

SECTION 01520 – HIGHLINING FOR WATER MAINS

PART 1 -- GENERAL

1.1 WORK OF THIS SECTION

- A. The CONTRACTOR shall provide, furnish and install all materials, equipment, and labor necessary to bypass sections of the existing City of Oceanside water main line with a temporary above-ground supply line (highline) in phases as indicated in the Contract Documents. Some portions of the highline system will be trenched and buried as shown or specified to avoid interference with roadways and walkways. All materials shall be NSF 61 approved.
- B. All costs related to procure highline materials and components, and to install, test, disinfect, connect, operate, maintain, and dismantle the highline system, as specified, shall be the at the CONTRACTOR's expense.
- C. The highline piping shall be installed along both sides of streets to supply water service connections to consumer's water meters. In no case shall a meter service connection be routed across a roadway, driveway, or other area subject to vehicular traffic.
- D. The highline system shall provide continuous full service to connected water services until the new water main line is installed, tested and accepted by the City of Oceanside Water Utilities Department. The work shall be organized, scheduled, and performed to provide minimum disruption of water services during installation and dismantling of the highline system.
- E. The CONTRACTOR shall properly flush, disinfect, and leak test the highline prior to placing it in service according to AWWA C-650-16 to maintain public health and safety. Bacteriological sampling and testing shall be performed by the City of Oceanside Laboratory at the CONTRACTOR's expense.
- F. The CONTRACTOR shall continually maintain the highline system as specified.
- G. The CONTRACTOR shall be aware that improper installation, pressure control, or operation of the highline may result in direct and/or subsequent damage, including but not limited to: burst pipes, damaged domestic water heaters, water and erosion damage to water users' property, and related public health and safety issues. In this regard, maintenance and monitoring of the highline system is of the utmost importance for a safe and reliable potable water supply.
- H. On completion of the new water main line, the CONTRACTOR shall reconnect services to normal supply from the new water main, dismantle the highline system and appurtenances, and restore streets, curbs and gutters, cross gutters, landscape, irrigation, and other disturbed facilities within ten working days of acceptance of the new complete water main line, services, and appurtenances.
- I. The AGENCY shall coordinate all interactions between the CONTRACTOR and the City of Oceanside Water Operations and Water Maintenance Divisions, the City of Oceanside Testing Laboratory, and other City of Oceanside organizations.

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1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. The work of the following Specifications, Divisions, or Sections apply to the work of this Section. Work of other Sections of the Specification, not referenced below, shall also apply to the extent required for proper performance of this work.
 - 1. Standard Specifications for Public Works Construction (SSPWC or “Greenbook”). References to the SSPWC shall include requirements and modifications stated in all supplements, amendments, and special provisions as adopted or issued by the AGENCY.
 - 2. Section 01300 Record Drawings and Submittals
 - 3. Section 01500 Construction Facilities and Temporary Controls

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. All reference specifications, codes, and standards shall be the latest edition, including all approved AGENCY supplements and amendments, unless a specific code issue date, edition, or adoption date is specified. The order of precedence shall be as defined in the Contract Documents.
- B. Codes and Safety Regulations: All equipment, products, materials, and their installation shall be as specified and shall be in accordance with the applicable parts of the following codes and safety regulations.
 - 1. Uniform Fire Code.
 - 2. Uniform Mechanical Code.
 - 3. Uniform Plumbing Code.
 - 4. City of Oceanside Water, Wastewater, and Recycled Water Design and Construction Manual (Oceanside Water Utilities Manual) Approved Materials List.
 - 5. State of California, Water Resources Control Board, Division of Drinking Water publication titled, “Approved for Service Isolation in California Public Water Systems.”
 - 6. City of Oceanside Standard Drawings.
 - 7. Applicable City, local, state, and federal codes and regulations.
- C. Commercial and Industrial Standards: All equipment, products, materials, and their installation shall be as specified and shall be in accordance with the following commercial and industrial standards.

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1. ANSI/AWWA C 606 Grooved and Shouldered Pipe Joints.
 2. ASTM A 53 Specification for Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.
 3. ASTM A 123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 4. ASTM A 153 Standard Specification for Zinc Coating (Hot-Dipped) on Iron and Steel Hardware
 5. ASTM A 307 Specification for Carbon Steel Bolts and Studs, 6,000 PSI Tensile Strength.
 6. ASTM A D1784 Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
 7. AWWA C 511 Standard for Reduced Pressure Principle Backflow Prevention Assembly
 8. AWWA C 651 Disinfecting Water Mains
- D. Testing Laboratories: All water sampling and bacteriological testing shall be performed by the following testing laboratory:
1. City of Oceanside Laboratory
 2. or AGENCY approved third party certified laboratory
- 1.4 CONTRACTOR SUBMITTALS
- A. Submittals shall be made in conformance with standard specifications.
 - B. Submit catalog data for all highline materials and components.
 - C. Temporary fire hydrants shall be required on all bypass pipe and shall be serviceable at all times. All temporary fire hydrants and its component shall meet all requirements outlined in Section 2 of the City of Oceanside Water, Sewer, and Recycled Water Design and Construction Manual.
 - D. Submit highline system installation including temporary fire hydrant locations and detail drawings prior to the start of fabrication or assembly of each phase of the highline system to the AGENCY. This plan must include the detailed locations of each fire hydrant, service connection, location of highline, etc. The plan must be drawn in on the AGENCY's Atlas books. This plan must include phase numbers which correspond to a written plan. The plan must also include an Emergency Contact Plan for disturbance and monitoring of the highline.

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- E. Submit a highlining schedule prior to the start of fabrication or assembly of any part of the highline system to the AGENCY.
- F. Submit traffic control drawings and an approved Traffic Control Plan prior to the start of fabrication or assembly of each phase of the highline system to the AGENCY.

1.5 QUALITY ASSURANCE

- A. Flushing, disinfecting, and testing requirements are specified in Paragraph 3.3.
- B. The highline system shall be flushed, hydrostatic tested for leaks, and disinfected, and shall pass the specified bacteriological tests prior to connection to user systems as described herein.

PART 2 -- PRODUCTS

2.1 GENERAL

- A. The CONTRACTOR shall provide all stocks of pipe, fittings, adapters, materials, and components required for a complete and operable highline system installation.
 - 1. The CONTRACTOR shall provide only products and materials which meet the specified requirements.
 - 2. At the CONTRACTOR's option, highlining products and materials shall be either:
 - a. New products and materials purchased specifically for this project.
 - b. Previously used products and materials provided that these products and materials shall have been used only in potable water service. These products and materials shall perform as new or have been refurbished to perform as new.
 - c. Certification as to the material use for potable water service shall be submitted by the CONTRACTOR to the AGENCY.
 - 3. Products and materials provided for this project shall be of current manufacture, and shall be products of manufacturers specializing in the manufacture of such products and materials.
 - 4. Products and materials shall be suitable for the intended purpose, free of defects, and recommended by the manufacturer for the application intended.
- B. The highline system shall NSF 61 certified and be sized to meet the water demands of the system.
 - 1. Hoses shall be used only at corners and curves and for connections to user's service meters.

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2. PVC piping shall be used only for service connections. In no case shall PVC piping be used in driveways, roadways, or other locations subject to being driven over by vehicular traffic.

2.2 PIPE

A. Galvanized steel pipe.

1. Pipe fabrication shall conform to ASTM A 53 or other equal ASTM galvanized pipe standard.
2. Minimum wall thickness shall be Schedule 40 (0.154 inches) and entire system shall be H20 traffic rated.
3. Pipe ends shall be machine cut or rolled for grooved couplings and fittings in compliance with ANSI/AWWA C 606.

B. PVC pipe.

1. PVC pipe shall not be run on streets, driveways, roadways, or any other location being driven over by vehicular traffic.
2. Pipe fabrication shall conform to ASTM D 1784.
3. The PVC pipe material shall contain ultraviolet (UV) light inhibitors and shall be rated for outdoor use when exposed to direct sunlight.
4. Minimum wall thickness shall be Schedule 80 (0.218 inches).
5. Minimum pressure and temperature rating shall be 350 PSIG at 73 °F.
6. Pipe ends shall be machine cut for grooved couplings and fittings in compliance with ANSI/AWWA C 606 or shall be solvent weld PVC ends with adapters to grooved couplings.

2.3 FITTINGS AND COUPLINGS

A. Fittings and couplings, including tees, reducing tees, laterals, wyes, elbows, pipe couplings, reducers, caps, plugs, and adapters, shall have standard flexible grooved joint connections in compliance with ANSI/AWWA C 606. Minimum pressure rating shall be 350 PSIG.

1. Housing material shall be ductile iron coated with the manufacturer's standard painting system. Coupling gasket material shall be standard EPDM (ethylene-polypropylene diene monomer) rubber.
2. Couplings shall be Victaulic Style 75 or equal.
3. Victaulic Style 791 or equal tamper-resistant boltless couplings with locking pins may be used in lieu of bolted couplings.

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4. The branch outlet of reducing tees shall be 1-inch male pipe thread. All connections of standard tees shall be grooved.
5. Victaulic Style 72 or equal Outlet Couplings with 1-inch female threaded outlets may be used in lieu of reducing tees and couplings.
6. Grooved elbows with 113, 222, 45 and 90-degree bend angles will be required to configure the highline piping system to existing bends and contours at the work site.
7. Manufacturers: Victaulic, Mech-Line, or equal.

B. Meter connections.

1. For meters up to 1-inch size, the connections shall be 90-degree, long radius, brass elbow couplings with a swivel meter nut on one end and male pipe threads on the other.
 - a. The swivel meter nut shall be sized to fit the specific meter. The male pipe thread end shall be fitted with a galvanized steel “Chicago” 2-lug, quarter-turn, quick disconnect hose fitting-to-female pipe thread fitting.
 - b. Manufacturers: James Jones Co., Ford Meter Box Co., Inc., or equal.
2. For meters larger than 1-inch, the connections shall be elbows with a 2-bolt Class 125 flange on one end and female pipe threads on the other.
 - a. The flange shall be sized to fit the specific meter. The female pipe thread end shall be fitted with a short pipe thread to grooved connection adapter nipple.
 - b. Alternatively, the assembly can be a 2-bolt Class 125 flange-to-male pipe thread fitting, a threaded pipe elbow, and a short pipe thread-to-grooved connection adapter nipple.
 - c. Manufacturers: James Jones Co., Ford Meter Box Co., Inc., or equal.

C. Bushings, reducers, and adapters.

1. The CONTRACTOR shall be responsible for all fit-up and connections in the system and shall provide all bushings, reducers, and adapters required to connect the highline system to the existing fire hydrants, meters, and other facilities at the project site. All bushings, reducers, and adapters shall be provided at no additional cost to the AGENCY.

D. Pipe-to-hose adapters.

1. For 1-inch hoses, the adapter shall be a 1-inch, galvanized steel, “Chicago” 2-lug, quarter-turn, quick disconnect hose-to-female pipe thread fitting.

E. Fire hydrant-to-pipe connectors.

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1. Shall be a brass or bronze 2-inch female fire hydrant thread to 2-inch male pipe thread fitting.

2.4 BOLTS AND FASTENERS

- A. Bolts and fasteners, including bolts, nuts, and washers, shall meet the minimum requirements of ASTM A 307, and shall be hot dipped galvanized according to ASTM A 153.

2.5 VALVES

- A. Pipe shutoff valves shall be 2-inch, lever handle, two-position, manual ball valves with grooved mechanical connections in compliance with ASTM C 606. Minimum pressure rating shall be 200 PSIG.

1. Housing material shall be ductile iron coated with the manufacturer's standard painting system. Seal material shall be standard EPDM rubber.
2. Manufacturers: Victaulic, Mech-Line, or equal.

- B. Curb stop valves shall be bronze full-port ball valves without handles.

1. Seats shall be molded Buna-N rubber or other approved material. The ball shall be Teflon-coated brass or bronze. Approved plastic ball materials will be considered as substitutes.
2. Size shall be 1-inch with female pipe thread connections. Other sizes and end connections may be required to accommodate specific user connections.
3. Manufacturers: James Jones Co., Ford Meter Box Co., Inc., A. Y. McDonald Mfg. Co., or equal.

2.6 HOSES

- A. User connection.

1. For meters up to 1-inch, the hose shall be a 1-inch standard general service air compressor hose with EPDM cover and 300 WP rating. End connections shall be galvanized steel, "Chicago" 2-lug, quarter-turn, quick disconnect fittings banded to the hose.
2. Manufacturer: Thermoid, or equal.

- B. Curves and curbs.

1. Hose shall be 2-inch standard general service air compressor hose with EPDM cover and 300 WP rating. End connections shall be galvanized steel grooved mechanical end fittings in compliance with ASTM C 606 banded to the hose.

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2. Manufacturer: Thermoid, or equal.

2.7 CHECK VALVES

- A. Check valves shall be swing check type with grooved mechanical connections in compliance with ASTM C 606. Minimum pressure rating shall be 200 PSIG.
- B. Housing material shall be ductile iron coated with the manufacturer's standard painting system. Seal material shall be standard EPDM rubber.
- C. Manufacturers: Victaulic, Mech-Line, or equal.

2.8 BACKFLOW PREVENTERS

- A. Shall meet the requirements stated on Oceanside Water Utilities Manual Standard Drawing No. W-27, Backflow Preventer, Reduced Pressure Principle Assembly, 2-Inch and Smaller.
- B. Shall meet the requirements of AWWA C 511.
- C. Manufacturer and model shall be approved by the City of Oceanside Water Utilities Department of Health Services.

2.9 PRESSURE REGULATORS

- A. Shall be 2-inch pipe size and bronze or ductile iron construction. Materials, coatings, seals, diaphragms, and trim shall be approved for potable water service. Connections shall be pipe threaded union couplings.
- B. Pressure ratings and regulation ranges shall be approved for the pressure zones involved.
- C. Manufacturer: Braukmann or equal.

2.10 TEMPORARY ASPHALT (COLD MIX)

- A. Temporary asphalt (cold mix) shall conform to SSPWC 306-1.5.1, Temporary Resurfacing.
- B. The cost of the temporary asphalt (cold mix) used in conjunction with the highline installation shall be included in the price bid for the water highline.

2.11 PIPE SUPPORTS

- A. Shall be adjustable type and fabricated from galvanized carbon steel.
- B. Manufacturers: Grinnell, Tolco, or equal.

2.12 SAFETY BARRICADES AND TRAFFIC CONE MARKERS

- A. Traffic cone markers and fold-up safety barricades shall conform to the latest editions of the California Manual on Uniform Traffic Control Devices (California MUTCD or CA MUTCD)

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Standards, the City of Oceanside, Engineering Division, Traffic Control Guidelines, and the San Diego Regional Standard Drawings (SDRSD Appendix A),

- B. Materials shall be polyvinyl chloride (PVC), high molecular weight polyethylene (HMWPE), or equal industrial plastic materials. Cones and barricades shall be weighted to prevent blowing over in high winds.
- C. Safety barricades shall be provided with durable, weatherproof, and removable labels.
 - 1. Labels shall be imprinted with the following in letters not less than 12-inches high: “24-Hour Emergency Phone: (760) 435-5800”. Below this, imprint the following in letters not less than 1-inch in height: “City of Oceanside Water Utilities Department”.
 - 2. Emergency telephone information shall be attached to the lower barricade crossbar, shall not interfere with the reflective striping on the upper crossbar, and shall be attached to both sides of the barricade.
 - 3. The label attaching method shall be durable and labels shall remain in place for the duration of the project. The CONTRACTOR shall replace any labels which become separated from the barricade at no additional cost to the AGENCY.
 - 4. Letters shall be black on white background.
 - 5. Labels shall be removed from barricades at the completion of the project. Barricades so labeled shall be used only for Water Utilities Department projects.

PART 3 -- EXECUTION

3.1 GENERAL

- A. Authorization.
 - 1. The CONTRACTOR shall not start fabrication or assembly of any part of the highline system without review of submittals and written authorization by the AGENCY.
- B. Workmanship.
 - 1. CONTRACTOR workmanship shall meet the accepted standards of the trades involved.
 - 2. Highline piping systems shall be installed and maintained such that they are neat, orderly, and leak-free, and shall be arranged to minimize interference with, or present a hazard to, normal usage of streets, sidewalks, driveways, and other affected facilities.
 - 3. Highline piping systems shall be installed in such a manner that they do not interfere with normal storm water drainage.
 - 4. Excess materials and debris shall be removed from the project site by the end of the working day on which they are generated.

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C. User Notification.

1. In addition to the written notification required elsewhere in the Contract Documents, the CONTRACTOR shall prepare and distribute a second written notification within twenty-four hours prior to starting work on any highline phase. This notification shall be delivered door-to-door to water users in the affected area. A copy shall be delivered to the AGENCY on the date of user notification. The notification shall include information on fire protection service outages/fire watch requirements.
2. The CONTRACTOR shall also notify affected users whenever the water service must be shut off for short periods of time.
 - a. This includes times when an individual user service is switched from the main line to the highline (and vice-versa) and when portions of the highline must be isolated to repair leaks or damage.
 - b. This notice shall be oral and shall be made by CONTRACTOR personnel knocking on user's doors immediately prior to shutting off the water service.
 - c. The CONTRACTOR shall coordinate the work to minimize the duration of shutdowns and outages.

D. Emergency Telephone.

1. The 24-hour Emergency Services telephone number which shall be listed in user notifications, imprinted on safety barricades, and posted in the work area is (760) 435-5800.
2. On receipt of notification of a problem in the work area, the 24-hour Emergency Services telephone dispatcher shall notify the AGENCY, CONTRACTOR, or Emergency Services as appropriate.

E. Repair and Maintenance.

1. The CONTRACTOR shall maintain the temporary asphalt (cold mix) protective ramps for the duration of the highline installation. All cold mix damage discovered or reported during working hours shall be repaired that same day before CONTRACTOR personnel leave the site.
2. During working hours the CONTRACTOR shall repair and maintain the highline system. This shall include damage or plugging of the user meters and service lines which occurs as a result of highlining activities.
 - a. All leaks or damage shall be repaired within two hours of discovery or reporting. All leaks or damage discovered or reported during working hours shall be repaired that same day before CONTRACTOR personnel leave the site. This repair criterion shall apply to leaks or damage arising for any reason, including

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vandalism and damage by CONTRACTOR personnel, equipment, or work activities.

- b. When the repair involves any disassembly of the system, disinfect and flush the affected components according to AWWA C651.
- c. Repair work shall be inspected and approved by the AGENCY. At the sole discretion of the AGENCY, the CONTRACTOR shall be back-charged for non-responsive or otherwise unacceptable repair and maintenance work.

F. Problem Reporting.

1. All highline system problems discovered or reported and corrective actions taken shall be documented in the CONTRACTOR's Daily Log and reported to the AGENCY.

G. Fire Department and Utility Coordination.

1. The CONTRACTOR shall submit a copy of the project written user notification to the local Fire Department office not less than five days prior to commencing work on the water system.
2. The CONTRACTOR shall submit a copy of the highline written user notification to the local Fire Department office within twenty-four hours prior to commencing work on any phase of the highlining system.
3. The CONTRACTOR shall submit written notification to the local Fire Department office on the date that each phase of the highline is activated and deactivated.
4. On the date of transmittal, copies of all Fire Department correspondence shall be delivered to the AGENCY.

H Traffic Control.

1. The CONTRACTOR shall provide traffic control during highline installation and dismantling activities as required by the project approved Traffic Control Plan, as shown on the Contract Drawings, or as directed by the AGENCY.

I. Schedules and Timing.

1. The CONTRACTOR shall coordinate highlining operations such that the overall water main replacement project schedule is not affected or delayed.

3.2 INSTALLATION

A. Highline Piping System.

1. The highline piping system shall be installed in phases as shown on Contract Drawings and/or as directed by the AGENCY.

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2. Piping phases shall be installed in loop systems as shown on the Contract Drawings with a fire hydrant connection to the water supply at each end.
 3. The highline piping system shall be inspected and approved in writing by the AGENCY prior to charging the system with potable water or connecting to any user service line.
 - 4.
 4. Shutoff valves shall be installed at each fire hydrant connection, along the piping runs at the middle of each block, on either side of highline tee fittings for user connections to meters larger than 1-inch, and at the ends of cul-de-sac blind runs to permit flushing. The lever handles shall be removed from the valves to prevent unauthorized operation.
 5. The two-bolt grooved couplings or swing clamp devices shall be installed with the bolts oriented downward. This orientation permits the pipe to be laid closer to the curb and is less susceptible to damage by auto traffic. Also, to prevent damage to auto tires, coupling bolts shall not extend beyond the thickness of the nut when installed and tightened.
- B. Fire Hydrant Connection.
1. The fire hydrant connection shall be as shown on the approved drawings.
 2. Elbows of different bend angles shall be used as required to align the connection fittings parallel to the sidewalk or curb.
 3. Pressure regulators shall be installed where shown on Approved Drawings, when the fire hydrant is located in a pressure zone higher than all or part of the affected service area, or in any situation where pressures in the affected service area may exceed safe ratings.
 4. In situations where the fire hydrant is located such that piping must cross a sidewalk, piping shall be routed under the sidewalk surface in a 12-inch wide by 12-inch minimum deep (approximate dimensions) saw cut trench. The trench backfill and temporary asphalt surface shall be tamped and compacted to provide a smooth, safe surface for the duration of the highlining installation. Routing the pipe above the sidewalk shall not be permitted.
 5. Provide barricades and cones as required by the approved Traffic Control Plan and to ensure public safety.
- C. User Connection.
1. Connection to meters sized up to 1-inch shall be as shown on the Approved Drawings. Adapters may be required to connect to specific meters.
 2. Connection to meters 1-1/2-inch and larger shall be submitted to and reviewed by the AGENCY on a case-by case basis.

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- a. A shutoff valve in the user connection line shall be provided at the highline tee fitting.
 - b. Meters 1-1/2-inch and larger typically have 2-bolt flanged connections. Provide adapters as required to connect to specific meters.
 - c. Sidewalk crossings may be routed above ground and ramped with temporary asphalt (cold mix). and as required elsewhere in this Section.
 - d. Field cut, groove, and fit 2-inch galvanized steel pipe as required to make user connections. Sections of the highline piping shall be cut such that service tees are as close as possible to the user meters and service connection hose or piping length is minimized.
3. Provide barricades and cones as required by the approved Traffic Control Plan, at service tees and meters, and as required to ensure public safety.

D Roadway Crossing and Trenching.

1. Wherever piping is required to cross a roadway, piping shall be routed below the roadway surface in a 12-inch wide by 12-inch minimum deep (approximate dimensions) saw cut trench. Routing the pipe above the roadway shall not be permitted.
2. The trench backfill and temporary asphalt surface shall be tamped and compacted to provide a smooth, safe surface for the duration of the highlining installation.

E Driveway or Handicapped Access Crossing.

1. Wherever the highline piping crosses an auto driveway or handicapped access ramp, the piping shall be provided with temporary asphalt (cold mix) crossing ramps which shall be H20 traffic rated.
2. The temporary asphalt (cold mix) crossing ramps shall be tamped and compacted to provide a smooth, safe surface for the duration of the highlining installation. Slopes shall not exceed those shown.
3. The temporary asphalt (cold mix) crossing ramps shall be constructed such that they do not interfere with normal storm water or other drainage flows. They shall not divert drainage flows either into the street or onto adjacent properties. Where required to achieve proper drainage, sections of galvanized steel piping shall be installed in the crossing ramp parallel to the highline piping to allow for drainage past the crossing ramp. All crossing ramp installations shall be inspected and approved by the AGENCY.

F Corners and Curves.

1. Routing the highlining system around corners and curves shall typically be accomplished by use of hose.

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2. A shutoff valve shall be installed at each end of the curve.
3. Portions of corners and curves with driveways or handicapped access ramps shall be crossed with galvanized steel pipe as described elsewhere. Use of hose shall not be permitted at these crossings.
4. Corners and curves with bend radii too short to be accommodated by hose shall be routed with short sections of galvanized steel pipe and grooved elbows of different bend angles. Pipe shall be cut, grooved, and fitted in the field as required.
5. Portions of the piping and fittings extending 12 inches or more from the curb shall be protected with an asphalt cold mix covering of not less than 2 inch thickness above the pipe and fittings. The cold mix shall be sloped over the pipe and tamped in place to provide a durable surface.

3.3 START-UP PROCEDURES

1. Shall comply with the Design Manual.

B System leak test. The CONTRACTOR shall:

1. Charge the system with available water pressure, bleed the system of air, and verify that the entire system is filled.
2. Visually inspect the system for leaks and repair any leaks discovered. The system will not be accepted by the AGENCY until all leaks are repaired.

C. User Hook-up and Service Change. The CONTRACTOR shall:

1. Coordinate work such that user service downtime is minimized. Any single service downtime shall not exceed thirty minutes.
2. Notify the user as specified prior to connection of the user to the highline system.
3. Disinfect hoses, fittings, and other highline user connections according to AWWA C651 prior to connection to user meters.
4. Flush the highline connection, including the meter adaptor on the hose, with potable water until the effluent is clear and free of debris.
5. Shut off and disconnect the user water meter from the existing water main service line. Ensure that no dirt or debris enters to meter or meter connection. Remove any dirt or debris which may enter and plug the meter.
6. Move or bend aside the existing water main service line to provide room for the highline service line. Ensure that the water main service line is not damaged. Some soil may need to be removed from the bottom of the meter box to allow bending of the line.

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7. Connect the user water meter to the highline water service line. Use approved adaptors as required to make the connection. Open the shutoff valve to activate the connection.
8. Flush each user system from the hose bibb closest downstream to the water meter - until the effluent is clear and free of debris.
9. Verify proper flow and operation of the system. Clean plugged meters or regulators as required. Reset regulators as required after disturbance of the system to achieve proper service pressures.

D. Shutdown of Water Main.

1. The CONTRACTOR shall notify the AGENCY after all highline user water meter connections are made and activated. The AGENCY will inspect the system and issue a written approval to cut and plug the main line.
2. The CONTRACTOR shall coordinate the shutdown of the water main with the AGENCY after receiving approval from the AGENCY.
3. As stated elsewhere in the Contract Documents the shutdown of the water main line shall be performed by City of Oceanside Water Utilities Department personnel only. Notification in accordance with the Water Utilities Manual must be given to AGENCY personnel before shutdown of waterline. Cutting and plugging operations shall be complete within ten working days of CONTRACTOR notification to the AGENCY.

3.4 RESTORATION OF NORMAL SERVICE

A. Flushing of the New Water Main.

1. The CONTRACTOR shall not flush the new water main with water from the highline system without written approval of the AGENCY.

B. User Hook-up to the New Main Line.

1. Restoration of user service to the new water main shall be in accordance with the Water Utilities manual.

C. Shutdown of Highline System.

1. The CONTRACTOR shall shut down the highline system by closing the fire hydrant valves only after all water user services have been transferred to the new water main line.

3.5 DISASSEMBLY OF HIGHLINE SYSTEM

A. Disassembly.

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1. After restoration of normal service to water users, the CONTRACTOR shall fully disassemble the highline system and remove all highline construction materials and debris from the area by the end of the working day.
- B. Restoration of Streets and Other Facilities.
1. The CONTRACTOR shall repair or replace all disturbed facilities to a condition equal to or better than the existing condition.

**** END OF SECTION ****