SECTION 22 13 00

FACILITY SANITARY SEWERAGE

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes (unless otherwise noted):

1. Sanitary sewer, vent and storm drain piping buried within 5 feet of building.
2. Sanitary sewer, vent and storm drain piping above grade.
3. Chemical resistant sewer piping.
4. Grease waste
5. Subsoil drainage
6. Sump pump discharge
7. Unions and flanges.
8. Valves.
9. Floor drains.
10. Floor sinks.
11. Planter drains.
12. Cleanouts.
13. Interceptors (grease, clarifier).
14. Manholes.
15. Roof drains
16. Overflow drains
17. Area drains
18. Roof receptor

B. Related Sections:

1. Division 03 - Cast-In-Place Concrete: Execution requirements for placement of concrete specified by this section.
2. Division 07 - Firestopping: Product requirements for firestopping for placement by this section.
3. Division 08 - Access Doors and Frames: Product requirements for access doors for placement by this section.
4. Division 09 - Painting and Coating: Product and execution requirements for painting specified by this section.
5. Division 22 - Pipes and Tubes for Plumbing Piping and Equipment: Product and installation requirements for piping materials applying to various system types.
6. Division 22 – Facility Water Distribution
7. Division 23 - Hangers and Supports for HVAC and Plumbing Piping and Equipment: Product requirements for pipe hangers and supports for placement by this section.
8. Division 23 - Vibration and Seismic Controls for HVAC and Plumbing Piping and Equipment: Product requirements for vibration isolators for placement by this section.
9. Division 23 - Identification for HVAC and Plumbing Piping and Equipment: Product requirements for pipe identification for placement by this section.
10. Division 23 – HVAC and Plumbing Insulation: Product and execution requirements for pipe insulation.
11. Division 26 - Equipment Wiring Connections: Execution requirements for electric connections to equipment specified by this section.
12. Division 31 - Soils for Earthwork: Soils for backfill in trenches.
13. Division 31 - Aggregates for Earthwork: Aggregate for backfill in trenches.
14. Division 31 - Excavation: Product and execution requirements for excavation and backfill required by this section.
15. Division 31 - Trenching: Execution requirements for trenching required by this section.
16. Division 31 - Fill: Requirements for backfill to be placed by this section.

1.02 REFERENCES

A. American Society of Mechanical Engineers:

1. ASME A112.14.3 - Grease Interceptors.
2. ASME A112.21.1 - Floor Drains.
3. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.
4. ASME B16.3 - Malleable Iron Threaded Fittings.
5. ASME B16.4 - Gray Iron Threaded Fittings.
6. ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings (DWV).
7. ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV.
8. ASME B31.9 - Building Services Piping.

B. ASTM International:

1. ASTM A47 - Standard Specification for Ferritic Malleable Iron Castings.
2. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
3. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings.
4. ASTM A234 - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
5. ASTM A395 - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.
6. ASTM A536 - Standard Specification for Ductile Iron Castings.
7. ASTM A746 - Standard Specification for Ductile Iron Gravity Sewer Pipe.
8. ASTM B32 - Standard Specification for Solder Metal.
9. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes.
10. ASTM B43 - Standard Specification for Seamless Red Brass Pipe, Standard Sizes.
11. ASTM B302 - Standard Specification for Threadless Copper Pipe.
12. ASTM B306 - Standard Specification for Copper Drainage Tube (DWV).
13. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.
14. ASTM C564 – Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
15. ASTM D2662 - Standard Specification for Polybutylene (PB) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter.
16. ASTM F1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications.

C. Cast Iron Soil Pipe Institute:

1. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
2. 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.

D. Manufacturers Standardization Society of the Valve and Fittings Industry:

1. MSS SP 70 - Cast Iron Gate Valves, Flanged and Threaded Ends.
2. MSS SP 71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends.
3. MSS SP 80 - Bronze Gate, Globe, Angle and Check Valves.
4. MSS SP 110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

E. Plumbing and Drainage Institute:

1. PDI G101 - Standard - Testing and Rating Procedure for Grease Interceptors.

1.03 SUBMITTALS

A. Division 01 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate dimensions, weights, and placement of openings and holes for manholes and interceptors (grease interceptor).

C. Product Data:

1. Piping: Submit data on pipe materials, fittings, and accessories. Submit manufacturers catalog information.
2. Valves: Submit manufacturers catalog information with valve data and ratings for each service.
3. Sanitary and Storm Drainage Specialties: Submit manufacturers catalog information, component sizes, rough-in requirements, service sizes, and finishes.

D. Manufacturer's Installation Instructions: Submit installation instructions for material and equipment.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.04 CLOSEOUT SUBMITTALS

A. Division 01 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Record actual locations of equipment and clean-outs.

C. Operation and Maintenance Data: Submit frequency of treatment required for interceptors. Include, spare parts lists, exploded assembly views for equipment.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with State of California standards.

B. Maintain one copy of each document on site.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience, and interceptor service facilities within 100 miles of Project.

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Division 01 - Product Requirements: Product storage and handling requirements.

B. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Division 01 - Product Requirements.

B. Do not install underground piping or interceptors when bedding is wet or frozen.

1.09 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.10 WARRANTY

A. Division 01 - Execution and Closeout Requirements: Product warranties and product bonds.

1.11 EXTRA MATERIALS

A. Division 01 - Execution and Closeout Requirements: Spare parts and maintenance products.

PART 2 PRODUCTS

2.01 SANITARY SEWER, VENT AND STORM DRAIN PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Cast Iron Pipe: CISPI 301, hub-less.

1. Fittings: Cast iron, CISPI 301.
2. Joints: FM 1680, neoprene gasket and 4 band stainless steel clamp and shield assemblies or MG, neoprene gasket and cast iron clamp and stainless steel bolt assemblies.

B. Perforated Pipe: (Subsoil) ABS/PVC, sock cover.

C. ABS Pipe: ASTM D2751, SDR 23.5, 35, 42, Acrylonitrile-Butadiene-Styrene (ABS) material, bell and spigot style solvent sealed ends.

1. Fittings: ABS, ASTM D2751.
2. Joints: ASTM D2235, solvent weld.

2.02 SANITARY SEWER, VENT AND STORM DRAIN PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hub-less, service weight.

1. Fittings: Cast iron, CISPI 301.
2. Joints: FM 1680, neoprene gaskets and 4 band stainless steel clamp and shield assemblies.

B. Steel Pipe: (pump discharge) ASTM A53 Schedule 40, galvanized.

1. Fittings: Cast Iron, ASME B16.1, flanges and fittings; ASME B16.4, threaded fittings.
2. Fittings: Malleable Iron, ASME B16.3, threaded type, ASTM A47.
3. Joints: Threaded for pipe 2 inch and smaller; flanged for pipe 2-1/2 inches and larger.

2.03 GREASE WASTE SEWER PIPING

A. Stainless steel pipe: IAPMO approved 316 stainless steel, spigot and socket bubbler lipseal ring joint as manufactured by Blucher-Josam.

2.04 UNIONS AND FLANGES

A. To match piping material.

2.05 BALL VALVES

A. Refer to Division 22 Facility Water Distribution:

2.06 CHECK VALVES

A. Spring Loaded and Horizontal Swing Check Valves:

B. Refer to Division 22 Facility Water Distribution

2.07 FLOOR DRAINS

A. Manufacturers:

1. J.R. Smith
2. Mifab
3. Blucher-Josam

B. Floor Drain: ASME A112.21.1; lacquered cast iron two piece body with double drainage flange, weep holes, reversible clamping collar, and round, adjustable round, square, hinged grate, heavy duty strainer nickel-bronze strainer with removable perforated sediment bucket, polished bronze funnel, sediment bucket.

2.08 FLOOR SINKS

A. Manufacturers:

1. J.R. Smith
2. Mifab
3. Blucher-Josam

B. Floor Sink: Round, Square lacquered cast iron body with integral seepage pan, epoxy coated interior, aluminum dome strainer, clamp collar, sediment bucket, nickel bronze frame and half grate.

2.09 ROOF DRAINS

A. Manufacturers:

1. J.R. Smith
2. Mifab
3. Blucher-Josam

B. Roof Drain:

1. Assembly: ASME A112.21.2M.
2. Body: Lacquered cast iron with sump.
3. Strainer: Removable cast iron dome with vandal proof screws.
4. Accessories: Coordinate with roofing type.

a. Membrane flange and membrane clamp with integral gravel stop.
b. Adjustable under deck clamp.
c. Roof sump receiver.
d. Waterproofing flange.
e. Controlled flow weir.
f. Leveling frame.
g. Adjustable extension sleeve for roof insulation.
h. Perforated or slotted ballast guard extension for inverted roof.
i. Perforated stainless steel ballast guard extension.

C. Overflow Drain :

1. Assembly: ASME A112.21.2M.
2. Body: Lacquered cast iron with sump.
3. Strainer: Removable cast iron dome with vandal proof screws.
4. Pipe extended to 2 inches above flood elevation.
5. Accessories: Coordinate with roofing type.

a. Membrane flange and membrane clamp with integral gravel stop.

b. Adjustable under deck clamp.
c. Roof sump receiver.
d. Waterproofing flange.
e. Controlled flow weir.
f. Leveling frame.
g. Adjustable extension sleeve for roof insulation.
h. Perforated or slotted ballast guard extension for inverted roof.
i. Perforated stainless steel ballast guard extension.

2.10 AREA DRAINS

A. Manufacturers:

1. J.R. Smith
2. Mifab
3. Blucher-Josam

B. Area Drain: ASME A112.21.1M; lacquered, galvanized cast iron two piece body with double drainage flange, weep holes, reversible clamping collar, and round, square, adjustable nickel-bronze strainer.

C. Trench Area Drain: Lacquered cast iron two piece body with drainage flange, heavy duty grate 12 inches wide, 24 inches long, dome strainer, end plates with gaskets.

2.11 CLEANOUTS

A. Manufacturers:

1. J.R. Smith
2. Mifab
3. Blucher-Josam

B. Exterior Surfaced Areas: Round or square cast nickel bronze access frame and non-skid cover.

C. Exterior Unsurfaced Areas: Line type with lacquered cast iron body and round epoxy coated cover wit gasket.

D. Interior Finished Floor Areas: Lacquered cast iron body with anchor flange, reversible clamping collar, threaded top assembly, and round scored cover with gasket in service areas and round, square depressed cover with gasket to accept floor finish in finished floor areas.

E. Interior Finished Wall Areas: Line type with lacquered cast iron body and round epoxy coated cover with gasket, and round stainless steel access cover secured with machine screw.

F. Interior Unfinished Accessible Areas: Calked or threaded type. Provide bolted stack cleanouts on vertical rainwater leaders.

2.12 GREASE INTERCEPTORS

A. Manufacturers:

1. Jensen
2. Pro-Cast

B. Comply with PDI G101, ASME A112.14.3, ASME A112.14.4.

C. Construction:

1. Material: Precast concrete.

2. Rough in: Fully recessed (shallow rough in) with manholes to grade.

D. Accessories: Multi-weir baffle assembly, integral deep seal trap, removable integral flow control, level alarm.

E. Cover: Steel, cast iron, air tight, non-skid traffic cover with gasket.

2.13 HEATING CABLE

A. Provide a grease waste above and below grade piping, a complete UL Listed system of heaters and components approved specifically for pipe heat tracing, as manufactured by Raychem XL-Trace systems.

B. The self regulating systems shall consist of (2) nickel plated copper bus wires embedded in a radiation cross linked semi conductive polymer core. The system shall be capable of varying its heat output all along its length, allowing the system to be crossed over itself without overheating. The system shall be covered by a polyolefin dielectric jacket rated 300 VAC at 105 degrees C and a tinned copper braid, (12 AWG equivalent wire size). Buried piping to ground hydrant shall have an additional covering of a flouropolymer outer jacket for protection from organic chemicals or corrosives. For piping above grade, heating cable shall have an additional polyolefin outer jacket for protection from aqueous inorganics.

C. The system shall operate on live voltage of 110-120 VAC without the use of transformers. They system shall have additional thermostat control.

D. Buried grease waste shall be heat traced and insulated with closed call waterproof thermal insulation and waterproof covering.

E. Power connections and end seal are made in UL Listed boxes above grade.

2.14 MANHOLES

A. Formed Bottom Manholes: ASTM C478; reinforced precast concrete sections laid on cast-in-place reinforced concrete foundation pad as specified in Division 03.

1. Size: 48 inch diameter.
2. Cover: Standard cast iron with minimum sized pick hole, and frame. Use heavy-duty cover and frame in vehicular traffic areas.
3. Steps: 3/4 inch diameter galvanized steel on 16 inch centers.

2.15 BEDDING AND COVER MATERIALS

A. Bedding: Fill Type A1, A2, A3, A4 as specified in Division 31.

B. Cover: Fill Type A1, A2, A3, A4, as specified in Division 31.

C. Soil Backfill from Above Pipe to Finish Grade: Soil Type S1, S2, as specified in Division 31. Subsoil with no rocks, frozen earth or foreign matter.

D. Soil Backfill around Interceptor to Finish Grade: Soil Type S1, S2, as specified in Division 31. Subsoil with no rocks, frozen earth or foreign matter. Alternate: provide sand or pea gravel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Division 01 - Administrative Requirements: Coordination and project conditions.

B. Verify excavations are to required grade, dry, and not over-excavated.

3.02 PREPARATION FOR PIPING AND INTERCEPTORS

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Keep open ends of pipe free from scale and dirt. Protect open ends for below grade piping with temporary plugs or caps.

3.03 INSTALLATION - BURIED PIPING SYSTEMS

A. Verify connection to existing piping system, verify size, location, and invert.

B. Establish elevations of buried piping with not less than 12 inches of cover.

C. Establish minimum separation from other services and piping in accordance with code.

D. Remove scale and dirt on inside of piping before assembly.

E. Excavate pipe trench in accordance with Division 31.

F. Place bedding material at trench bottom to provide uniform bedding for piping, level bedding materials in one continuous layer not exceeding 12 inches; compact to 95 percent maximum density.

G. Install pipe on prepared bedding.

H. Route pipe in straight line.

I. Install plastic ribbon tape continuous buried 12 inches below finish grade, above metallic pipe line; coordinate with Division 31. Refer to Division 23.

J. Install trace wire continuous above non-metallic pipe line; coordinate with Division 31. Refer to Division 23.

K. Pipe Cover and Backfilling:

1. Backfill trench in accordance with Division 31.
2. Maintain optimum moisture content of fill material to attain required compaction density.
3. After hydrostatic test, evenly backfill entire trench width by hand placing backfill material and hand tamping in 6 inches compacted layers to 12 inches minimum cover over top of jacket. Compact to 95 percent maximum density.
4. Evenly and continuously backfill remaining trench depth in uniform layers with backfill material.
5. Do not use wheeled or tracked vehicles for tamping.

3.04 INSTALLATION - ABOVE GROUND PIPING

A. Establish invert elevations, slopes for drainage to 1/4 inch per foot minimum. Maintain gradients.

B. Extend cleanouts to finished floor or wall surface on underslab plumbing. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Provide clearances at cleanout for snaking drainage system.

C. Encase exterior cleanouts in concrete flush with grade.

D. Install floor cleanouts at elevation to accommodate finished floor.

E. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

F. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

G. Install piping to maintain headroom. Do not spread piping, conserve space.

H. Group piping whenever practical at common elevations.

I. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

J. Provide clearance in hangers and from structure and other equipment for installation of insulation. Refer to Division 23.

K. Provide access where valves and components are not accessible. Coordinate size and location of access doors with Division 08.

L. Install piping penetrating roofed areas to maintain integrity of roof assembly.

M. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

N. Install bell and spigot pipe with bell end upstream.

O. Sleeve pipes passing through partitions, walls and floors.

P. Install firestopping at fire rated construction perimeters and openings containing penetrating sleeves and piping. Refer to Division 07.

Q. Support horizontal cast iron drainage piping at every joint and per CBC/CPC.

R. Insulate of horizontal sanitary sewer, piping serving AHU's from roof to risers

3.05 FIELD QUALITY CONTROL

A. Division 01 - Quality Requirements and 01 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Test sanitary waste, storm drain and vent piping system in accordance with applicable code and local authority having jurisdiction.

END OF SECTION