen lbs. per cubic foot.
   5. Compressive Strength: 140 psi.
   6. Cut insulation 1/2-inch longer than insulation shield it rests on.

2.5 PAINTING

A. Piping, equipment and accessories shall be painted in accordance with Section 09 91 00, Painting.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:
   1. Install all items as shown, specified, and as recommended by the manufacturer.
   2. Request instructions from ENGINEER, in writing, when there is a conflict between the manufacturer's recommendations and the Contract Documents.
   3. Present conflicts to ENGINEER, in writing, who will determine corrective measures to be taken.
   4. Do not modify structures to facilitate installation of piping, unless specifically approved by ENGINEER.
   5. Installation to conform to the requirements of all local and state codes.
   6. Properly plug or cap the open ends of all piping at the end of each day’s Work or other stopping point through construction. Equipment shall be tightly covered and protected against dirt, water, and chemical or mechanical damage.

3.2 FIELD QUALITY CONTROL

A. Field Tests:
   1. Fill all systems and fully test all equipment, valves, etc. in operation.
   2. Check for excessive vibration while all systems are operating.
   3. Installed systems and components will not be released to OWNER unless all systems have been tested and approved by the ENGINEER.

B. Inspection:
   1. Examine areas to receive equipment, piping, valves and accessories for:
      a. Defects that adversely affect execution and quality of the Work.
      b. Deviations beyond allowable tolerances for equipment, piping, valves and accessories.
      c. Start the Work only when conditions are satisfactory.
   2. The ENGINEER reserves the right to reject or authorize replacement of equipment, piping, valves and accessories found to be defective, blistered, cracked or deviated from allowable tolerances as described above.

3.3 ADJUSTING AND CLEANING

A. Adjusting:
   1. Adjust all controls for proper settings.
   2. While system is operable, balance all equipment, valves, dampers, etc. to achieve design conditions.

B. Cleaning:
   1. Thoroughly clean all piping, fittings, valves, equipment and accessories prior to installation.
   2. Remove all dirt, rust, dust, etc. from piping and equipment in preparation for painting.
   3. Remove and dispose of all debris and waste from the Site resulting from installation.

3.4 MATERIAL SCHEDULES

A. Piping:
   1. All potable water supply, hot and cold 2-1/2-inches and smaller, run within the interior of a building, shall be hard-drawn copper Type “L” with solder joints and connections.
   2. All potable water piping 2-1/2-inches and smaller run underground shall be soft-annealed copper Type “K” copper tubing.
   3. All exposed water piping and valves to plumbing fixtures shall be chrome-plated brass.
   4. All valves for copper or brass piping shall be bronze bodied, unless otherwise specified.
   5. Use “wrought copper” fittings for copper tubing.

+ + END OF SECTION + +

+ +THIS PAGE LEFT BLANK INTENTIONALLY + +

SECTION 22 13 33

PACKAGED SUBMERSIBLE SEWERAGE PUMP UNITS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install packaged submersible sewerage pump units complete and operational with accessories.

B. Coordination:
   1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with or before packaged submersible sewerage pump units Work.

C. Related Sections:
   1. Section 09 91 00, Painting.

1.2 REFERENCES

A. Standards referenced in this Section are:
   1. ABMA.
   2. ANSI B16.1, Cast-Iron Pipe Flanges and Flanged Fittings.
   3. ANSI B73.1, Horizontal End Suction Centrifugal Pumps for Chemicals.
   4. ANSI/HI 1.3, Standard for Centrifugal Pumps for Design and Application.
   5. ANSI/HI 1.4, Standard for Centrifugal Pumps for Installation, Operation, and Maintenance.
   6. ANSI/HI 1.6, Centrifugal Pump Tests.
   7. ANSI/HI 9.6.2, Standard for Centrifugal and Vertical Pumps for Allowable Nozzle Loads.
   8. ANSI/HI 9.8, Pump Intake Design.
   9. ANSI/HI 11.6, Submersible Pump Tests.
   10. ASTM.
   11. IEEE 112, Test Procedure for Polyphase Induction Motors and Generators.
   12. NEMA MG-1, Motors and Generators.
   13. NFPA.
   14. UL 778, Motor-Operated Water Pumps.

1.3 QUALITY ASSURANCE

A. Manufacturer’s Qualifications:
   1. Manufacturer shall have at least five years experience producing substantially similar equipment to that required and shall be able to provide

documentation of at least five installations in satisfactory operation for at least five years.

B. Component Supply and Compatibility:
   1. Obtain all equipment for each type of packaged submersible sewerage pump unit specified in this Section, regardless of the component manufacturer, from a single packaged submersible sump pump Supplier.
   2. Packaged submersible sewerage pump units Supplier shall review and approve or prepare all Shop Drawings and other submittals for all components provided under this Section.
   3. All components furnished shall be specifically constructed for the specified service and suitable for the specified service conditions, and shall be integrated into overall assembly by packaged submersible sewerage pump unit Supplier.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Shop Drawings:
      a. Detailed drawings of all wiring diagrams.
      b. Detailed installation drawing of each individual component showing: mounting requirements, location at Site, labeled and coded piping and wiring connections
      c. Schedule of equipment.
      d. Equipment data sheets.
   2. Product Data:
      a. Manufacturer's literature, illustrations, specifications, weight, dimensions, required clearances, materials of construction, and performance data for all equipment, and part lists for all components in sufficient detail for item-by-item comparison with the Contract Documents.
   3. Testing Plans, Procedures, and Testing Limitations:
      a. Provide pump Supplier's proposed shop testing plan, including complete list of testing facility limitations.
      b. Provide proposed field testing plan.

B. Informational Submittals: Submit the following:
   1. Manufacturer's Instructions:
      a. Setting drawings, templates, and directions for the installing anchor bolts and other anchorages.
      b. Instructions for handling and installing equipment.
   2. Source Quality Control Submittals:
      a. Results of shop tests for each complete pump system.
   3. Site Quality Control Submittals:
      a. Results of field tests for each complete pump system.
   4. Manufacturer's Reports:

a. Submit a written report of results of each visit to Site by pump Supplier, including purpose and time of visit, tasks performed, and results obtained.

C. Closeout Submittals: Provide the following:
   1. Operation and Maintenance Data:
      a. Submit operation and maintenance manuals including test reports, maintenance data, and schedules, description of operation, and spare parts information.
      b. Provide operation and maintenance manuals per Section 01 78 23, Operations and Maintenance Data.

D. Maintenance Material Submittals: Furnish the following:
   1. Spare Parts and Special Tools:
      a. All spare parts and tools recommended by manufacturer.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading:
   1. Prior to shipping, completely inspect products to assure that components are complete and comply with all requirements. Box or crate products as required to prevent damage during shipment. Protect machined surfaces and matching connections to prevent damage.
   2. Deliver products to Site to ensure uninterrupted progress of the Work. Deliver anchorage products to be embedded in concrete in ample time to prevent delaying the Work.
   3. Inspect all boxes, crates, and packages upon delivery to Site and notify ENGINEER in writing of loss or damage to products. Promptly remedy loss and damage to new condition per manufacturer's instructions.
   4. Conform to Section 01 65 00, Product Delivery Requirements.

B. Storage and Protection:
   1. Keep all products off ground using pallets, platforms, or other supports. Protect steel, packaged materials, and electronics from corrosion and deterioration.
   2. Conform to Section 01 66 00, Product Storage and Handling Requirements.

PART 2 - PRODUCTS

2.1 EQUIPMENT PERFORMANCE

A. Design Criteria:
   1. As shown in in the table below.

	Design Conditions	**Value**
a.	Type:	Simplex
b.	Quantity:	1

c.	Minimum Design Flow (gpm):	20
d.	TDH (ft) at Minimum Design Flow:	30
e.	Minimum Head at Zero Flow (ft):	35
f.	Maximum Motor, (HP):	0.5
g.	Drive Type:	Constant
h.	Electrical Service:	115 V, 1 Phase, 60 Hz

B. Equipment shall conform to ANSI/HI 1.3, ANSI/HI 9.8, and UL 778.

2.2 MANUFACTURERS OF CAST IRON SUMP PUMPS AND EJECTORS

A. Manufacturers: Provide products of one of the following:
   1. Weil Pump Company.
   2. Goulds Pump Company.
   3. Zoeller Pump Company.
   4. Or equal.

2.3 SUBMERSIBLE SUMP PUMPS

A. Type: Centrifugal, end-suction, single-stage non-clog, heavy duty sump pumps with motors and operating controls.

B. Material:
   1. Pump and Motor Housing: Cast iron.
   2. Impeller: Cast iron, non-clog, open type, statically and dynamically balanced, keyed to shaft and secured by locking setscrew.
   3. Fasteners: 18-8 stainless steel.
   4. Shaft: Stainless steel.
   5. Discharge: Flanged connection.
   6. Seals: Mechanical seals ceramic face with heat resistant stainless steel and Buna-N components.
   7. Cord: 18 AWG, SJTW.
   8. Float bracket: Stainless steel.

C. Motor:
   1. Motor Chamber: Submersible air-filled, hermetically sealed motor with Class F insulation.
   2. Built-in thermal overload protection.
   3. RPM: 1750.
   4. Motors shall be rated minimum 1/3 HP suitable for operation on a 115 volt, 1 phase 60 Hz supply

D. Non-mercury Float Switches:
   1. Provide integral vertical float switch.
   2. Materials:
      a. Support Pole: One-inch diameter Type 304 stainless steel pipe threaded one end.
      b. Support Bracket: Stainless steel.

c. Float Switch: Normally open non-mercury switches encapsulated in epoxy resin. Float casing shall be polypropylene. Provide snap-action type switch activated by steel ball rolling back and forth within switching tube in plastic float housing. Provide float switches by Anchor Scientific Inc. “Eco-Float”; Model G, Zoeller non-mercury float switches; or equal.
d. Switch Cable: Cable within sump Type SO neoprene jacket, four No. 18 conductor, 41 strand, 300-volt insulation. Cable between control panel and sump shall conform to requirements of Division 16, Electrical.
e. Cable Supports: Polypropylene composition clamp with stainless steel bolts.
f. High Liquid Level in Sump Alarm: Two conductors cable with color-coded cover.

E. Accessories:
1. Provide quick-removal system in sump specified in this Section.
2. Provide aluminum, factory-fabricated vented sump cover plate to accommodate pumps, quick removal system devices, level controls, power cabling, and piping furnished by sump pump Supplier.
a. Sump cover plate shall be of sufficient thickness to support all components without flexure.
b. Sump cover plate shall have gasketed, manhole-style cover, pump removal cover, and other required gastight penetrations.
3. Provide 15-foot standard length power cord with NEMA 5-15P plug.

2.4 SUBMERSIBLE PUMP QUICK-REMOVAL SYSTEM

A. Type: Provide as accessory allowing submersible pump or sewage ejector to be removed from the sump without disturbing piping or electrical connections. Quick-removal system shall be furnished by the pump Supplier and shall be compatible with the associated pumps or ejectors.
1. Stainless steel steel baseplate with stationary discharge fittings and spool support.
2. Two cast iron discharge elbows, one stationary (bolted to pump discharge flange) and one moveable.
3. Two stainless steel guide poles with connecting bars.
4. Stainless steel wire rope and complete fittings.
5. Rectangular hinged cover plate with drop handles and hinges.

2.5 VALVES

A. Iron Body Gate Valves:
1. Products and Manufacturers: Provide one of the following:
a. Stockham Valves and Fittings, Fig. No. G-623.
b. Lunkenheimer Company, Fig. No. 1430.
c. Or equal.
2. Type: Rising stem, outside screw and yoke, solid wedge.

3. Materials: Iron with bronze trim.
4. Rating: 125 lb. SWP.
5. End Connections: Flanged, ANSI B16.1 drilling.

B. Iron Body Check Valves:
1. Products and Manufacturers: Provide one of the following:
a. Crane Valves, Fig. No. 383.
b. Nibco, Inc., Fig. No. 918.
c. Or equal.
2. Type: Swing, regrind-renew disc and seat ring, bolted cover with outside lever and weight.
3. Materials: Iron body, bronze trim, bronze disc and seat ring.
4. Rating: 125 lb. SWP.
5. End Connections: Flanged, ANSI B16.1 drilling, or threaded.

2.6 PAINTING

A. Prior to shipment from the factory, pumps, motors, drives, frames, baseplates, appurtenances shall receive manufacturer's standard paint system for the application specified.

B. Machined, polished, and non-ferrous surfaces shall be coated with corrosion prevention compound.

2.7 SOURCE QUALITY CONTROL

A. Equipment shall be completely manufactured and pre-assembled. Prior to shipping, perform the following tests and inspections at factory:
1. Test and inspect completed units for UL label.
2. Factory-test equipment to ensure that each entire sump pump or ejector package has been properly fabricated and assembled, that all controls function as specified, and that equipment meets specified performance requirements. Conduct tests per ANSI/HI 1.6 and ANSI/HI 11.6.

PART 3 – EXECUTION

3.1 INSPECTION

A. Examine conditions under which products are to be installed and notify ENGINEER in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. General:

1. Install all products per the Contract Documents and as recommended by manufacturer. Do not modify structures to facilitate installation of pumps or ejectors, unless specifically approved by ENGINEER.
2. Conform to ANSI/HI 1.4.
3. Perform all fitting required for installation. Set products accurately in location, alignment, and elevation, plumb and true.
4. Provide utility connections per the Contract Documents. Support piping and valves independent of pump. Verify that utilities and valves are tested and operational before placing equipment into operation. When pumps are connected to piping with rigid hardware, connection of discharge nozzle to piping shall conform to ANSI/HI 9.6.2.
5. Align and adjust products and piping in presence of ENGINEER
6. Provide for initial operation lubricants recommended by equipment manufacturer
7. Prior to energizing motor driven equipment, rotate drive motor by an external source to demonstrate free operation of mechanical parts. Do not energize equipment until safety devices are installed, connected, and functional.

B. Field painting shall conform to Section 09 91 00, Painting.

3.3 FIELD TESTING / QUALITY CONTROL

A. All equipment will be given running tests by CONTRACTOR at the job Site following installation of the equipment and controls. Should the tests indicate any malfunction, CONTRACTOR shall make any necessary repairs and adjustments. Such tests and adjustments shall be repeated until, in the opinion of the ENGINEER, the installation is complete and the equipment is functioning properly and accurately, and is ready for permanent operation.

A. Field Tests:
1. Prior to placing sump pumps and ejectors into service, successfully test all related piping per the Contract Documents.
2. Fill all systems and test-operate all equipment and materials.
3. With Supplier's representative and ENGINEER, check equipment for excessive noise and vibration while systems are operating. Verify by measuring sump liquid level drawdown versus time the capacity of each pump provided. Correct defective Work until successful test results are obtained.

3.4 SERVICES OF MANUFACTURER'S REPRESENTATIVE

A. Provide a factory-trained representative for visits for the following activities:
1. Installation Supervision – 1 visit.
2. Field Testing – 1 visit.
3. Training – 1 Visit.

B. Each visit shall be a minimum of 8 hours on site, unless otherwise specified.

C. Representative shall revisit the Site as often as necessary until all trouble is corrected and the installation and operation are entirely satisfactory at no additional cost to the OWNER. All costs, including travel, lodging, meals and incidentals, for additional visits shall be at no additional cost to the OWNER.

D. The factory-trained representative shall provide the Supplier's Installation Certificate in accordance with Section 01 75 11, Checkout and Startup Procedures.

E. Provide operation and maintenance personnel training services in accordance with Section 01 79 23, Instruction of Operations and Maintenance Personnel.

3.5 ADJUSTING AND CLEANING

A. Adjusting:
   1. Adjust all controls for proper settings.
   2. While system is operating, balance and adjust all equipment and valves to achieve specified conditions.

B. Cleaning:
   1. Thoroughly clean all equipment and accessories prior to installation and prior to Substantial Completion.
   2. Remove all dirt, rust, dust, scale, and corrosion from products to receive field painting.
   3. Remove and dispose of all debris and waste from the Site resulting from installation.

+ + END OF SECTION + +