

SECTION F

**SUPPLEMENTAL SPECIAL PROVISIONS AND STANDARD DRAWINGS
FOR THE RECYCLED WATER RETROFITS FOR
SOUTH HIGH SCHOOL AND CALLE MAYOR MIDDLE SCHOOL**

SECTION F

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SECTION 01001

SUPPLEMENTAL SPECIAL PROVISIONS

PART 1 - GENERAL

A. Responsible Agencies and Contacts

West Basin Municipal Water District (WBMWD) distributes recycled water on a wholesale basis. The local water and recycled water purveyor is City of Torrance. South High School and Calle Mayor Middle School are owned and operated by the Torrance Unified School District (TUSD). The existing school irrigation systems are connected to potable water. The purpose of this project is to convert the existing irrigation systems from potable water to recycled water.

The Contractor shall provide the City and TUSD; a) Tobacco/Alcohol Certificate, b) Drug Free Workplace Certification and c) Fingerprint Certification for all its employees that shall be working on or in the vicinity of school property.

Prior to converting the existing irrigation systems to recycled water and begin delivering recycled water, a successful cross-connection and coverage test will be required. The following agencies may be participating in the cross-connection and coverage test: WBMWD; City of Torrance; County of Los Angeles Department of Public Health; State of California Department of Public Health (DPH); and the Engineering Consultant's representative from RMC, Inc. Contractor will be required to sequence his work to allow for the cross-connection and coverage test prior to performing the disconnection of the potable water and connection of the recycled water to the existing irrigation system. The Contractor shall be present during this test to assist as necessary during testing. The Contractor shall provide a minimum two (2) laborers in addition to the foreman to install and operate the temporary connection and assist as necessary during the testing for a period of eight (8) hours for each test.

The following is a summary of these agencies and their responsible contact information:

City of Torrance: Mr. John Dettle	(310) 618-3059
Torrance Unified School District: Mr. Cesar Vergara	(310) 972-6241
WBMWD Project Manager: Mr. Frank Fuchs	(310) 660-6225
County of Los Angeles Department of Public Health: Mr. Carlos Borja	(626) 430-5295
State of California Department of Health Services: Mr. Jeff O'Keefe	(213) 580-3181
RMC, Inc. Project Manager: Mr. Kraig Erickson	(310) 566-6460

B. Cross-Connection Testing

Prior to the beginning of construction, an initial cross-connection inspection/test will be coordinated by the City, TUSD, and Department of Public Health Agencies. The test will follow the general guidelines outlined in Section F of the Recycled Water Urban Irrigation User's Manual. The purpose of the test is to determine if there are any connections between the existing irrigation system and the potable water system prior to construction.

After the construction work has been completed a final cross-connection test will be performed. This on-site test is to ensure the absolute separation of the recycled and potable water systems. The City will coordinate the scheduling of the cross-connection test. The shutdown test procedure is detailed in Section F of the Recycled Water Urban Irrigation User's Manual. The Contractor shall assume that the testing will take one day at each site.

The Contractor shall provide a temporary water supply from a fire service to the proposed recycled water service for the test at South High School and Calle Mayor Middle School. The Contractor shall coordinate and pay for a temporary water meter from the local water purveyor. The temporary water shall be protected with an RP back flow device approved by the City. The Contractor to provide all temporary piping and appurtenances necessary for the temporary water supply.

C. Schedule Constraints

The Contractor shall notify the City in writing three (3) calendar days prior to beginning of construction activities at each site. The Contractor shall assume at least a one week time period (five (5) consecutive working days) will be required from the date of the written notification to the City that the site is ready for final cross-connection testing for the completion of the final cross-connection test.

The Contractor shall keep the existing irrigation system operational during construction to facilitate maintenance of the park. When it is necessary to de-activate the existing system or portions thereof, the Contractor shall coordinate with the City so as not to unduly hamper their maintenance work. After the Contractor's work is complete and the final acceptance of the new irrigation system is made, the Contractor shall terminate all service to the old system.

D. Construction Sequencing

A pre-construction meeting with the City, TUSD and Los Angeles County Department of Public Health will be held with the Contractor prior to any construction activities to discuss the overall project, define the specific work requirements and cover any questions.

All buried piping shall be inspected by the City field representative and Los Angeles County Department of Public Health prior to being backfilled. If any recycled water, potable water, non-potable water piping is buried before field inspection, all or any portion of the piping system may be required to be exposed and corrected as necessary.

After the construction work has been completed the Contractor shall notify the City in writing so the final inspection and cross-connection test can be scheduled.

During the final cross-connection test, a punch list may be generated which the Contractor will be required to complete prior to connecting the irrigation system to the recycled water system. The City will notify the Contractor in writing of the successful completion of the final cross-connection testing.

This construction sequencing is further explained within Section G of the Recycled Water Urban Irrigation User's Manual.

E. Detailed Specifications

The material specifications for all products and the execution requirements for these products shall be per these Specifications and the Recycled Water Urban Irrigation User's Manual. If the material is not covered within the above Specifications, then the Standard Specifications for Public Works Construction ("Greenbook" 2012 edition) shall govern.

F. Restoration of Improvements

The Contractor shall be responsible for the protection of all trees, shrubs, irrigation systems, fences, hardscape, walkways, street and other landscape items adjacent to or within the work area, unless they are directed to do otherwise on the Plans.

In the event of damage to City/School improvements, the Contractor shall replace the damaged items in a manner satisfactory to the City.

All curbs, gutters, driveways, sidewalks, buildings, equipment, roadways, utilities, grounds, landscaping, irrigation and similar improvements that are broken or damaged by the Contractor's operations shall be reconstructed by the Contractor. Reconstruction shall be of the same kind of materials with the same finish and in no less than the same dimensions as the original work. Repairs shall be made by removing and replacing the entire portion between joints or scores and not merely refinishing any damaged part. All work shall match the appearance of the existing improvements as nearly as possible.

Parking lots and roads in which the surface is removed, broken, or damaged, or in which the ground has caved or settled during the work under this Contract, shall be resurfaced and brought to the original grade and section. Parking lots and roadways used by the Contractor shall be cleaned and repaired. Before resurfacing material is placed, edges of pavements shall be trimmed back far enough to provide clean, solid, vertical faces, and shall be free of loose material.

Planted areas (including grass) and hardscape areas which are damaged by actions of the Contractor shall be restored as nearly as possible to their original condition. All trees, bushes or shrubbery that are removed or cut must be replaced with similar kind and quality. All irrigation lines that are cut or damaged during the construction activities shall be repaired by approved methods to good working order at the end of each day. The Contractor shall be responsible for maintaining and cleaning up of all areas within each park of all paper, debris, etc., occurring from his construction activity. The Contractor shall resod all grass areas damaged during the construction activities. This restoration shall include placement of five (5) inches of good topsoil, along with resodding and/or replacement of the landscape items.

G. Separation Requirements

All potable water, recycled water and sewer lines shall be installed to maintain a 10-foot minimum horizontal separation between utilities. Parallel construction of recycled water mains shall maintain a minimum of four (4) feet outside diameter to outside diameter clearance as shown on WBMWD Standard Drawing RW-21. Normally, water, sewer and recycled water shall be located vertically from the finish surface in order of the higher quality, i.e., water shall be above recycled water and recycled water shall be above sewer. A minimum of 1-foot clearance vertically between the utilities should be maintained at all times. Whenever a crossing must occur where there is no alternative but to install the main with

less than the required horizontal separation or not in the higher quality, special construction will be required as shown on WBMWD Standard Drawing RW21 or as directed by the City.

H. Traffic Requirements

Pedestrian, vehicle traffic flow and pedestrian traffic through the schools shall be maintained at all times. If it is necessary to impact any vehicle traffic, the Contractor shall obtain approval from the City two days prior to disturbing the normal traffic flow. The Contractor shall maintain the access roads through the project site and shall keep all public roads around the schools open to public traffic. The Contractor shall conduct his operations to cause the least possible obstruction to traffic and inconvenience to the public.

The Contractor shall provide traffic control for street work within the schools. Traffic control limited to one lane closure shall be in conformance with the City of Torrance Standard Drawings for Traffic Control.

If two traffic lanes are required the Contractor is required to prepare traffic control plans in conformance with the latest Watch Manual and CA MUTCD. The traffic control plans shall be prepared by a registered civil or traffic engineer licensed in the State of California. The Contractor shall submit traffic control plans to the City for approval.

The Contractor shall provide a four (4) week review time of traffic control plans.

I. Contractor's Records/As-Built Drawings

The stamped set of approved plans and specifications shall be on the jobsite at all times and in addition the Contractor shall maintain "As-Built" drawings of all work, continuously as the job progresses. A separate set of prints for this purpose shall be required and these drawings shall be up-to-date. Upon completion of the project, the Contractor shall provide the "As-Built" corrections on a copy of the plans.

J. Job Site Safety

Contractor acknowledges responsibility for jobsite safety and acknowledges that the City, WBMWD, TUSD or engineer (RMC, Inc.) will not have any such responsibility.

K. Contractor's License

The Contractor shall possess a valid Class A Contractor's license or better at the time of submitting bids.

L. Control Of Materials

All testing of materials to be furnished by the Contractor, testing of materials placement, and testing of manufactured materials shall be the responsibility of the Contractor and shall be done by and under the supervision and direction of a licensed California Registered Engineer or Geotechnical Engineer. This includes all compacting testing stated in Section 02223, Part 1.C.7. The City will not provide any testing services and all costs for testing shall be borne by the Contractor. The Contractor shall notify the City 24 hours prior to any planned testing. The Contractor shall submit all test results to the City. The City reserves the right at their discretion to perform their own independent testing.

M. Construction Staking

The Contractor shall be responsible for providing all construction staking required to prosecute the work of the contract. The City will not perform any construction survey staking. The construction staking shall be done under the direction and supervision of a Registered Licensed Surveyor. The Contractor shall provide the City with copies of all cut sheets. The accuracy of all the Contractor's stakes, alignments and grades is the responsibility of the Contractor. However, the City has the discretionary right to check the Contractor's stakes, alignments, and grades at any time. Where such discretion is to be exercised by the City, the City will notify the Contractor of their intention, stating the time at which the checking will commence. Any part of the work in progress, the results of which are predicated directly upon the Contractor's stakes, alignments, or grades to be checked, shall be held in abeyance until the City has notified the Contractor that the checking has been completed.

N. Drawings and Verification of Dimensions

All plot plan dimensions are approximate, and shall be checked and verified by the Contractor before proceeding with work. The Contractor shall report all variations from those indicated in the plot plan to the City, TUSD and the Designer.

For clarity and legibility, pipelines and electrical lines are diagrammatic. The sizes and location of equipment are drawn to scale wherever possible.

O. Shop Drawing Submittals

Shop drawings shall be submitted in accordance with Specification Section 01300 – Contractor Submittals.

The Contractor shall include as part of their bid the costs associated with the preparation of Shop Drawings for the following critical scheduling items:

1. DIP, CL350
2. PVC CL315 Pipe
3. Transition Couplings
4. RPPD
5. Protective Enclosures
6. Recycled Water Identification Signs
7. Potable/Non-Potable/Recycled Water Identification Tags and Labels
8. RW Quick Coupler
9. Brass Pipe
10. Bronze Valves
11. Copper Pipe
12. Pressure Reducing Valve
13. Concrete Mix
14. Sand Bedding
15. Asphalt Paving
16. Aggregate Base
17. Resilient Wedge Gate Valves
18. Valve Box

P. Lead Free Plumbing (For Potable Water Only)

In September 2006, the State Legislature passed Assembly Bill 1953 prohibiting the use of any pipe, pipe or plumbing fitting or fixture, solder or flux that is not lead free in the

installation or repair of any fixture intended to convey or dispense water for human consumption. The prohibition has been in effect since January 1, 2010.

All potable water facilities shall be provided with materials that meet the lead free requirements as defined in AB 1953, and certified by an independent American National Standards Institute (ANSI) accredited third party, including but not limited to, NSF International, as being in compliance with section 116875 (g) of the Health and Safety Code as amended by AB 1953. Each shipment shall contain a copy of the certification that the item is lead free as defined by AB 1953.

Q. Asbestos Materials

It is the specific intent of these Contract Documents to exclude from the work any and all products or materials containing asbestos. No products containing asbestos shall be incorporated in the work.

Water lines constructed of asbestos cement pipe are unknown to exist in the area and have not been identified on the plans based on the best utility information available. If asbestos materials are encountered during any work, the Contractor shall promptly notify the City in writing. Removal of existing asbestos material shall be performed by a Contractor registered by CAL/OSHA and certified by the State Contractors Licensing Board for asbestos removal. Copies of the certification shall be submitted to the City prior to the commencement of any asbestos removal activities. The Contractor or subcontractor shall comply with all State and Federal laws regarding handling and removal of asbestos materials. Removal of asbestos materials from the project site and disposal at an authorized disposal facility will be the responsibility of the Contractor and all costs for this will be borne by the Contractor.

In the specific instance of making piping connections to existing asbestos cement pipe, the Contractor shall disconnect, at the nearest joints, the length of asbestos cement pipe to be connected into. This length of existing asbestos cement pipe will be replaced by the new pipe making the tie-in.

R. New Potable Water Service and Recycled Water Service

The City of Torrance will request and obtain new potable water service and or new recycled water service. The Contractor shall notify the City in writing three (3) weeks in advance when these services are required.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

END OF SECTION

SECTION 01045

EXISTING FACILITIES

PART 1 - GENERAL

A. Description This section includes requirements for connection to existing School facilities.

B. Related Work Specified Elsewhere

All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).

Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

- 1 Trenching, Backfilling, and Compacting: WBMWD Standard Specifications Section 306-1
- 2 Hydrostatic Testing of Pressure Pipelines: WBMWD Standard Specifications Section 306-1.4
- 3 Main Line Valves: WBMWD Standard Specifications Section 207-26.2.1

C. Condition of Existing Facilities

The City does not warranty the condition, size, material, and location of existing facilities. The contractor shall be responsible for verifying the properties of the existing pipe that will be connected to the proposed piping.

D. Location

The contractor shall be responsible for potholing and verifying in advance the location of all existing pipelines as shown on the plans.

E. Protection of Existing Utilities and Facilities

- 1 The contractor shall be responsible for the care and protection of all existing sewer pipe, water pipe, gas mains, culverts, power or communications lines, sidewalks, curbs, pavement, or other facilities and structures that may be encountered in or near the area of the work.
- 2 It shall be the duty of the contractor to notify Underground Service Alert and each agency of jurisdiction and make arrangements for locating their facilities prior to beginning construction.
- 3 The Contractor shall submit a plan as to the method the Contractor will use to protect and support any utilities which will become exposed during excavation or that which are vulnerable to failure due to unsupported trenches or other construction activity.

4. In the event of damage to any existing facilities during the progress of the work and of the failure of the contractor to exercise the proper precautions, the contractor will pay for the cost of all repairs and protection to said facilities. The contractor's work may be stopped until repair operations are complete.

F. Protection of Landscaping

- 1 The contractor shall be responsible for the protection of all the trees, shrubs, irrigation systems, fences, and other landscape items adjacent to or within the work area, unless they are directed to do otherwise on the plans.
- 2 In the event of damage to landscape items, the contractor shall replace the damaged items in a manner satisfactory to the City representative and the owner, or pay damages to the owner as directed by the City.
- 3 When the proposed pipeline and/or vault is to be within planted or other improved areas in public or private easements, the contractor shall restore such areas to the original condition after completion of the work. This restoration shall include grading, a placement of 5 inches of good topsoil, resodding, and replacement of all landscape items indicated.
- 4 If the contractor does not proceed with the restoration after completion of the work or does not complete the restoration in a satisfactory manner, the City reserve the right to have the work done and to charge the contractor for the actual cost of the restoration including all labor, material, and overhead required for restoration.

G. Permits

All work shall conform to the specifications and requirements of the jurisdictional agency. The contractor shall keep a copy of all the required permits in the job site and comply with all the terms and conditions of said permits.

PART 2 - MATERIALS

All materials used in making the connection or removing the facility from service shall conform to the applicable sections of these specifications.

A. Portland Cement Concrete

Portland cement, water and sand shall conform to the applicable requirements of concrete in accordance with Section 201-1 of WBMWD Standard Specification for Concrete, Mortar and Related Materials

B. Concrete

Concrete used for the replacement of damaged or removed facilities shall be in accordance with Section 201-1 of WBMWD Standard Specification for Concrete, Mortar and Related Materials and shall match the mix design of the existing facility and per the requirement of the jurisdictional agency.

PART 3 - EXECUTION

A. Connection to Existing Facilities

- 1 All connections shall be made by the contractor unless shown otherwise on the plans or specified herein.
- 2 The contractor shall notify the City a minimum of two working days before the time of any proposed shutdown of existing mains or services. The City inspector may postpone or reschedule any shutdown operation if for any reason he feels that the contractor is improperly prepared with competent personnel, equipment, or materials to proceed with the connection work.
- 3 Connections shall be made only in the presence of the City, and no connection work shall proceed until the City has given notice to proceed. If progress is inadequate during the connection operations to complete the connection in the time specified, the City shall order necessary corrective measures. All costs for corrective measures shall be paid by the contractor.
- 4 The contractor shall furnish all pipe and materials including furnishing all labor and equipment necessary to make the connections, all required excavation, backfill, pavement replacement, lights, and barricades, and may be required to include a water truck, high line hose, and fittings as part of this equipment for making the connections. In addition, the contractor shall assist the City in alleviating any hardship incurred during the shutdown for connections. Standby equipment or materials may be required by the City inspector.
- 5 The contractor will de-water existing mains, as required, in the presence of the City inspector. The dewatering shall be discharged to a sewer system. The Contractor shall notify the City of dewatering activities two working days prior to commencing the activity.
- 6 Connections shall be made with as little change as possible in the grade of the new main. If the grade of the existing pipe is below that of the new pipeline, a sufficient length of the new line shall be deepened so as to prevent the creation of any high spot or abrupt changes in grade of the new line. Where the grade of the existing pipe is above that of the new pipeline, the new line shall be laid at specified depth, except for the first joint adjacent to the connection, which shall be deflected as necessary to meet the grade of the existing pipe. If sufficient change in direction cannot be obtained by the limited deflection of the first joint, a fitting of the proper angle shall be installed. Where the connection creates a high or low spot in the line, a standard air release or blow off assemble shall be installed as directed by the City inspector.
- 7 New pipelines shall not be connected to existing facilities until the new pipelines have been successfully tested, disinfected and accepted by the City.

8. Tapping connection can be made to the existing system while it is either in service or shut down depending on the City's prior direction. A tapping valve shall be used when the existing system is maintained in service during connection. Tapping shall be in accordance with the specification requirements for the pipe being tapped.

B. Abandonment of Existing Water Service

- 1 The Contractor shall notify the City a minimum of two working days before any proposed abandonment of existing service.
- 2 The Contractor shall excavate and expose the service tap at the main and close the existing corporation stop. Install a bronze cap at the corporation stop and crimp close the service lateral at the main and meter box. Backfill within the street shall be one sack slurry.
- 3 The Contractor shall remove the existing water meter and deliver the meter to the City Yard. Remove and dispose the existing water meter box and crimp close service at both ends of meter. Backfill void with native and compact to 85% relative compaction and restore landscaping to original condition.
- 4 If the existing meter box is within the concrete side walk, the Contractor shall remove and replace the concrete sidewalk to the nearest construction joint per City Standard Drawing T102.

C. Cutting and Restoring Street Surfacing

- 1 In cutting or breaking up street surfacing, the Contractor shall not use equipment that will damage adjacent pavement.
- 2 All asphalt and/or portland cement concrete surfaces shall be scored with sawing equipment of a type meeting the approval of the City; providing however, that any cement concrete base under an asphaltic mix surface will not be required to be scored by sawing. Existing paving surfaces shall be saw cut back beyond the edges of the trenches to form neat square cuts before repaving is commenced.
- 3 Pavement, sidewalks, curbs, or gutters removed or destroyed in connection with performance of the work shall be saw cut to the nearest score marks, if any, and shall be replaced with pavement sidewalks, curbs, or gutters of the same kind, or better by the contractor in accordance with the latest specifications, rules, and regulations and subject to the inspection of the agency having jurisdiction over the street or highway.
- 4 Aggregate base shall be placed beneath the restored pavement to the thickness required by the agency having jurisdiction.

END OF SECTION

SECTION 09900
PAINTING AND COATING

PART 1 -GENERAL

A. Description

This section includes the materials and application of painting and coating systems for buried and exposed surfaces.

All articles to be painted or coated will be painted or coated in the place of manufacture, unless field painting and coating is absolutely necessary. The City representative will make the determination. In the event that the paint or coating is damaged in the field, it will be touched up in the same manner as the original paint or coating applied in the place of manufacture.

B. Related Work Described Elsewhere

All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).

Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

- 1 Ductile-Iron Pipe and Fittings: WBMWD Standard Specification Section 310
- 2 Manual Valves: WBMWD Standard Specification Section 310
- 3 Domestic and Recycled Water Facilities Identification: RW Urban Irrigation User Manual

C. Approved Manufacturers

- 1 Organic Zinc Primer Koppers Tnemec 90-93 Rust-Oleum
- 2 Alkyd Enamel Koppers Glamortex 501 Dunn-Edwards Syn-Lustro
Rust-Oleum Industrial Enamel Tnemec Endura Shield IV
- 3 Epoxy Paint

- a. Field Applied Koppers 200 Tnemec Series
66 Epoxoline Rust-Olem 9100 High
Performance Epoxy

- b. Factory Applied Keysite 750 Tnemec Series 140 NSF 61
 - c. Factory Applied Fusion Bonded Epoxy 3M Scotchkote 134 NSF 61
4. Bituminous Mastic Minnesota Mining and Manufacturing EC 244 Koppers Bitumastic (Supertank) 505

D. Paint Schedule

It is desired that aboveground or exposed facilities be color coded depending if they are recycled water facilities, domestic water or wastewater facilities. Unless otherwise noted, the color for surfaces that are to be coated shall be selected by the City.

- 1. Recycled Water System
 - a. Piping and Equipment: Purple (Pantone 512)
- 2. Potable Water System
 - a. Piping and Equipment: Edison Blue (Sinclair No. 75-30)

The Contractor shall submit color samples for approval by the City.

E. Permits

All work shall conform to the specifications and requirements of the jurisdictional agencies involved. The contractor shall keep a copy of all the required permits in the job site and comply with all the terms and conditions of said permits.

PART 2 -MATERIALS

A. Primer

- 1 All primer shall be synthetic-alkyd based.
- 2 All primer shall contain not less than 73% solids by volume and not less than 54% pigment by weight.
- 3 All primer shall contain not less than 43% zinc chromate pigment and 14% red iron oxide pigment by weight.

B. Alkyd Enamel

- 1 All enamels shall be synthetic-alkyd based.
- 2 All enamels shall be lead-free.
- 3 All enamels shall be high gloss industrial type intended for use on exterior metal surfaces.
- 4 All enamels shall contain not less than 60% solids by volume and not less than 30% pigment by weight.

C. Bituminous Mastic

- 1 Bituminous mastic shall be coal-tar pitch based.
- 2 Bituminous mastic shall have a minimum of 68% solids by volume.

D. Epoxy Paint

- 1 Epoxy shall be a colored polyamide cured epoxy with not less than 49% solids by volume.
- 2 All coatings and pigments to be used on domestic water services shall have FDA approval for use with domestic water.

PART 3 -EXECUTION

A. Surface Preparation

1. Do not sandblast or prepare more surface area than can be coated in one day. Remove all sharp edges, burrs, and weld spatter. Do not sandblast epoxy-coated pipe that has already been factory coated.
2. Surface preparation shall conform with the SSPC specifications as described below:

Solvent Cleaning SP-1 Hand Tool Cleaning SP-2 Power Tool Cleaning SP-3
White Metal Blast Cleaning SP-5 Commercial Blast Cleaning SP-6 Brush-Off
Blast Cleaning SP-7 Pickling SP-8 Near-White Blast Cleaning SP-10
3. Wherever the words "solvent cleaning," "hand tool cleaning," "wire brushing," or "blast cleaning" or similar words are used in these specifications or in paint manufacturer's specifications, they shall be understood to refer to the applicable

SSPC (Steel Structure Painting Council, Surface Preparation Specifications, ANSI A159.1) specifications listed above.

B. Painting Systems

- 1 All materials of a specified painting system, including primer, intermediate, and finish coats, shall be produced by the same manufacturer. Thinners, cleaners, driers, and other additives shall be as recommended by the paint manufacturer for the particular coating system.
- 2 Deliver all paints to the job site in the original, unopened containers.

C. Surfaces Not To Be Coated

The following surfaces shall not be painted and shall be protected during the painting of adjacent areas:

- 1 Mortar-coated pipe and fittings
- 2 Stainless steel
- 3 Metal letters
- 4 Nameplates
- 5 Grease fittings
- 6 Brass and copper, submerged
- 7 Buried pipe, unless specifically required in the piping specifications
- 8 Bronze meters and strainers

D. Protection of Surfaces Not To Be Painted

Remove, mask, or otherwise protect hardware, lighting fixtures, switch plates, aluminum surfaces, machined surfaces, couplings, shafts, bearings, nameplates on machinery, and other surfaces not intended to be painted. Provide drop cloths to prevent paint materials from falling on or marring adjacent surfaces. Protect working parts of mechanical and electrical equipment from damage during surface preparation and painting process. Mask openings in motors to prevent paint and other materials from entering the motors.

E. Field Touch Up of Manufacturer-Applied Prime Coats

Surfaces that are primed at the place of manufacture shall receive a field touch-up of organic zinc primer to cover all scratches or abraded areas.

F. Alkyd Enamel

1. The following items shall be painted using an alkyd enamel system:

All aboveground or exposed piping and all piping in vaults

- a. Fire hydrants
- b. Valve box lids
- c. Air release valves
- d. Meter box reading lids for all recycled water services
- e. Steel meter vault covers for all services 3 inches and larger
- f. All exposed metalwork as directed by the City representative

2. Surface Preparation:
 - a. All rust, mill scale, or weld splatter shall be removed by sandblasting or power tool cleaning.
 - b. All unpainted surfaces shall be solvent cleaned in accordance with SP-1.
 - c. All abraded or scratched enamel coatings shall be sanded smooth or receive power tool cleaning per SP-3.
 - d. All failures in the existing coating shall be sandblasted in accordance with SP-6.
 - e. All existing surfaces to be repainted shall be washed with TSP, or other cleanser suitable for removing grease, dust or other residue, and a stiff bristle brush.
3. All unpainted or damaged surfaces shall be coated with primer to a dry-film thickness of not less than 2 mils.
4. The finish coats shall be two or more coats of alkyd enamel applied to a dry-film thickness of 3 mils, providing a total painted dry film thickness of not less than 5 mils.

G. Bituminous Mastic

- 1 Buried metal (flanges, non-stainless steel nuts and bolts, flexible couplings, exposed reinforcing steel, etc.) shall be coated with a minimum of 20 mils of bituminous mastic.
- 2 All surfaces coated with bituminous mastic shall be covered with 8 mil polyethylene wrap per Section 15056.

H. Epoxy Coating

- 1 Only those metal surfaces specifically called out shall be epoxy coated.
- 2 Epoxy lining and coating of valves shall be per AWWA C550 and Section 15100 Manual Valves. All valves shall be lined and coated by manufacturer.
- 3 Surfaces to be epoxy coated shall be sandblasted to SP-6 requirements.
- 4 Sandblasted surfaces shall be coated with organic zinc primer to a dry film thickness of 3 mils.
- 5 Apply two coats of epoxy paint (4 mils each) to the primed surface. The manufacturer's recommended drying time between coats shall be followed.
- 6 Prepare multiple-component coatings using all of the contents of the container for each component as packaged by the paint manufacturer. Do not use partial batches. Do not use multiple-component coatings that have been mixed beyond their pot life. Provide small quantity kits for touch up painting and for painting other small areas. Mix only the components specified and furnished by the paint

manufacturer. Do not intermix additional components for reasons of color or otherwise, even within the same generic type of coating.

H. Dry-Film Thickness Testing

- 1 *Measure coating thickness specified for metal surfaces with a majestic-type dry-film thickness gage. Test the finish coat (except zinc primer and galvanizing) for holidays and discontinuities with an electrical holiday detector, low-voltage, wet-sponge type. Measuring equipment shall be provided by the contractor. Provide detector as manufactured by Tinker and Razor or K-D Bird Dog. Provide dry-film thickness gage as manufactured by Mikrotest or Elcometer. Check each coat for the correct dry-film thickness. Do not measure within eight hours after application of the coating.*
- 2 *If the item has an improper finish color or insufficient film thickness, the surface shall be cleaned and top coated with the specified paint material to obtain the specified color and coverage. Visible areas of chipped, peeled, or abraded paint shall then be primed and finish coated in accordance with the specifications. Work shall be free of runs, bridges, shiners, laps, or other imperfections.*

END OF SECTION

SCHEDULE AND GENERAL PIPING REQUIREMENTS

PART 1 -GENERAL

A. Description

This section describes the general requirements for selecting piping materials; general piping specifications; backfill requirements; and requirements for miscellaneous piping appurtenances, including bolts, nuts and gaskets.

B. Related Work Specified Elsewhere

Supplemental Special Provisions: 01001.

C. Submittals

Submit shop drawings on the following items, as a minimum: piping, fittings, strainers, valves, gauges, and enclosures.

D. Definitions of Buried and Exposed Piping

1. Buried piping is piping buried in the soil, or encased in concrete, commencing at the inside face of the wall or top of the slab of a structure. Where a coating is specified, and pipe enters or leaves the ground, extend the coating a minimum of 6-inches above the ground surface. Where a coating is specified, extend the coating up to three inches inside of the structure.
2. Exposed piping is piping in any of the following conditions or locations:
 - a. above ground;
 - b. inside vaults, or other structures;

E. Default Piping Materials

If no material is shown in the drawings, use the following piping materials:

Size Range Water System Service (inches) PW/RW/IRRIG

Material

Buried 2" and smaller PW Copper 4" PW AWWA C-900 PVC

Service 2" and smaller RW Copper 3" RW DIP 4" RW AWWA C-900 PVC

	Size Range (inches)	Water System PW/RW/IRRIG	Material
Buried	2" and smaller	IRRIG	PVC Sch. 80
	2-1/2" and larger	IRRIG	PVC Sch. 80
Exposed	2" and smaller	PW	Copper
		PW	DIP
	3" and larger	RW	Copper
		RW	DIP
	2" and smaller	IRRIG	Brass
		IRRIG	Brass
2-1/2", 3" and larger	IRRIG	DIP	

PART 2 -MATERIALS

A. Pipe Material Selection

The acceptable piping materials for the pipelines are shown on the Construction Plans or use the above default materials.

B. Ductile Iron Pipe

All ductile iron pipe shall be in accordance with Section 207-9.2 of WBMWD Standard Specifications for Pipeline Construction. All DIP buried underground shall be protected with polyethylene encasement as specified in Section 207-9.2.6 of WBMWD Standard Specifications for Pipeline Construction. Also, recycled water DIP buried underground may be encased with purple colored polyethylene encasement as stated in 207-9.2.7 of WBMWD Standard Specifications for Pipeline Construction.

C. PVC Pipe: 4-inches in diameter

PVC Pipe 4-inches in diameter and larger shall be in accordance with Section 207-25 of WBMWD Standard Specifications for Pipeline Construction. Tracer wire will not be required for the PVC pipelines.

D. PVC Pipe: 1-inch Through 3-inch in diameter

PVC Pipe 1-inch through 3-inches in diameter shall be in accordance with Section 207 25.7 of WBMWD Standard Specifications for Pipeline Construction. Tracer wire will not be required for the PVC pipelines. All irrigation pipe and fittings shall conform to Section 212-2.1 of the Standard Specification for Public Works Construction unless modified herein. Pressure main line piping (3-inches and larger or where called for on the plan) shall be PVC 315. Fittings shall be Schedule 80. Non-pressure lateral piping (2-inches and smaller) shall be PVC Class 200. Fittings shall be Schedule 40.

E. Resilient-Wedge Gate Valves

Resilient-wedge gate valves shall be in accordance with Section 207-26.2.3 of WBMWD Standard Specifications for Pipeline Construction. Valve painting and coating shall be in accordance with Section 207-26.2.7 of WBMWD Standard Specifications for Pipeline Construction.

F. Flanges

Flanges shall be in accordance with Section 207-26.3.2 of WBMWD Standard Specifications for Pipeline Construction.

G. Copper Pipe and Fittings

Copper pipe and fittings shall be in accordance with Section 207-26.4 of WBMWD Standard Specifications for Pipeline Construction.

H. Brass Pipe, Nipples and Fittings

Brass pipe, nipples and fittings shall be in accordance with Section 207-26.5 of WBMWD Standard Specifications for Pipeline Construction.

I. Bronze Appurtenances

Bronze appurtenances shall be in accordance with Section 207-26.6 of WBMWD Standard Specifications for Pipeline Construction.

J. Painting and Protective Coatings

Painting and protective coatings shall be in accordance with Section 210 of WBMWD Standard Specifications for Pipeline Construction.

K. Concrete

Concrete shall be 560-C-3250 unless otherwise specified and shall be in accordance with Standard Specifications for Public Works Construction.

L. Bedding and Backfill Material

Pipe bedding and backfill material shall be per WBMWD Standard Drawing RW17 and shall be per the Standard Specifications for Public Works Construction, except where modified by the plans and permit requirements.

M. Enclosures

Enclosures shall be of rugged construction that will prevent vandalism and theft of the above ground piping, valves and appurtenances. The enclosures shall have no sharp corners. The enclosures shall be powder-coated metal for lasting durability and lower maintenance costs.

Standard color shall be High Gloss Forest Green. The City shall approve of the color prior to ordering the enclosure.

Enclosures shall be Powder coated Enclosures, GuardShack manufactured by BPD1 or approved equal. Enclosures shall be provided with LockShield brackets for maximum protection form bolt cutters. The enclosures shall be furnished with complete hardware kit needed to secure unit to concrete base.

N. Strainers

2-inch strainer shall be constructed of bronze and shall have a NPT blow-off connection. Strainer shall be provided with 40 mesh stainless steel screen. Strainer shall be provided with a 1-inch bronze plug.

3-inch strainer shall be constructed of cast iron and shall have a NPT blow-off outlet. Strainer shall be provided with a perforated 304 stainless steel screen (1/16" perforations). The body and cover shall be fusion epoxy coated per AWWA C550. Strainer shall be provided with a 1-inch cast iron plug.

O. Backflow Preventers

All backflow prevention assemblies shall be listed in the latest edition of the "List of Approved Backflow Prevention Assemblies" Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California, School of Engineering.

Upon completion of the installation of the device, a test shall be performed and a certificate of the adequacy and operational compliance shall be furnished to the City and WBMWD. The tests shall be performed by a testing agency approved by the County of Los Angeles Department of Health Services.

P. Pressure Reducing Valves

The pressure reducing valves shall be a hydraulically-controlled diaphragm actuated valve. The main valve body and cover shall be made of ductile iron, ASTM A 536. The main valve trim and seat shall be Type 303 stainless steel, ASTM A 276 or A 351. The pilot control system shall be cast bronze, ASTM B 62, with Type 303 stainless steel trim. Piping and tubing shall be copper and brass or stainless steel. Elastomers shall be EPDM rubber material. The interior surfaces of the valve shall be epoxy coated. Valves shall be coated the same as the adjacent piping.

Pressure reducing valves shall automatically maintain a constant downstream pressure regardless of changing flow rates and/or varying inlet pressures. The pilot control shall be direct-acting, spring loaded, diaphragm valve, designed to permit flow when controlled pressure is less than the spring setting. The pilot control system shall be provided with a strainer, isolation valves, opening speed control, and closing speed control.

The valve shall be Cla-Val 90-01, Ames ACV 910 Series "Mustang Valve", Singer Model 106-PR or approved equal.

Q. Bolts and Nuts

Bolts, nuts and washers for buried flanges and for above ground applications shall be Type 316 stainless steel. Provide one (1) washer for each bolt. The length of each bolt or stud shall be such that between ¼ inch and 3/8 inch will project through the nut when drawn tight. Lubricant for stainless steel nuts and bolts shall be TRX-Synlub by Ramco, Anti-Seize by Ramco, Husk-It Husky Lube O'Seal, or equal.

PART 3 -EXECUTION

A. Trenching, Backfilling and Compaction

Trenching, backfilling and compaction shall be per Standard Specifications for Public Works Construction, except where modified by the plans and permit requirements.

B. Pipe Installation

Pipe installation shall be per WBMWD Standard Specifications for Pipeline Construction. If not specified therein, the pipe installation shall be per the Standard Specifications for Public Works Construction.

END OF SECTION

SECTION 15057

COPPER, BRASS, AND BRONZE PIPE FITTINGS AND APPURTENANCES

PART 1 -GENERAL

A. Description

This section includes materials and installation of copper, brass, and bronze pipe, fittings and appurtenances.

B. Approved Manufacturers

1. All materials shall be the appropriate model number specified on WBMWD standard drawings as manufactured by the companies listed herein.

2. Copper Tubing
Anaconda Phelps –
Dodge Revere

3. Service Saddle
Jones, Mueller

4. Corporation Stop
Jones, Mueller, Ford
A.Y. McDonald

5. Angle Meter Stop
Jones, Mueller, Ford,
A. Y. McDonald

6. Customer Valve
Jones, Ford,
A.Y. McDonald

7. Insulating Pipe Bushings, Unions, or Couplings
Pipeline Coating and Engineering Co. 1566 East
Slauson Avenue, Los Angeles Smith Blair
Pipe Seal and Insulator Company

PART 2 -MATERIALS

A. Copper

- 1 Copper tubing shall conform to the requirements of ASTM B 88 for seamless copper water tube. Piping located aboveground or suspended within vaults shall be Type L. Buried piping shall be Type K. Copper pipe shall be of domestic manufacture.
- 2 Fittings shall be copper conforming to ASTM B 75 and ANSI B16.22, with solder end joints. Fittings 3/8 inch and smaller may have flared end connections.
- 3 Solder shall be silver solder conforming to ASTM B 32, Grade 95TA. Do not use cored solder.
- 4 All copper lines shall be encased within a 8-mil polyethylene sleeve. Sleeves shall be color coded per Section 15151.

B. Brass Pipe, Nipples, and Fittings

Short threaded nipples, brass pipe and fittings shall conform to ASTM B 43, regular wall thickness, except that nipples and pipe of sizes 1-inch and smaller shall be extra strong. Threads shall conform to ANSI B2.1.

C. Bronze Appurtenances

- 1 All items specified herein shall be manufactured of bronze conforming to ASTM B 62, "Composition Brass or Ounce Metal Castings."
- 2 All size service saddles shall be of the double-strap type for any type of pipe. The straps (or bails) shall be flat and shall be manufactured of silnic bronze for ACP and of stainless steel for C900 PVC and ductile iron pipe. The body shall be manufactured of bronze and shall be tapped for an iron pipe thread. The seal with the pipe shall be effected with either a rubber gasket or an O-ring.
- 3 Corporation stops shall be, ball valve type and shall be manufactured of bronze. The inlet fitting shall be a male iron pipe thread when used with saddle and the outlet connection shall be a flare type.
- 4 Angle meter stops shall be ball valve type for 3/4-inch and 1-inch services and ground inverted key type for 1-1/2-inch and 2-inch services and shall be manufactured of bronze. The inlet connection shall be a flare type or female iron-pipe thread and the outlet fitting shall be a meter flange or meter coupling. The inlet and outlet shall form an angle of 90 degrees on a vertical plane through the centerline of the meter stop. A rectangular lug and lock wing shall be provided on the top of the fitting to operate the shutoff mechanism.
- 5 Customer service valves shall be manufactured of bronze, ball valve type, with lever-type turn handle. The inlet connection shall be a meter flange or a meter coupling and the outlet female iron pipe.

D. Flanges, Gaskets, Bolts, and Nuts

- 1 Connect to flanged valves and fittings with bronze flanges conforming to ANSI B16.24, Class 125 or Class 150, to match the connecting flange. Use solder end companion flanges.
- 2 Gaskets for flanged-end fittings shall be made of synthetic rubber binder and shall be fullface, 1/8-inch-thick John-Manville 60, John Crane Co. "Cranite," or equal.
- 3 When both adjoining flanges are bronze, use bronze bolts and nuts. Bolts shall conform to ASTM F 468, Grade C65100 or C63000. Nuts shall conform to ASTM F 467, Grade C65100 or C63000.
- 4 When only one of the adjoining flanges is bronze, use type 316 stainless-steel bolts and nuts conforming to ASTM A 193, Grade B8M for bolts, and ASTM A 194, Grade 8M for nuts.
- 5 Connect to buried ferrous flanges with flange insulation kits. Bolts used in flange insulation kits shall conform to ASTM B 193, Grade B7. Nuts shall comply with ASTM A 194, Grade 2H. If the adjoining buried flange is bronze, use bronze bolts and nuts as described above, without a flange insulation kit.
- 6 Provide one (1) washer for each nut. Each washer shall be of the same material as the nut.

PART 3 -EXECUTION

A. Copper Tubing and Fittings

- 1 Cut tubing square and remove burrs. Clean both the inside and outside of fitting and pipe ends with steel wool and muriatic acid before soldering. Prevent annealing of fittings and tubing when making connections. Do not miter joints for elbows or notch straight runs of pipe for tees.
- 2 Bends in soft copper tubing shall be long sweep. Shape bends with shaping tools. Form bends without flattening, buckling, or thinning the tubing wall at any point.
- 3 Brazing procedures shall be in accordance with Articles XII and XIII, Section IX, of the ASME Boiler and Pressure Vessel Code. Silver solder shall be used. Solder shall penetrate to the full depth of the cup in joints and fittings. Solderers shall comply with ANSI B31.3, paragraph 328.
- 4 Buried piping shall be installed with some slack to provide flexibility in the event of a load due to settlement, expansion or contraction. A MINIMUM COVER OF 36 INCHES BELOW THE FINISHED STREET GRADE SHALL BE ADHERED TO. The tubing is to be bedded and covered with sand or select material as determined by the City inspector.
- 5 All domestic service laterals shall be 3/4-inch minimum size copper tubing. End connections shall be flare type.

- 1 All 2-inch size services shall be installed with straight lengths of soft copper water tube Type K. Flare fittings are acceptable on only the corporation stop and angle meter stop. All couplings and adapters shall be silver soldered.
- 2 The service line shall extend perpendicular to the centerline of the street from the water main to the meter stop or structure, except in a cul-de-sac, where the service shall run in a straight line from the water main to the meter stop.
- 3 The service line shall be placed within an 8-mil polyethylene sleeve, color-coded for the type of service. The ends and splices in the sleeve shall be sealed with 20mil tape.

B. Service Saddle

- 1 The service saddle shall be no closer than 18 inches to a valve, coupling, joint, or fitting.
- 2 The surface of the pipe shall be filed to remove all loose material and to provide a hard, clean surface before placing the service saddle.
- 3 The service saddle shall be tightened per manufacturer's recommendation. Care shall be used to prevent damage or distortion of either the corporation stop or service saddle by over tightening.
- 4 The tap into the pipe shall be made in accordance with the pipe manufacturer's recommendation.

C. Installing Flange Bolts and Nuts

- 1 Lubricate bolt threads with anti-seize compound prior to installation.
- 2 Set flanged pipe with the flange bolt holes straddling the pipe horizontal and vertical centerlines.

D. Insulating Bushings and Unions

Pipe or fittings made of nonferrous metals shall be isolated from ferrous metals by nylon insulating pipe bushings, union, or couplings.

- E. Backfill Material The pipe zone material for all service laterals shall be compacted sand per Section 02223.

END OF SECTION

AND RECYCLED WATER FACILITIES IDENTIFICATION

PART 1 -GENERALA. Description

All domestic water systems and appurtenances shall be identified as herein described.

This section describes special identification, markings, materials and their installation procedures for recycled water facilities. All recycled water systems and appurtenances must be marked as described herein to avoid confusion with other utilities and between potable water facilities.

B. Related Work Specified Elsewhere

All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).

Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

1. Painting and Coating: 09900

C. Approved Manufacturers1. Warning Tape and Pipe Sleeves

- a. Griffolyn Company, Inc.
10020 Mykawa Road
P.O. Box 33248 Houston, TX 77033
Phone: (713) 943-0070 or (800) 231-6074
- b. Terra Tape, Division of Reef Industries
P. O. Box 33310
Houston, TX 77233
Phone: (800) 231-2417
- c. T. Christy Enterprises, Inc.
655 E. Ball Road Anaheim,
CA 92805 Phone: (714)
507-3300

2. Warning Labels and Signs

In all cases the warning labels or signs must be approved prior to installation. Failure to receive prior approval may result in the Contractor removing such sign(s) and providing approved replacement(s). All costs shall be borne by the Contractor for the replacements.

D. Recycled Water Identification For

PVC pipe carrying recycled water:

- 1 Purple colored pipe marked with the wording "CAUTION: RECYCLED WATER, DO NOT DRINK" on opposite sides of the pipe.
- 2 Purple identification tape with the wording "CAUTION: RECYCLED WATER, DO NOT DRINK" may be attached directly to the top of the pipe with plastic adhesive tape.
- 3 Encase PVC pipe with purple colored polyethylene encasement with the wording "CAUTION: RECYCLED WATER, DO NOT DRINK".

For Ductile Iron Pipe

1. Attach purple colored identification tape with the wording "CAUTION: RECYCLED WATER, DO NOT DRINK" directly to the top of the ductile iron pipe and polyethylene encasement with plastic adhesive tape.
2. Encase ductile iron pipe with purple colored polyethylene encasement with the wording "CAUTION: RECYCLED WATER, DO NOT DRINK". Polyethylene encasement shall conform to the requirements of Section 15056.3.C.4, "Plastic Film Wrap".

E. Recycled Water Warning Tape

For PVC or ductile iron pipe, all pipelines shall have purple colored warning tape placed in the trench 12-inches above the pipe with the wording, "CAUTION: RECYCLED WATER LINE BURIED BELOW".

F. Valve Boxes:

Valve boxes shall be as specified in WBMWD Standard Drawing RW 7

G. Color and Painting Schedule

- 1 Recycled water facilities shall be painted purple (Pantone 512) per Section 09900.
2. Domestic water facilities shall be blue, with the exception of fire hydrants which shall be painted per the jurisdictional agencies requirements.

H. Warning Signs and Labels

1. The City requires warning labels to be installed on all appurtenances in vaults, such as, but not limited to, air release valves, blow offs, and meters, and on

designated facilities, such as, but not limited to, filtration systems, pressure reducing valves, filters, above ground valves, controller panels and wash down or blow off hydrants on water trucks and temporary construction services.

1. Each filter and every pipe shall be identified with a painted label. In the fenced filter system area, at least one sign shall be posted on the fence which can be readily seen by all operations personnel utilizing the facilities.
2. Painted labels may, at the City Engineer's discretion be acceptable in lieu of plastic labels.

I. Domestic Water Piping

- 1 All domestic water piping shall be installed with domestic water identification.
- 2 All PVC domestic water piping shall be blue or shall be white with blue stenciling appearing on both sides of the pipe with the marking "DOMESTIC WATER" in 5/8-inch letters repeated every 12 inches.
- 3 Blue warning tape identifying it as a domestic water line and stating "CAUTION: DOMESTIC WATER-LINE BURIED BELOW" may be used as an alternate to blue or stenciled pipe. The tape shall run continuously for the entire length of the main line piping. The tape shall be attached to the top of the pipe with plastic tape banded around the warning tape and pipe every 5 feet on center.

PART 2 -MATERIALS

A. Buried Piping Warning Tape

The plastic warning tape shall be virgin low-density polyethylene specifically formulated for prolonged underground use. Warning tape for domestic water pipeline shall be purple (Pantone 512) with 2-inch black printing having the words, "CAUTION: RECYCLED WATER, DO NOT DRINK" The minimum thickness shall be 4 mils and the overall width of the tape shall be 12 inches (for 8-inch pipe) and 6 inches (for 6-inch and smaller pipe).

B. Warning Labels

Labels shall be inert plastic film specifically formulated for prolonged exposure and shall be prepared with black printing on a purple field having the words: "CAUTION: RECYCLED WATER, DO NOT DRINK" on one side and "AVISO: AGUA IMPURA – NO TOMAR" on the other side. The minimum thickness shall be 4 mils for adhesive backed labels and 10 mils for tag type labels. Tag type labels shall have reinforced tie holes and shall be attached with heavy-duty nylon fasteners. The size, type of label and location will be dictated by each individual application and subject to acceptance by the City Engineer. The minimum size shall be 1/2-inch letters.

PART 3 -EXECUTION

A. Installation of Pipe Warning Tape

Warning tapes shall be installed directly on the top of the pipe longitudinally and shall be centered. The warning tape shall be installed continuously for the length of the pipe and shall be fastened to each pipe length by plastic adhesive tape banded around the pipe and warning tape at no more than 5-foot intervals. Taping attached to the sections of pipe before installing in the trench shall have 5-foot minimum overlap for continuous coverage.

B. Installation of Warning Labels

Warning labels shall be firmly attached to all appurtenances using heavy-duty nylon fasteners.

C. Installation of Witness Markers

Witness markers shall be installed over pipe in unpaved areas, open space areas, at appurtenances, including but not limited to valves, air release/vacuum breaks, dead ends, inflection points, tees, and at intervals not greater than 200 feet.

Witness markers shall be embedded into the soil at least 18-inches and shall be equipped with a barb or other such device to secure it in the surrounding soil.

END OF SECTION

