

DIVISION 33
UTILITIES

SECTION 33 30 01

PIPED UTILITIES

PART 1 - GENERAL

The conditions of the Contract and requirements of Division 1, General Requirements, are part of this Section and apply to work of this Section as fully as if herein repeated.

1.01 SCOPE OF WORK

- A. The work includes, but is not necessarily limited to, the following:
 - 1. Sanitary waste systems.
 - 2. Water piping systems.
 - 3. Connections to existing facilities.
 - 4. Other items as may be specified or shown on the Drawings.
Furnish and install any incidental work not shown or specified but which can reasonably be inferred as required and necessary to provide complete and workable systems.

1.02 RELATED SECTIONS

- A. Section 31 23 33 - Trenching, Backfilling & Compaction.

1.03 SUBMITTALS

- A. Refer to Section 01 33 00.

1.04 REQUIREMENTS OF REGULATORY AGENCIES

- A. Work and materials shall be in full accord with Title 24, California Code of Regulations; Uniform Plumbing Code; Uniform Building Code; National Electric Code; State Fire Marshall; California OSHA; National Fire Protection Association; and other applicable state or local laws or regulations. Nothing in drawings or specifications shall be construed to permit work not conforming to these Codes.
- B. When Contract documents differ from governing codes, furnish and install larger size or higher standards called for without extra charge.

1.05 FEES, PERMITS, AND UTILITY SERVICES

- A. Obtain and pay for permits and service charges required in installation of Work. Arrange for required inspections and secure approvals for authorities having jurisdiction.

1.06 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies: Comply with requirements of local regulatory agencies having jurisdiction. Submit for Agency approvals.

1.07 SITE EXAMINATION AND CONDITIONS

- A. Examine site, verify dimensions and locations against drawings and inform self of conditions under which work is to be done before submitting proposal. No allowance will be made for extra expense on account of error.
- B. Information shown relative to existing services is based upon available records and data but shall be regarded as approximate only. Make minor deviations found necessary to conform with actual locations and conditions without extra cost. Field verify location and elevation of utilities prior to commencement of excavation for new piping or its installation.
- C. Exercise extreme care in excavating near existing utilities to avoid any damage thereto. This Contractor shall be held responsible for any damage caused by his operations.

1.08 RECORD DRAWINGS

- A. Upon completion of this Contract, furnish one tracing showing all outside utility lines, piping, etc., installed under this Contract. Locate and dimension all work with reference to permanent landmarks.
- B. All symbols and designations used in preparing "RECORD" drawings shall match those used in Contract drawings.
- C. Properly identify all stubs for future connections, as to location and use, by setting of concrete marker at finished grade in the manner suitable to Architect.

PART 2 - PRODUCTS

2.01 MATERIALS - GENERAL

- A. Provide each item listed herein or shown on drawings of quality noted or approved equal. All material shall be new, full weight, standard in all respects and in first-class condition. Insofar as possible, all materials used shall be of same brand or manufacture throughout for each class of material or equipment. Materials shall be of domestic manufacture and shall be tested within Continental United States.
- B. Grade or quality of materials desired is indicated by trade names or catalog numbers stated herein.
- C. Dimensions, sizes, and capacities shown are minimum and shall not be changed without permission of Architect.

2.02 VALVE BOXES

- A. Provide at each valve or cock in ground a Christy, Brooks, or equal, to Christy G5, concrete valve box with cover marked for service. Furnish extension handle for valves as required; Alhambra, or equal. Do not locate valve boxes in walks or covered passages, unless necessary. Where necessary to locate valve boxes in traffic or paved areas, use Christy G5 with cast iron-ring and cover. Provide valve box extensions as required to set bottom of valve box tight to top of piping in which valve is installed. Provide State with set of special wrenches or tools as required for operation of valves.

2.03 PIPES AND FITTINGS

- A. Sanitary Sewer: PVC sewer pipe and fittings with Ring-Tite joints, ASTM D3034 SDR35.
- B. Fire protection and domestic water service pipelines, sizes 4" and larger, shall conform to AWWA standard C900-89, Class 150. Fittings shall be ductile iron, rated for 350 psi working pressure and conforming to AWWA standard C110-82, for O-ring push-on joints, conforming to AWWA standard C111-84.
- C. Domestic water service pipelines, sizes 3" and smaller, shall be Schedule 40, polyvinyl chloride (PVC) extruded rigid pipe, Type 1, Grade 1, conforming to ASTM D1784 and ASTM D1785. PVC pipe fitting shall be extruded and shall conform to the applicable requirements specified herein.
- D. Joints for pipe 3" in diameter or less shall be solvent welded. Solvent welding cement shall be as supplied by the PVC manufacturer. Schedule 40 PVC pipe shall not be threaded. Flanges shall be 150 lb., flat face, socket type. Diameter and drilling of flanges shall be accordance with ANSI B16.5, "Steel Pipe Flanges and Flanged Fittings," 150 psi. Flange gaskets shall be full faced neoprene gaskets, as recommended by the PVC manufacturer. Bolting shall be Type 316 stainless steel conforming to the requirements of ASTM A276.
- E. All PVC pipe shall be approved for use by the National Sanitation Foundation (NSF). Pipe shall be clearly marked with manufacturer's name, material, type, grade, size and NSF approval.

2.04 CLEANOUTS

- A. Cleanouts of same diameter as pipe shall be installed in all horizontal soil and waste lines where indicated and at all points of change in direction. Cleanouts shall be located not less than 18" from building construction so as to provide sufficient space for rodding. No horizontal run over 100 feet shall be without cleanout whether shown on Drawings or not.
- B. Cleanouts shall be as shown on the drawings.

2.05 UNIONS

- A. Furnish and install unions at each threaded or soldered connection to equipment, valves, etc.
- B. Locate unions so that piping can be easily disconnected for removal of equipment or valve. Provide type specified in following schedule:

Type of Pipe Union

Steel Pipe:	150 lb. screwed malleable ground joint, brass, brass-to-iron seat, black or galvanized to match pipe.
Copper tubing:	Brass ground joint with sweat connections.

2.06 VALVES

- A. Provide valves as shown and other valves necessary to segregate branches or units. Furnish discs suitable for service intended. Valves shall be properly packed and lubricated. Place union adjacent to each threaded valve. Install valves with stems vertical wherever possible. Stems shall not be placed below horizontal.
- B. Valves shall be full size of pipe, Jenkins, Rockwell, Nibco/Scott, Homestead, or approved equal. Gate Valves thru 2-1/2", Jenkins #370.
- C. Underground Valves: Smaller sizes shall be as shown above, but may furnished with either operation nuts or handwheels. One wrench of each size required for operating underground valves shall be furnished to State.

2.07 FIRE HYDRANTS

- A. Fire Hydrants shall be Dry Barrel "Steamer" type, conforming to AWWA Standard C502-85 and must be a traffic- type equipped with and approved break-off protection devise.
- B. The hydrant main valve shall be 5-1/4" diameter, shall open CCW, with bronze-to-bronze seating. The footpiece shall have 6" push-on or mechanical joint inlet, for connection to the 6" diameter PVC C900 hydrant lateral. Hydrants are to be furnished without a drain opening to the base; if manufactured with such opening, it shall be threaded or plugged.
- C. Hose nozzles shall be threaded-in with one 4-1/2" diameter Pumper Outlet and two 2-1/2" Hose Outlets, having "National Standard Fire Hose Coupling Screw Threads," conforming to ASA Standard B26. The hydrant nozzle caps shall be securely chained to the body. Pumper Outlet shall face the street or traffic lane unless specified otherwise. In the event that the hydrant must be disassembled to rotate the pumper outlet so that it faces the street, new gaskets shall be applied to the hydrant when reassembled.
- D. Even though not indicated on the plans, every fire hydrant installation must have a 6" butterfly valve or resilient seat valve installed on the lateral at the tree from the main.
- E. The portion of the completed hydrant above the "breakable" flange shall be finish-painted with "RUST-O-CRYLIC" No. 5745 Yellow.

2.08 CHECK VALVES, BACKFLOW PREVENTERS, FIRE DEPARTMENT CONNECTIONS, POST INDICATOR VALVES

- A. Check valves, backflow preventers, fire department connections and post indicator valves shall conform to the applicable standards and details of the South Placer Fire Protection District and the San Juan Water District.

PART 3 - EXECUTION

3.01 DRAWINGS AND COORDINATION

- A. General arrangement and location of piping, etc., are shown on Drawings or herein specified. Install work in accord therewith, except for minor changes that may be necessary on account of other work. Carefully examine other work that may conflict with this work. Install this work in harmony with other craft and at proper time to avoid delay of work.

- B. In advance or construction, work out minor changes and relocations to suit actual conditions and work of other trades to avoid conflict therewith. This shall not be cause for additional cost.
- C. Execute any work or apparatus shown on drawings and not mentioned in specifications, or vice versa. Omission from Drawings or Specifications of any minor details of construction, installation, materials, or essential specialties does not relieve Contractor of furnishing same in place complete.

3.02 PIPE JOINTS AND CONNECTIONS

- A. Cut steel pipe and hard copper tubing with power hacksaw or in square end vice by means of hand hacksaw. Wheel cutters may be used for steel pipe only provided that pipe shall have ends reamed to full inside diameter and beveled before being made up into fittings. Remove rough edges or burrs from pipe so that smooth and unobstructed flow will be obtained.
- B. Make joints in threaded pipe with Rectorseal #5, or equal. Place joint compound carefully and smoothly on male thread and not in fitting. Make threaded joints tight with tongs or wrenches.
- C. Use joint compound, same as specified for threaded pipe joints, on cleanout plugs.
- D. Make joints in copper tubing for all installations with Sil-Fos silver brazing alloy. Surfaces to be jointed shall be free of oil, grease, rust and oxides. Immediately after cleaning and before assembly or heating, apply Handy Flux to each joint surface and spread evenly. Carefully apply heat with oxy-acetylene torch to avoid overheating fitting, valves, etc.
- E. Remake any leaking joints with new materials. Use of thread cement or caulking to make old joints tight is absolutely prohibited.
- F. Close nipples shall not be used unless absolutely necessary. They shall be extra heavy.
- G. Connections between copper and steel piping shall be made with Epco dielectric unions.

3.03 ACCESS

- A. Continuously check for clearance and accessibility of equipment specified herein to be placed. No allowance of any kind shall be made for negligence on part of Contractor to foresee means of installing his equipment into proper position.

3.04 CARE AND CLEANING

- A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work. Leave entire work in condition satisfactory to Architect. At completion, carefully clean and adjust equipment, fixtures and trim that are installed as part of this work. Leave systems and equipment in satisfactory operating condition.
- B. Drain and flush piping to remove grease and foreign matter.
- C. Clean out and remove surplus materials and debris resulting from the work, including surplus excavated material.

3.05 EXCAVATING AND BACKFILLING

- A. Refer to Section 31 23 33.

3.06 CLOSING IN OF UNINSPECTED WORK

- A. Do not allow or cause work installed to be covered up or enclosed before it has been inspected, tested, and approved. Should work be enclosed or covered up before it has been approved, uncover work at own expense. After it has been inspected, tested and approved, make repairs necessary to restore work of other contractors to condition in which it was found at time of cutting.

3.07 INSTALLATION OF PIPING

- A. Immediately cap or plug ends of, and opening in, pipe and fittings to exclude dirt until final connections made. Use reducing fittings where any change in pipe size occurs. Bushings shall not be used.
- B. General: Should existing conditions or other work prevent the running of pipes or the setting of equipment at the points indicated by drawings, changes as authorized by the Architect shall be made without additional cost to the State.
- C. Each piping system shall be thoroughly flushed and proved clean before connection to equipment.
- D. Do not install water lines in same trench with non-metallic sewer lines unless bottom of water pipe at all points is at least 12" above top of sewer line and water line is placed on solid shelf excavated at one side of common trench.
- E. Wrap connections to steel water piping, buried in the ground. Protecto Wrap #11700 tape as manufactured by Pipe Line Service Corporation, or Primer #200 tape by Royston Products, or equal. Installation shall be as per manufacturer's recommendation and instructions. Clean all piping thoroughly before wrapping. Damaged or defective wraps shall be repaired as directed. No wrapped pipe shall be covered until approved by the Architect. No rocks or sharp edges shall be backfilled against the wrap. When backfilling with other than sand, protect wrap with an outer wrapping of Kraft paper; leave in place during backfill.

3.08 TEST OF PIPING

- A. Test piping at completion of roughing-in, in accord with following schedule, and show no loss in pressure or visible leaks after minimum duration or four (4) hours at test pressures indicated.

TEST SCHEDULE

System Tested

Test Pressure PSIG Test With

Water Piping:

150 Lbs. Water

Sanitary Sewer Piping:

Fill with water to top of 10-foot high standpipe, allow to stand two hours or longer as directed by Inspector.

- B. Testing equipment, materials, and labor shall be furnished by this contractor.

3.09 WATER SYSTEM STERILIZATION

- A. Close all open ends of water piping each day to prevent contamination or foreign matter entering pipe during construction. Piping shall be thoroughly flushed out to remove any dirt or foreign matter.
- B. After flushing, entire water system from new point or points of connection shall be sterilized before being turned over to State for use. Slowly fill system with water and add chlorine chemical agent to produce minimum of 50 ppm of chlorine in entering water. Treated water shall be retained in pipe overnight. Chlorine residual at pipe extremes shall be at least five ppm at end of this time. Should chlorine residual be less than this amount, pipe shall be re-chlorinated.
- C. After chlorination, lines shall be flushed of chlorinated water and refilled from domestic supply. Flushing shall continue until residual chlorine is not greater than 0.2 ppm at all pipe extremities.

END OF SECTION

SECTION 33 30 02

SITE DRAINAGE

PART 1- GENERAL

1.01 SECTION INCLUDES

- A. Provide Site Drainage, complete, as shown and specified per Contract Documents.

1.02 RELATED SECTIONS

- A. Earthwork: Section 31 00 00.
- B. Trenching, Backfilling and Compaction: Section 31 23 33.
- C. Cast-in-Place Concrete: Section 03 30 00.

1.03 SUBMITTALS

- A. General: Refer to Section 01 33 00 – SUBMITTAL PROCEDURES.
- B. Samples: If Specifically Requested.
- C. Product Data: Submit manufacturer's specification, data, and installation instructions for review prior to fabrication of work.

1.04 PRODUCT HANDLING

- A. General: All work shall be manufactured and/or fabricated in ample time so as to not delay construction progress.
- B. Delivery: All materials shall be delivered to the site at such time as required for proper coordination of the work. Deliver all materials to the job site in their original containers with all labels intact and legible.
- C. Storage: Store all materials in a dry and well ventilated place adequately protected from damage and exposure to the elements. Repair or replace any damaged items necessary and as approved by the Architect.

1.05 JOB CONDITIONS

- A. Protection: Conform to Trench Construction Safety Orders of California State Industrial Accident Commission.

1.06 ALLOWABLE TOLERANCES

- A. Install piping within 0.05 feet of indicated grade and location.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Pipe: Use one of the following, unless noted on the Drawings otherwise. EXCEPTIONS: PVC Pipe may only be used up to and including 24 inch diameter, unless specifically noted on Drawings.
 - 1. Polyvinyl Chloride Pipe (PVC): PSM-SDR35 conforming to ASTM C3034 with elastomeric joints conforming to ASTM D3212.
 - 2. High density polyethylene pipe: The pipe shall be corrugated exterior/smooth interior pipe. Twelve to 36" diameter shall conform to AASHTO M294 Type S; 8 and 10 inch diameters shall meet the strength requirements of AASHTO M252 with the addition that the pipe have a smooth interior liner. Material shall conform to ASTM D3350.
- B. Drain Rock: 3/4" crushed rock.
- C. Cleanout: Shall be as shown on the drawings.
- D. Sand-oil Interceptor: Shall be as shown on the drawings.
- E. Manhole: Shall be as shown on the drawings.
- F. Area Drain: Shall be as shown on the drawings.
- G. Floor Drain: Shall be as shown on the drawings.
- H. Open concrete pipe inlet: Shall be as shown on the drawings.
- I. Downspout Connection: Shall be as shown on the drawings.
- J. Fossil Filter: Shall be as shown on the drawings.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General: Installation shall be in strict conformance with referenced standards, the manufacturers written directions, as shown on the drawings and as herein specified.
- B. Excavation and Bedding and Backfill: Refer to Section 31 23 33.
- C. Laying of Pipe
 - 1. General: Inspect pipe prior to placing. Set aside any defective or damaged material. Do not place pipe in water nor place pipe when trenches or weather are unsuitable. Lay pipe upgrade, true to line and grade.
 - 2. Bell and Spigot Joints: Lubricate inside of bells and outside of spigots with soap solution. Wedge joints tight. Bell of bell and spigot pipe to be pointed upgrade.
- D. Off Site Work: All work beyond the property lines shall be done in strict conformance with the requirements of the governmental agencies having jurisdiction.

- E. Trench Drain: Install per manufacturers recommendations and provide a minimum 4" concrete encasement to each side and below drain.

3.02 FIELD QUALITY CONTROL

- A. General: Thoroughly rod and flush entire drainage system.
- B. Field Testing: Test systems for water tightness at a hydrostatic pressure of 10 psi for a period of 4 hours.
- C. Retesting: Make necessary corrections to non-conforming work; Retest at Contractors expense.

3.03 CLEANING

- A. General: Keep premises free from accumulation of waste and rubbish. At the completion of work remove surplus materials, rubbish and debris.

END OF SECTION