PART III - WATER DISTRIBUTION SYSTEM

PART 1 – GENERAL

1.01 DESCRIPTION

Work includes installation of 16", 14", 12", 10" and 8" high density polyethylene (HDPE) water mains, 2", 4", 6", 8" water and fire services, fire hydrants, tracer wire, water valves and boxes, flange adapters, all appurtenances and all related equipment and fittings in accordance with the requirements of the Contract Documents.

1.02 RELATED WORK

A. Section 02200 Excavation, Backfill and Restoration

PART 2 -- MATERIALS

2.01 WATER DISTRIBUTION SYSTEM MATERIALS

“Wetted surfaces” of all materials, piping, or plumbing fixtures intended for conveying or dispensing potable water, supplied under these specifications, must contain less than 0.25% lead by weight in compliance with AB 1953.

A. POLYETHYLENE PIPE

GENERAL

All potable water polyethylene pipe supplied under this Specification shall be High Density Polyethylene Pipe (HDPE) PE 4710 conforming to the latest edition of ANSI/AWWA C901 and C906 and ANSI/NSF Standard 61. Resin used in the extrusion of water polyethylene pipe shall conform to the latest addition of the ASTM D 3350 Cell classification 445574E with the specifications stated herein.

1. All pipe shall be extruded from Dow 2490 blue resin if available, or approved black pipe with blue stripe or wrapped in blue PE for water pipe.

2. PENT test values of 500 hours min.

3. Pipe dimensions and tolerances:

   The outside diameter and wall thickness shall be within the limits specified in Table 1.
### Table 1: Dimensional Standards for IPS 4710 High Density Polyethylene Pipe

<table>
<thead>
<tr>
<th>Nominal IPS Size</th>
<th>Actual Outside Diameter (inches)</th>
<th>Minimum Wall Thickness (inches)</th>
<th>Average Inside Diameter (inches)</th>
<th>Standard Dimension Ratio (SDR) (unitless)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2” IPS</td>
<td>2.38</td>
<td>0.264</td>
<td>1.816</td>
<td>9</td>
</tr>
<tr>
<td>4” IPS</td>
<td>4.5</td>
<td>0.409</td>
<td>3.633</td>
<td>11</td>
</tr>
<tr>
<td>6” IPS</td>
<td>6.625</td>
<td>0.602</td>
<td>5.348</td>
<td>11</td>
</tr>
<tr>
<td>8” IPS</td>
<td>8.625</td>
<td>0.784</td>
<td>6.963</td>
<td>11</td>
</tr>
<tr>
<td>10” IPS</td>
<td>10.750</td>
<td>0.977</td>
<td>8.678</td>
<td>11</td>
</tr>
<tr>
<td>12” IPS</td>
<td>12.750</td>
<td>1.159</td>
<td>10.293</td>
<td>11</td>
</tr>
<tr>
<td>14” IPS</td>
<td>14.00</td>
<td>1.273</td>
<td>11.302</td>
<td>11</td>
</tr>
<tr>
<td>16” IPS</td>
<td>16.00</td>
<td>1.455</td>
<td>12.916</td>
<td>11</td>
</tr>
</tbody>
</table>

*Approved Manufacturers:* CP CHEM Performance Pipe or CSR Poly Pipe Industries, or approved equal

**B. Polyethylene PE Fittings**

All potable water polyethylene fittings supplied under this Specification shall be high density PE 4710 polyethylene manufactured by the injection molding process, pressure class 200 or greater, and conform to the latest edition of ANSI/AWWA C901 and C906 and ANSI/NSF Standard 61. Resin used in the molding shall conform to the latest addition of the ASTM D 3350 Cell classification 445574E (HDPE 4710) with the specifications stated herein.

1. All fittings shall have the AWWA specification stamp embedment or permanent line print. All fittings shall be pressure class 200 or greater. Additional pipe thickness required for saddle fusion fittings and other fittings to reach pressure class 200 shall be on the outside of the pipe so as to not constrict the flow.

2. **Approved Manufacturers:** CP CHEM Performance Pipe, CSR Poly Pipe Industries, Central Plastics/Georg Fischer, ISCO, or approved equal
C. Installation in Contaminated Areas

For areas of known contamination or where contaminated soil is found the following materials must be used:

**Mains:** Ductile iron water pipe (DIP), Class 52 restrained joint push-on type conforming to the latest editions of ANSI/AWWA C151/A21.51, ANSI/AWWA C150/A21.50. DIP shall be asphalt coated in accordance with ANSI/A21.51 and lined with cement mortar lining of 1/16-inch minimum thickness, conforming to ANSI/AWWA C104/A21.4. Push-on joints for restrained joint pipe shall be in accordance with ANSI/AWWA C111/A21.11.

All DIP pipe and fittings shall be encased in polyethylene tubing, 8 mil thick minimum, in accordance with the latest edition of ANSI/AWWA C105/A21.5.

**Gaskets:** DIP installation in contaminated soil will require special gasket (EPDM or Fluor-Carbon depending on the contamination type/levels). Gasket submittal shall be approved by the Engineer. Gasket lubricant shall be as specified by the pipe manufacturer.

**Services:** All services in contaminated soils shall be installed or reconnected in accordance with AWWA C800 using 2 CTS inch diameter copper tubing type K meeting ASTM B88 copper tubing specification. If the existing service is not copper, the service shall be replaced with new copper tubing. All services shall be replaced or reconnected in the original size or 2” copper whichever is larger. Four inch and larger services shall be installed using DIP pipe.

**Service Saddle:** Shall be Mueller BR2B series

**Gate Valves:**

- **a.) 12” or smaller**

  Gate valves in contaminated areas shall be Mueller A2360 series, 250 psi, resilient wedge gate valves with iron body and modified wedge disk, NRS type complying with AWWA C515, AWWA C111, and ANSI A21.11; NSF 61 listed. Valves shall have a protective epoxy two part thermal setting coating on the interior and on the exterior per AWWA C550. Valves shall have mechanical joint to mechanical joint end (M.J. x MJ) or flange joint ends (FL x FL.). Joints shall be in accordance with ANSI/AWWWA C110/A21.10 or ANSI/AWWWA C111/A21.11 requirements. All bonnet and stuffing box bolts shall be 304 stainless steel. Valves shall open counter clockwise.

- **b.) 14” and 16”**

  14” and 16” gate valves in contaminated areas shall be Mueller A2361 series (or approved equal), 250 psi, resilient wedge gate valves with iron body and four point wedging mechanism, NRS type complying with AWWA C515, AWWA C111, and ANSI A21.11; NSF 61 listed. Valves shall have a protective epoxy two part thermal setting coating on the interior and on the exterior per AWWA C550. Valves shall have mechanical joint to mechanical joint end (M.J. x MJ) or flange joint ends (FL x FL.). Joints shall be in accordance with ANSI/AWWWA C110/A21.10 or ANSI/AWWWA C111/A21.11 requirements. All bonnet and stuffing box bolts shall be 304 stainless steel. Valves shall open counter clockwise.

D. Main Tapping Hardware

All hardware must be ANSI/NSF 61 listed.

**Tapping Sleeves**
CIP/DIP/PVC: Tapping sleeve shall be Mueller H-615
ACP: Tapping sleeve shall be Mueller H-619
CCP: Tapping sleeve shall be Smith-Blair or JCM 415

Ford FTSC tapping sleeves may also be used with prior approval from WGW Utility Engineering. All tapping sleeves shall be epoxy coated with 304 stainless steel washers, nuts and bolts.

HDPE: Saddle shall be HDPE 4710, class 200 electrofusion branch saddle (IPS to IPS), NSF 61 listed and meet or exceed applicable ANSI/AWWA requirements manufactured by Georg Fisher (Central) or approved equal. The fittings shall be provided with bottom underclamps or installed using a loading tool as specified by manufacturer's installation procedure.

Tapping Valves

Tapping valves shall be Mueller A2360 with flange inlets and mechanical joint outlets and be supplied with 304 stainless steel washers, nuts and bolts.

E. Electrofusion Couplings

Electrofusion couplings shall be Georg Fisher Plastics (Central), Frialen®, Plasson, or approved equal HDPE 4710, IPS DR 11 (4” through 16”) and DR 9 (2”), Class 200 or greater, and ANSI/NSF 61 listed. HDPE pipe to HDPE pipe shall be joined by butt or electro fusion.

F. Mechanical Joining Hardware

All hardware must be ANSI/NSF 61 listed.

Mechanical Joint (MJ) HDPE Adapter Kit (HDPE to PVC or DIP)

Mechanical Joint (MJ) adapter kit shall be pressure class 200 or greater, designed for fusion to HDPE pipe and mechanical connection to PVC pipe (stiffener is required for PVC pipe). Glands, material assembly and bolting shall be in accordance with ANSI A21.11 (AWWA C111); full face rubber gasket shall be included in the kit.

The MJ adapter connection shall provide a fully self-restrained joint and shall not require additional restraint.

Mechanical Couplings

All mechanical couplings (parts) shall be NSF 61 listed and pressure class 200 or greater and in accordance with ANSI/AWWA C153/A21.53:

Mechanical couplings for joining HDPE to ACP shall meet the following minimum requirements:

Sleeve: Ductile Iron ASTM A-536. Ends have smooth inside taper for uniform gasket seating.
Gaskets: Nitrile (Buna N).
Follower Flanges: Ductile Iron ASTM A-536; designed for high strength/weight ratio. Thickness determined by coupling size.
Bolts & Nuts: 304 Stainless.
Finish: asphaltic or fusion bonded epoxy coating in accordance with AWWA C213.

Mechanical couplings shall be Smith-Blair 441 - 442 OMNI Series or 461-462 Quantum Series couplings or approval equal. Stiffener inserts are required in the bores of the HDPE and ACP pipes.

Mechanical coupling for joining HDPE to CIP shall be Smith Blair Maxi-Grip EZ-W restraint coupling designed for joining HDPE and CIP (cast iron pipe). A stiffener insert is required in
the bore of the HDPE pipe.

HDPE to PVC - Mechanical Compression Coupling with restraint – PE shall be restrained by electrofusion flex restraints; PVC pipe restrained using a tapered gripping ring. Stiffener inserts in the pipe bore are required for both HDPE and PVC pipes.

**Stiffener**

The stiffeners must be stainless steel and sized to encompass the entire bearing length of the restraint devices and shall be engineered to prevent movement causing fitting to slide or rotate.

**Joint Restraints**

All joint restraints shall be EBAA IRON 2000PV series for PVC pipe and EBAA IRON MEGALUG 1100 series for ductile iron pipe, or approved equal.

**HDPE TO Flange Connection**

HDPE flange adapter shall be pressure class 200 or greater and used to join HDPE pipe to an existing flange or gate valve.

A backup ring for flange adapter shall be pressure class 200 or greater and stainless.

Bolts & Nuts: 304 stainless.

Gasket: Garlock Blue-Gard 3000 gasket, blue, nitrile rubber, full face gasket designed to be used with potable water, NSF Standard 61 compliant.

**Flexible Restraint Devices**

Electrofusible HDPE pipe flex restraint device, encased in concrete, shall be attached to HDPE pipe near all transition connections to prevent pull out of HDPE pipe and/or movement of existing pipe. Flex restraint device shall be ISCO Central Plastics/Georg Fisher, or approved equal, designed for installation after a pipe is in place, and be rated at min. 7000 lbs of force per fitting. Resin used to make this fitting shall meet the requirements of ASTM 3350 with a cell classification of 345464C.

<table>
<thead>
<tr>
<th>Pipe size (in.)</th>
<th>Approximate Pull Force (lb)</th>
<th>Calculated Number of Flex Restraints (each)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>7,553</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>13,428</td>
<td>2</td>
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<tr>
<td>10</td>
<td>20,981</td>
<td>3</td>
</tr>
<tr>
<td>12</td>
<td>30,213</td>
<td>5</td>
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<tr>
<td>14</td>
<td>41,124</td>
<td>6</td>
</tr>
<tr>
<td>16</td>
<td>53,712</td>
<td>8</td>
</tr>
</tbody>
</table>

The valve tie-back detail Trust Block Table (standard details WD-19 and WD-24) shall be used to size concrete encasement.

**G. Service Hardware and Appurtenances**

All hardware must be ANSI/NSF 61 listed

**Saddles**
HDPE 4710 main/HDPE 4710 services: Service Saddle shall be electrofusion IPS, HDPE 4710, Class 200 Central Electrofusion Branch Saddle manufactured by Georg Fisher Plastics or Frialen Electrofusion Branch Saddle manufactured by Friatec Water Inc. The fitting shall be NSF Standard 61 listed and meet or exceed ANSI/AWWA applicable requirements. Pneumatic top-loading tool is required for proper installation.

HDPE 4710 main/copper services: Service Saddle shall be Frialen VA Service Saddle manufactured by Friatec Gas Water Inc. or Central Electrofusion Transition Saddle manufactured by Georg Fisher Plastics, IPS, HDPE 4710, Class 200 with brass 360 Alloy outlet Stainless 304 compression ring. The fitting shall be NSF Standard 61 listed and meet or exceed ANSI/AWWA applicable requirements Pneumatic top-loading tool is required for proper installation. The fittings' outlets are designed for AWWA straight iron pipe thread.

PVC C-900 main/copper services: Service Saddle shall be Class 200 NSF 61 listed Mueller H-13441 (6”), 13442 (8”), 13443 (10”), 13444 (12”) with 1”, 1 ½” or 2” CC threads or approved Ford equal.

DIP or ACP main/copper services: Services Saddle shall be Class 200 NSF 61 listed Mueller BR2B series.

HDPE/Copper Service Transition

a.) Flare Nut Transition

Poly –Cam Series 914 female swivel flare nut, lead free, transition designed for connecting 2” IPS HDPE 4710 potable water services directly to Mueller angle meter valves H-14276 (2") copper flare nut and to 2” Mueller corp. stops H-15000 and H-15025.

The HDPE portion of the transition fitting shall be High Density Polyethylene Pipe (HDPE) PE 4710 SDR 9, IPS size conforming to the latest edition of ANSI/AWWA C906 and have legible marking indicating word Water, type of material HDPE 4710, cell classification 445574C or 445574E, ANSI/AWWA C906, the manufacturer’s name or trademark, IPS size, OD, SDR, resin supplier identification, and year of manufacture.

The fittings shall be conforming to NSF Standard 61.

Approved Manufacturers: Poly-Cam, Inc or approved equal

b.) Transition Fitting

This transition fitting shall be 2” IPS x 2” CTS straight and incorporate minimum 60” long straight copper pipe type K meeting ASTM B88 standard for copper tubing for potable water and minimum 18” long High Density Polyethylene Pipe (HDPE) PE 4710 SDR 9 conforming to the latest edition of ANSI/AWWA C906 and ANSI/NSF Standard 61.

The HDPE portion of the transition fitting shall have legible marking indicating word Water, type of material HDPE 4710, cell classification 445574C or 445574E, ANSI/AWWA C906, the manufacturer’s name or trademark, IPS size, OD, SDR, resin supplier identification, and year of manufacture.

The transition fitting shall be pull-out resistant (Class 1 rating).

Ball Valve for HDPE service

Ball valve shall be 2” IPS DR 9 HDPE 4710 full port ball valve with minimum pressure rating 200 psig manufactured by Georg Fisher Plastics or approved equal.

Corporation Stops
Corporation Stops for Copper Services shall be Mueller or Ford:

a.) Mueller No. 15025 or approved Ford equivalent with AWWA I.P. thread inlets and copper flare straight connection outlets to use with Frialen VA service saddle.

b.) Mueller No. 15000 or approved Ford equivalent to use with saddles on non-HDPE pipe.

Three Part Unions

Three part unions shall be Mueller H15400 CC threads or approved equal.

Angle Meter Stops

Angle meter stops shall be Mueller H-14255 or H-14276 meter swivel nut and meter flanged respectively.

Meter Boxes

All meter boxes shall be supplied by the Contractor when box replacement is required or a new service is installed. The boxes shall be the following sizes:

- 1017 box for 5/8” meters
- 1120 box for 1” meters
- 1324 box for 1-1/2” meters
- 1730 box for 2” meters
- 1416 box for double headed service with two 5/8” meters
- 2436 box for double headed service with two 1” meters

Boxes shall be supplied with self closing reading lids centered over the meter dials. Box and lid shall have a minimum Tier 5 rating (ANSI/STCE 77 2010) for sidewalk and planting strip applications and a minimum Tier 22 rating for driveway and parking lot applications. Meter boxes shall not be installed in driving lanes of public or private streets. Lids shall have “Water” marked on them.

For installation in areas subject to vehicular traffic meter box shall have H-20 load rating.

Meters

New water meters 5/8”x3/4”, 1”, 1-1/2” and 2” shall be Badger E-meters, 4” and 6” water meters shall be Badger compound water meters to be obtained from the City of Palo Alto Water Department.

H. Fire Hydrant Assemblies

Fire Hydrant assemblies shall use wet barrel type hydrants meeting AWWA C503 standards. The fire hydrant assemblies shall be constructed using the following materials:

Hydrants

Hydrants shall be Clow/Rich No. 76 in residential, commercial, and heavy industrial areas. Clow/Rich No. 76 hydrant shall be supplied with two (2) 2-1/2” and one (1) 4-1/2” outlets conforming to AWWA C503.

Hydrant Risers

Hydrant Risers shall be AVK Series 2488 Flowguard II Hydrant Check valve conforming to the latest edition of ANSI C110/A21.10 standards and AWWA C503. as shown on the Standard Detail drawing.
Hydrant Bury

Hydrant Bury shall be 6” mechanical joint ductile iron conforming to the latest edition of ANSI C110/A21.10 standards and AWWA C503, as shown on the Standard Detail drawing.

Hydrant Valves Locations

Hydrant valves shall be placed as close as practical to the water main. See specifications for hydrant valves below at Gate Valves (subpart I).

Hydrant Valve Boxes

Hydrant Valve Boxes shall be Christy G5 Traffic Box with G5C non-locking type metal traffic lid marked “Water”.

I. Gate Valves (Hydrants and Mains)

a). 12” or smaller

All gate valves shall be 250 psi, ductile iron ASTM A536 body, resilient-seated, tight closure gate valves with non-rising stems in accordance with all applicable requirements of ANSI/WWA C515 and have IPS HDPE 4710 DR 11 IPS polyethylene pipe ends; must be NSF 61 listed. All valves shall have protective interior/exterior electrostatically applied epoxy-resin coating in accordance with AWWA C550, stainless steel A2-Grade 304 bonnet bolts, and shall open counter clockwise.

Acceptable Manufacturers: American AVK or approved equal

b.) 14” or 16”

Shall be Mueller A2361 series or approved equal, 250 psi, resilient wedge gate valves with iron body and four point wedging mechanism, NRS type complying with AWWA C515, AWWA C111, and ANSI A21.11; NSF 61 listed. Valves shall have a protective epoxy two part thermal setting coating on the interior and on the exterior per AWWA C550. Valves shall have mechanical joint to mechanical joint end (M.J. x MJ) or flange joint ends (FL x FL.). Joints shall be in accordance with ANSI/AWWWA C110/A21.10 or ANSI/AWWWA C111/A21.11 requirements. All bonnet and stuffing box bolts shall be 304 stainless steel. Valves shall open counter clockwise.

J. Air Release and Air/Vacuum Valves

Air Release Valves shall conform to the latest editions of AWWA C512 manufactured by APCO, Crispin Multiplex Manufacturing Co., or approved equal. For 8” through 12” HDPE mains air valves assemblies shall be min. 1” and for 16” HDPE mains air valves assemblies shall be min. 2”. All assemblies shall have stainless steel float.

Air/Vacuum Valves shall conform to the latest editions of AWWA C512 manufactured by APCO, Crispin Multiplex Manufacturing Co., or approved equal. Valves shall have stainless steel float with the minimum size of inlet/outlet of:

1” for water mains up to 10”
2” for water mains 12” and larger

Air Release/Vacuum Valves vents shall be placed above flood planes.

K. Linestopping
Line valves shall comply with all requirements for gate valves. If the existing line valve cannot be operated to shut down the water line, a new line valve shall be installed by linestopping. The linestopping shall be performed following written approval by the Senior Project Engineer. The Contractor shall use Hydra-Stopping™, or an approved equal method of linestopping.

All linestopping equipment must be disinfected prior to use per ANSI/AWWA C651/B301.

In order to minimize potential traffic hazards, all excavation and necessary preparation, prior to line stopping and new line valve installation, shall be done one (1) day in advance prior to the actual plumbing work. Each line valve installation shall include two (2) line stops, one upstream and one downstream of the line valve to be installed, complete with all necessary equipment (i.e., bypass, sawcutters, backhoes, deck plates, traffic control, etc.) and materials (i.e., piping, disinfectant, couplings, concrete, AC, backfill, restraint, etc.), needed to assemble a complete and fully functioning line valve installation.

L. Valve Boxes

All valve boxes shall be Christy G5 Traffic Valve Box with G5C non-locking type metal lid marked “Water”. Solid 10” PVC pipe, Class 200 shall be used as extension as shown on the Utility Standards WGW standard detail.

M. Thrust Blocks

Thrust blocks shall be Class B Portland cement concrete Type II meeting the State of California Standard Specifications Section 90 requirements and sized according to the detail shown on the Utility Standards WGW standard detail WD-19.

N. Mechanical Joint Bolts

Bolts for Mechanical Joint Glands shall be high strength, low alloy steel bolts only, meeting the current provisions of American National Standard ANSI/AWWA C111/A 21.11 for rubber gasket joints for cast iron or ductile iron pipe and fittings. Bolt manufacturers certification of compliance must accompany each shipment. NSS Cor-Ten T-Bolts or approved equal.

O. Spigot Plugs

Spigot plugs shall be Johns Manville UPC0079012 or approved equal.

P. Shell Cutter

Shell cutter shall be:

Mueller Co or approved equal for tapping HDPE 4710 pipe.
Mueller Co, Pipeline Products, or approved equal for C-900 PVC and DIP pipe.

Shell cutters shall be tungsten carbide tipped, designed for an easy fit through valves, and shall have large slots for debris removal. "Drill-bit" type cutters shall not be used.

Q. Tracer Wire and Connections

All tracer wire shall be 10 AWG solid copper wire coated with .45 mils Type HMW - PE blue insulation. The wire shall meet all requirements of the latest version of ASTM D1351 and ASTM B8. Tracer wire shall be UL listed as direct burial wire at temperatures between -40° C and 75° C for circuits not exceeding 600 volts. The surface of the insulation shall be durably marked, at intervals not exceeding 24 inches, with only the following information: maximum working voltage "600 VOLTS", wire type, manufacturer's name or trademark, AWG size or circular mil area, UL required markings, and at the Contractor's option "CAUTION CPA WATER LINE".
One tracer wire shall be installed with the pipe. All tracer wire connections shall be made with Nicotap #3519J connectors wrapped with aqua seal and electrical tape. All Nicotap fittings must be installed with tooling specified by the manufacturer, the use of pliers or other crimping devices will not be allowed.

Anode boxes with 5 lb bagged Mg anode shall be installed at fire hydrants with tracer wire extending as shown on standard detail; the maximum distance between anodes shall not exceed 500 ft. The wire configuration shall be as follows: North tracer wire – terminal 1, no knot, East tracer wire – terminal 2, with one knot, South tracer wire – terminal 3, with two knots, and West tracer wire – terminal 4, with three knots.

R. Valve Stem Extension

Valve stem extensions shall be fusion coated Mueller 63209 series or approved equal, furnished with an AWWA brass wrench nut; top of AWWA brass wrench nut not to exceed two (2) feet below finished grade. The Mueller 63209 or approved equal shall have a six inch (6") diameter, 1/4-inch thick, fusion-coated black iron guide plate welded six inches (6") below the AWWA brass wrench nut. Stem extensions are to be installed on valves four (4) feet and greater, in depth, as shown on Project Drawings.

S. Bolting For Buried Flanged Joints

Use Type 304 stainless steel, ASTM A193, Grade B8 Hex Head bolts and ASTM A194, Grade 8M Hex Head nuts.

T. Flange Gaskets

Gaskets for flanged joints shall be 1/8-inch thick cloth inserted rubber, one-piece, full-face type, conforming to AWWA C207. For installation requirements in contaminated areas see 2.01-C of this Section.

U. Warning Tape

Warning tape shall be 2 inches wide, blue and carry the inscription: “Caution Buried Water Line Below”, manufactured by Calpico or approved equal. Warning tape shall be installed 12 inches above the top of the new water main (initial backfill zone).

V. Anode Boxes

All anode boxes shall be Christy G5 Traffic Valve Box with G5C non-locking type metal lid marked “Anode Water”.

W. Marker balls shall be blue 3M, Omni, or blue approved equal.

2.02 WORK MATERIALS TO BE FURNISHED BY THE CITY.

The City will provide new water meters for replacement where designated by Engineer. All other materials will be supplied by the Contractor.

2.03 WORK MATERIALS TO BE FURNISHED BY THE CONTRACTOR.

Work materials supplied by the Contractor shall include but not be limited to:

A. All polyethylene pipe and fittings, copper pipe and fittings, fire hydrant assemblies, electrofusion couplings, valves, tapping sleeves and saddles, weak links, tapping valves, corporation and meter stops, unions, anodes, meter boxes, valve and anode boxes, valve extensions, MJ adapters, mechanical and transition fittings, tracer wire, Nicotap connectors, linestopping equipment and hardware, electrical tape, aquaseal, end caps, restraints, marker
balls, and marking tapes.

B. **Expendable Concrete Materials.** Materials required to install and finish Portland cement concrete, such as form lumber, tie-wire, nails, etc.

C. **Concrete.** All Portland cement concrete including reinforcing steel, wire mesh, etc.

D. **Temporary and Permanent Fencing including traffic barricades required to provide a barrier between vehicular/pedestrian movements and excavations.**

E. **Trench Backfill Sand.** All backfill sand shall be clean imported sand, rock and salt free. Bay sand shall not be accepted.

F. **Paving Material.** All materials required for temporary and permanent street repairs including base materials.

G. **Landscaping Materials.** All landscaping materials, plants and surface improvements that are damaged due to this Work.

H. **Traffic Control Materials.** All materials damaged by Work required to direct vehicular and pedestrian traffic including striping, loop detectors, reflectors, etc.

I. **Drilling fluids and bentonite.**

J. **Non-skid trench plates.**

K. **Project notification signs.**

### 2.04 MANUFACTURER'S TESTING

**A. Health effects evaluation:** All materials in direct contact with potable water including but not limited to pipe and fittings must comply with ANSI/NSF Standard 61.

**B. Long-term hydrostatic strength:** Materials must be tested to establish that their minimum long-term hydrostatic strength is in compliance with the requirements of the applicable AWWA product standard (ANSI/AWWA C903/C906).

**C. Material cell classification:** PE materials must have a cell classification 445574E per ASTM D3350.

### 2.05 SUBMITTALS AND QUALITY CONTROL

**A.** The Manufacturer shall submit to CPA a written quality control procedure conforming to requirements of ANSI/AWWA C901 (up to 4") and C906 (4" and larger), which shall be subject to approval by CPA.

**B.** The Manufacturer shall permit CPA representatives to tour extrusion facilities for the purpose of evaluating manufacturer's capabilities. The tour shall be during extrusion of a CPA order or if prior to order placement during the extrusion of a similar material.

**C.** The Manufacturer shall certify that the plastic pipe and or fittings supplied meet all the requirements of this Specification. When requested by CPA the Manufacturer shall supply certification for all items ordered, failure to do so shall be cause for order rejection.

### 2.06 INSPECTION

CPA reserves the right to inspect each order upon delivery and, at the option of CPA, reject any items not meeting this Specification.
3.02 WATER POLYETHYLENE PIPE SYSTEM INSTALLATION - MAINS

A. Minimum size of new main

The minimum size of new HDPE water main shall be 8" (I.D. = 6.963), SDR 11.

B. Minimum/Maximum Cover

Water mains shall be installed with a minimum cover, as measured vertically from the top of pipe to the top of pavement:

<table>
<thead>
<tr>
<th>Pipe Diameter</th>
<th>Minimum Depth of Cover</th>
<th>Maximum Depth of Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>8&quot;</td>
<td>3'</td>
<td>4.5'</td>
</tr>
<tr>
<td>10&quot; -16&quot;</td>
<td>4'</td>
<td>4.5'</td>
</tr>
</tbody>
</table>

C. Underground Clearances

Water Mains, and Sewers and Other Non-potable Fluid-carrying Pipelines

Parallel Construction: The distance between new water mains and sewer lines shall be at least 10 feet horizontally and one foot vertically above. These separation distances shall be measured from the nearest edge of the facilities.

Water mains and non-potable fluid-carrying pipelines shall not be installed in the same trench.

Exceptions to the basic separation standards shall comply with the "Criteria for the Separation of Water Mains and Non-Potable Pipelines" and will be reviewed by the City on a case by case basis. (See Utility Standard Detail #WGW-08 and “Guidance Memo No. 2003-02: Guidance Criteria For The Separation Of Water Mains and Non-Potable Pipelines,” dated October 16, 2003 from the California Department of Health Services)

Other Facilities

Unless otherwise specified a minimum of 12 inches vertically and 48 inches horizontally shall be maintained between the pipe surface and other utility lines or adjacent foreign structures surfaces.

In the event that it is not possible to maintain required vertical clearance from other structures, the Contractor shall case the water main in steel pipe or concrete at the discretion of the City's representative.

If horizontal separation is between 1’ to 4’, review and approval by WGW Engineering Department is required. Horizontal separation less than 1’ is prohibited.

D. Location

1. Water mains shall be located seven (7) feet off the lip of gutter/edge of pavement on the north and east side of streets, unless otherwise specified on the Project Drawings.

2. Water services shall be installed perpendicular from the water main in the shortest straight line to the water meter. Water meters and services shall be installed 5’ minimum from trees, edge of driveway, and the sanitary sewer house lateral.

3. Water meters two inches and smaller in size shall be installed in the public right-of-way. The meter location and installation shall conform to the standard details.
4. Water meters larger than two inches in size shall be installed on the customer's property, adjacent to the customer's property line. The meter location and installation shall conform to the standard details.

E. Maximum Velocity of Flow for Water Main

The maximum design flow velocity in any water main shall not exceed 7 feet per second, based on the maximum calculated loads.

F. Water Pipe Bedding

Trench shall be free of debris, sharp rocks, etc. before adding the sand bed for the new water main. Sand bed shall have a minimum thickness of 4" below and 12" above the water main.

G. Location of Valves

Valves in water mains shall, where possible, be located on property line extensions unless shown otherwise on the Drawings. Each valve's position shall be GPS surveyed and data submitted in the required format to the City along with the set of record drawings of Work performed. On record drawings, valves shall be tied to two existing permanent physical features in the field. The horizontal distances tied to the valve shall be less than 100 feet.

In order to minimize customer shutdowns and construction time, line stopping for the installation of line valves, shall be implemented as shown on the Project Drawings or as directed by the Engineer.

Where no permanent fixtures are available in the right-of-way, the valves shall be located by a 4"x 4" x 6' redwood post, offset 5 feet from the mains, painted white with the words "WATER VALVE" painted in 3 inch black block letters on all FOUR sides of post.

H. Valve Boxes and Valve Pits

A valve box provided by the Contractor with a cast iron lid marked water and metal lip ring shall be installed over each valve as shown on the Plan. The riser from the valve box to the top of the installed valve shall be constructed of solid 10" PVC pipe and shall be sized to fit the valve box installed.

Tracer wire shall be extended up from the main along the O.D. of each valve riser into the valve box. A three foot (3') coil of the wire will remain inside the valve box on each end of the tracer wire as shown on the Drawings.

I. Main Filling

All main filling shall be done in the presence of the Engineer and field operations personnel. Suitable corporation stops shall be installed on the main by the Contractor, so as to remove trapped air from the main. Payment for main filling shall be included in price paid per linear foot of water main installation and no separate payments will be made.

J. Marker Balls shall be placed above all fittings, taps, changes in main alignments and other locations as determined by the Engineer.

K. Maximum Pull Force

A commercially available weak link approved by the Engineer shall be used, in accordance with manufacturer’s recommendations, between the puller and the pipe. The maximum pull force for PE 4710 HDPE shall be **less than:**
### 3.03 WATER SERVICES

All new services, except in the area of known contamination shall be HDPE 4710, installed as shown on the Construction drawings and described in Specifications. In the area of known contamination existing copper service shall be replaced with copper, as directed on the Construction drawings. All connections are to be electrofusion type HDPE portion of a new service and flare type HDPE /Cu transition to angle meter stop. Flare type connections shall be used on all reconnected copper services.

The minimum distance between service taps shall be 24 inches. New services shall be installed perpendicular to the main. All new services shall be shown accurately on the "as-built" drawings and tied to existing property lines.

Tracer wire shall be installed along with all new HDPE services.

Transfer or reconnection of a water service from the existing main to a new main may cause an interruption in the customer's service. The contractor must notify the customer via door hanger notices, 24 hours in advance of the service interruption with the approximate time (8 am - 12 pm or 1 pm - 5 pm) and duration of the service interruption. At that time of service interruption, the customer will be notified by ringing the door bell or knocking. The customer's main water valve will be closed if it can be located. After the service has been transferred/reconnected the customer's main water valve will be opened, and customer's service pipe flushed through a hose bib to remove air, sand, chlorine, shaving material, etc.

#### A. Minimum size of new service

The minimum size of a new and replacement water service shall be 2" IPS HDPE 4710 pipe. For installation requirements in contaminated areas see 2.01-C of this Section.

#### B. Depth

Water services shall be installed with a minimum cover of 24", as measured vertically from the top of pipe to the top of pavement. The maximum depth of installation shall not exceed 30".

#### C. Maximum Velocity of flow

The maximum design flow velocity in any residential or commercial water service shall not exceed 10 feet per second, based on the maximum calculated loads.

### 3.04 HYDRANT ASSEMBLIES AND FIRE SERVICES

Hydrant Assemblies shall be installed and field tested according to the requirements of AWWA M17, ANSI/AWWA C503 and as shown on the Drawings.
Prior to reconnection, all existing fire services shall be potholed by the Contractor to avoid possible conflicts. Existing fire service pipe shall be joined with new HDPE pipe, connected to a new HDPE water main, by MJ adapter as shown on WGW Utility Standard Detail. Contractor may be required to furnish shop drawings of how re-connection will be constructed and shall inform the nearest City Fire Station, City Communications Center, and Customer regarding the fire service work. The Contractor will be required to make all necessary schedule arrangements to accommodate the customer’s needs.

PART 4 -- TESTING

4.01 Testing and Inspection

The Engineer or Inspector shall have access to the Work at all times whenever it is in preparation or progress, and the Contractor shall provide proper facilities for such access and inspection. If the Specifications, the Engineer's instructions, law, ordinances, or any other public authority require any work to be specially tested or approved, the Contractor shall give the Engineer 24 hours notice of its readiness for inspection, and if the inspection is by an authority other than the Engineer, the Contractor shall make special arrangements for the outside authority to make its inspection. Inspections by the Engineer will be promptly made.

Work covered up without approval or consent of the Engineer, shall, if required by the Engineer, be uncovered for examination and properly restored at the Contractor's expense if the Work is not in conformance with the Drawings and Specifications.

Authorized Inspectors will be considered to be the representatives of the City limited to the duties and powers entrusted to them. It will be the Inspectors' duty to inspect materials and workmanship of those portions of the Work to which they are assigned, either individually or collectively, under the instructions of the Engineer and to report any and all deviations from the Drawings, Specifications and other Contract provisions which may come to their notice.

An Inspector will order the Work entrusted to his/her supervision stopped if in his opinion such action becomes necessary. The Engineer will be notified and will determine if the Work is proceeding in due fulfillment of all Contract requirements. All pipe and accessories shall be laid, jointed and tested under pressure for defects and leakage in a manner specified, in the presence of and as approved by the Engineer.

A. Connection to Existing Main

The Contractor shall make connections to existing mains where indicated on the Drawings. All necessary preparation (not limiting to traffic control and excavation) for system connections shall be done one (1) day prior to actual materials installation. The new water mains are to be kept isolated from the City system until they are flushed and bacteriologically tested and accepted. New system isolation by a closed valve will not be permitted. The Engineer will review the Contractor's method and sequence of connecting to existing mains to minimize contamination danger. (Connections to existing valves prior to obtaining satisfactory leakage and pressure tests of the new facilities will not be allowed.)

The City assumes no responsibility for the water tightness of existing valves. If necessary, the Contractor must work with City of Palo Alto to accomplish water tightness of existing valves. All costs and expenses for obtaining water tightness shall be included in the bid price for various bid items and no special compensation shall be allowed.

Service interruption on existing mains impacted by the shutdown shall be coordinated with the Engineer who will specify time and duration of the interruption. The Contractor shall notify all affected users in writing at least 48 hours in advance of service interruption. The Contractor shall notify the City's Water-Gas-Wastewater Operations Division (496-6967) at least 5-days in advance to schedule valve closings for service interruptions. Manipulation of existing valves will only be done by or under the direction of City Water Division.
personnel.

After the new water system has been flushed, bacteriologically accepted, pressure and leak tested, and placed into service, all valves in the system shall be maintained in an "on" position except as directed by the Engineer.

B. Hydrostatic Pressure and Leak Testing

Installed main shall be adequately anchored with a covering of at least 6" of initial backfill, if installed by an open trench method. The joints and fittings, particularly flange connections shall be left uncovered for visual leak inspection.

Leak tests of HDPE water system shall be conducted in accordance with ASTM F2164. The pipeline should be slowly filled with potable water and all trapped air bled off. The main should undergo a hydrostatic pressure test using pressure at the lowest elevation in the system at 150 psi. The pressure shall be maintained constant for 4-hour period by adding makeup water. After 4-hour period is completed, the pressure shall remain steady within 5% (7.5 psi) of a target 150 psi test pressure for one hour.

The total test time should not exceed 8 hours. If the pipeline has to be retested – the pipe must be depressurized and allowed to “relax” for at least 8 hours before the next testing sequence.

In fused polyethylene water piping system no leakage shall be present. If leakage is observed at a fusion joint, complete rupture may be imminent. The Contractor shall move all personnel away from the joint and depressurize the main. Leaks, failure or defective construction shall be promptly repaired by the Contractor at the Contractor’s sole expense.

Payment for pressure and leakage testing shall be considered included in the price paid per linear foot for water main installation.

C. Disinfection and Bacteriological Testing

Newly installed potable water pipelines require disinfection in accordance with ANSI/AWWA C651/B301. The disinfection should take place after the initial flushing and after the completion of the pressure testing.

Injection of liquid chlorine solution shall be used to disinfect HDPE water mains. The disinfecting solution should not contain more than 12 percent of active chlorine. Prolonged exposure to highly concentrated disinfection chemicals may damage the inside surface of HDPE pipe and is to be avoided.

Air is to be exhausted from each high point, dead end, branch run and hydrant run. The chlorinated water shall be removed prior to samples being collected for bacteriological testing.

Before bacteriological testing samples are taken, each hydrant run, branch run and dead end shall be thoroughly flushed to clear foreign matter and until the residual chlorine concentration is less than one part per million. The Contractor shall measure residual chlorine concentrations by using a color comparator test that is witnessed and approved by the Inspector.

After the chlorine concentration is less than 1 ppm, samples shall be gathered and tests conducted according to the provisions of AWWA C651-92, at the expense of the Contractor, by a laboratory approved by the Engineer. Samples shall be taken at representative points as required to thoroughly test the installed main.

The Contractor will be required to perform two consecutive 24-hour apart Coliform tests. Testing laboratory used by the Contractor shall be State Certified and provide QA/QC report.
The new facilities shall remain isolated and out of service until satisfactory test results have been obtained that meet the requirements of the California Department of Public Health (CDPH) and the Engineer has accepted the results as indicative of the bacteriological condition of the new water main. If unsatisfactory or doubtful results are obtained from the initial sampling, the chlorination process shall be repeated until acceptable test results are obtained. The bacteriological test takes at least 48 hours for results to be conclusive.

Individual new water services will be flushed thru the angle meter stop after connection to the new water main.

Payment for disinfecting water mains shall be considered included in the price paid per linear foot for water main installation.

Disposal of chlorinated water shall comply with all federal, state, and local regulatory requirements. Disposal directly to the storm drain system without removal of chlorine is strictly prohibited. No discharge into the storm drain system shall be allowed during rain. Upon termination of the flushing, any standing water in the gutter shall be removed by sweeping it to the nearest storm drain catch basin. Flushing of chlorinated water directly into the sanitary sewer system will only be allowed with the written approval of the City.

New water mains must be tied-in into water distribution system within 24 hours following the Engineer’s acceptance of the bacteriological tests’ results or the Contractor will be required to repeat flushing, disinfection and bacteriological testing procedures at the Contractor’s expense.

The new pipe, connections, and fittings must be kept clean and swabbed with a 5% solution of hypochlorite before installation.

D. Washing/Flushing Vehicles

All vehicles used for street washing or flushing must be equipped with meters and have air gap separation connection to hydrants and filling tanks.

PART 5 – DESIGN AND REGULATORY STANDARDS

A. Load

The design load shall be the total present (and additional future) water demand as presented on the Utilities Application - Load Sheet.

B. Calculating Service Size

The service size calculation must be based on the use of the Hazen-Williams Formula to calculate the head loss due to the pipe friction.

C. Available Pressure

The service designer must consult the Fire Hydrant Flow Data available at Fire Station 5 located at 600 Arastradero Rd. (Phone 650-329-2187), and the Pressure Contour Map for an estimate of static pressure at the water supply main. The water pressures in the distribution system vary with the elevations of the area served. During average demand conditions, pressures range from 30 to 125 pounds per square inch, psi, with an average of 50 psi which is sufficient for normal water delivery. However, the City does not guarantee any water main pressure, during peak hour and/or emergency conditions, certain areas of the City are subject to inadequate pressures. The water pressure on Foothill properties, west of highway 280, may be as high as 200 psi.

D. Blowoffs and air release valves
1. Water mains shall not be designed as dead end mains. Easements shall be provided to cross-tie water mains in cul-de-sacs and as required by the City.

2. Blowoffs shall be provided at all low points and as required by the City. Temporary blowoffs shall be provided as necessary to pressure test and chlorinate the water mains.

3. Vacuum and air release valves shall be installed at all summits in the water main and as directed by the City.

E. Valves

1. All line valves 12” or smaller shall be 250 psi, ductile iron ASTM A536 body, resilient-seated, tight closure gate valves with non-rising stems in accordance with all applicable requirements of ANSI/AWWA C515 and have IPS HDPE 4710 DR 11 IPS polyethylene pipe ends; must be NSF 61 listed. All valves shall have protective interior/exterior electrostatically applied epoxy-resin coating in accordance with AWWA C550, stainless steel A2-Grade 304 bonnet bolts, and shall open counter clockwise. For installation requirements in contaminated areas see 2.01 –C of this section.

2. 14” and 16” valves shall be Mueller A2361 series, 250 psi, resilient wedge gate valves with iron body and four point wedging mechanism, NRS type complying with AWWA C515, AWWA C111, and ANSI A21.11; NSF 61 listed. Valves shall have a protective epoxy two part thermal setting coating on the interior and on the exterior per AWWA C550. Valves shall have mechanical joint to mechanical joint end (M.J. x MJ) or flange joint ends (FL x FL.). Joints shall be in accordance with ANSI/AWWWA C110/A21.10 or ANSI/AWWWA C111/A21.11 requirements. All bonnet and stuffing box bolts shall be 304 stainless steel. Valves shall open counter clockwise.

3. A 2” HDPE bypass with 2” full port ball valve (NSF 61 listed) shall be installed around each 14” and 16” valve to facilitate operation of the valve (standard detail WD-20).

4. Four water valves shall be installed at each water main intersection or cross and three valves shall be installed at each water main tee at the property line extensions, see Figure 1.

F. Meter Bypasses

Some customers, such as hospitals, schools, beauty shops, and factories with processes requiring uninterrupted water service shall have bypasses installed around the meter so that...
tests at regular intervals and repairs can be carried out without inconvenience to either the customer or the utility.

G. Elevation of the Customer’s System

Customers on hillsides or in high-rise buildings will be affected by the difference in elevation between the utility’s water main and customer’s outlet. If the customer is at an elevation less than that of the water main, then he can anticipate a higher pressure than that in the main, and conversely, the homeowner at a higher elevation than the main will encounter lower water pressure.

Multistory buildings will often be too high to use the available main pressure, and pumping will be necessary. It is the responsibility of the customer’s engineer to design the system from the meter outlet to determine the pressure that will be available to meet their demand.

H. Pressure Reducing Valves

Pressure reducing valves (PRVs) are used in mountainous and hilly areas to control the downstream pressure and protect the property owner’s plumbing from excessive pressure when his building is located in the lower elevations of the pressure zone. These are installed by the customer at the meter or at a suitable location in the customer’s plumbing system to permit reduced pressure to the house fixtures. PRV’s must be installed to leave maximum pressure at outside hydrants. It is customer’s responsibility to install and maintain PRVs.

I. New Developments

When the City deems it necessary, the Developer will be asked to create a water model to show that the existing water distribution system will not be impacted by the new development. The applicant’s engineer shall prepare and submit a complete report for the new subdivision water distribution system. The report shall consist of an engineering study including a computer hydraulic water model. The study report shall analyze the existing City of Palo Alto water system and the new development by the use a hydraulics model. The recommendations for the new development water system improvements shall include a cost estimate and suggested design criteria.

J. Irrigation Meters

Water service for all new and rehabilitated industrial, commercial, and institutional landscaping and new and rehabilitated multi family common areas requiring a permit or review by the City shall be provided by a separate irrigation meter. This meter shall be designed as an irrigation account and no other utilities will be billed on such accounts. The customer shall pay for the additional service according to rate schedule W-5.

K. Fire Hydrants

Fire hydrants shall be located no more than 500 feet apart in residential areas and no more than 300 feet apart in the downtown areas. Locations and usage shall comply with City of Palo Alto Rule and Regulation 21.

L. Cross Connection Control

Cross Connection Control shall be installed per the City of Palo Alto SPECIAL WATER UTILITY REGULATION 21-E entitled “Water System Protection”, the revised California Administrative Code (Title 17, Sections 7583 through 7605 inclusive protecting the public water supply against actual or potential cross-connections), and standard drawings WD-17 through WD-18D. For further questions contact the Utilities Cross Connection Inspector at 650-496-6972.

1. Type of Protection Required
The type of protection provided to prevent backflow into the public water supply will be commensurate with the degree of hazard that exists on the consumer's premises as determined by the Cross-Connection Control Officer.

Reference: California Administrative Code, Title 17, Section 7604

Where the water service may not be interrupted during normal working hours, two parallel backflow preventer assemblies shall be installed.

2. Testing and Maintenance of Backflow Preventers

The Cross-Connection Control Officer will ensure that adequate maintenance and periodic testing is provided. Backflow preventers will be tested by a certified tester. Backflow preventers will be tested at least annually or more frequently if determined to be necessary by the Cross-Connection Control Officer. When a backflow preventer is found to be defective, it shall be repaired or replaced within 30 calendar days. Backflow preventers will be tested immediately after installation, relocation, or repair prior to being placed into service. The Cross-Connection Control Officer will notify the water user when testing is needed. Reports of testing and maintenance will be maintained by the City of Palo Alto for a minimum of three years. These regulations are to be reasonably interpreted. It is the intent of these regulations to recognize that there are varying degrees of hazard and to apply the principle that the degree of protection should be commensurate with the degree of hazard. It is recognized that the control of cross-connections requires cooperation between the City of Palo Alto, the water consumer, and the California Department of Public Health. The City of Palo Alto has the primary responsibility to prevent water from unapproved sources, or any other substance from entering the public water supply system. The California Department of Public Health has the overall responsibility for preventing water from unapproved sources from entering either the potable water system within consumer's premises or the public water supply.

Reference: California Administrative Code, Title 17, Section 7605

3. Parallel Reduced Pressure Principle Assemblies

Parallel reduced pressure principle assemblies shall be installed for all locations where the water can not be interrupted during normal working hours.

List of approved Backflow Preventers:

Only backflow assemblies approved for the State of California by USC Foundation for Cross-Connection Control and Hydraulic Research may be used.

5.01 Water Service Abandonment Procedure

1. Excavate the existing water service at the main.

2. Service with a corporation stop and service saddle; turn off the corporation stop and check for leaks. Cut the copper or HDPE tubing with a tubing cutter and bend both cut ends over approximately 1" from cut end (copper service) or electrofuse HDPE electro fusion end cap (HDPE service).

3. Service with a corporation stop with no service saddle; notify all effected water customers of the service interruption. Coordinate water shutdown with affected customers and C.P.A. Utilities. Remove the corporation stop and install a Mueller or Ford repair clamp. Any leaks, failures, or defective repairs shall be promptly repaired by the contractor.

4. Remove the water meter and salvage to the City of Palo Alto corporation yard water meter repair shop.
5. Remove the abandoned water meter vault and backfill and compact hole to City standards with top soil or clay dirt.

6. Backfill, compact and pave hole at the main per trench backfill standard detail Std. WD-01.

7. Abandonment of all existing water services shall be witnessed by Palo Alto's Utilities Inspector. Schedule WGW utilities inspections at 650/566-4504 five working days before start of abandonment.

5.02 ACP Pipe and Hazardous Material Disposal

Asbestos containing pipe will not be accepted by the City landfill and must be properly disposed of per State and Federal regulations. Contractor and subcontractors, if any, shall be in full compliance with any and all laws, orders, citations, rules, regulations, standings and statutes in effect with respect to handling, storage and removal of Hazardous Material. Contractor accepts sole responsibility for insuring the adequacy of any required use of all safety practices, procedures and equipment.

END OF SECTION