

SECTION 7

CONSTRUCTION

7-1 GENERAL REQUIREMENTS

This section describes the use of materials and the workmanship to be employed in construction of the water distribution system. The applicant or applicant's engineer shall prepare such general and special specifications as are necessary to define the nature and location of the work, contractual arrangements, payment for work and any other matters concerning the applicant or his contractor. Such matters are not discussed within the standards presented here.

7-1.1 Use of the Construction Section: This section is intended to highlight the features of construction that are deemed to be most significant. Please note that the omission of a particular practice which is generally considered to be a good construction technique and/or common to the construction industry should not be construed to mean that it is no longer necessary and/or required. In any construction project, the manufacturer's recommendations for their product shall apply when they are more stringent than common practice and/or applicable City standards.

There are a number of construction activities which pertain to all pipe types and these will be presented first. Specialized activities unique to a particular pipe type will be covered separately.

Specific references which are incorporated into this section include:

1. AWWA C206 "Field Welding of Steel Pipes"
2. AWWA C900 "Polyvinyl Chloride (PVC) Pressure Pipe, 4-inches through 12-inches"
3. AWWA Manual M11 "Steel Water Pipe: A Guide for Design and Installation"
4. AWWA Manual M17 "Installation, Field Testing, and Maintenance of Fire Hydrants"
5. AWWA Manual M23 "PVC Pipe: Design and Installation"

Finally, Section 3 of these Standards contains material descriptions. The applicant's contractor should use that section along with this section as well as the respective plates as references. Section 9 describes testing and disinfection procedures and/or requirements.

7-1.2 Protection/Operation of Existing Water System: A primary concern of the Public Works Department is the protection and operation of the existing water system. No applicant or contractor will be allowed to operate any existing water valves or to cause a shutdown of any portion

of the City's water system without prior approval from a Public Works Department representative. That representative may be the Public Works engineer, the Public Works superintendent, the Public Works inspector, or the Public Works water supervisor, following approval from the Public Works superintendent. In general, any operation of valves in a planned shutdown will be done by Public Works Department personnel. Any planned shutdown should be discussed at the preconstruction meeting or at least three working days in advance. Shutdowns will only be allowed if no other reasonable alternative exists, such as the use of a hot-tap connection in lieu of a cut-in tee. When shutdowns are required, the City will evaluate whether the shutdown should be done during the day or during the night. The potential interruption and inconvenience to existing customers shall be given greater consideration than the cost to the applicant or contractor. Any shutdown shall involve a thorough notification plan for existing customers as well as the provision of bottled water, water tanks, etc., at the applicants expense, where appropriate.

- 7-1.3 Quality of Materials: Materials and equipment to be incorporated into the work shall be new and unused unless otherwise approved. When the specifications or plans are not clear as to which of several available grades is required, the highest quality material shall be used. When construction bids are received directly by the City, such bids shall show the proposed pipe material and the manufacturer's name.

The contractor shall have at the job site, or be able to supply upon request, certified copies of factory or laboratory test reports showing the strength characteristics of any materials used in the work. For all reinforced concrete work the contractor shall, in advance to pouring the concrete, furnish the mix design and calculated concrete strength as prepared by the concrete supplier. Thereafter, no additional water may be added to the mix without the express approval of the inspector.

- 7-1.4 Substitutions: Where articles or materials are specified by brand or trade name, alternate materials or articles equal to those specified may be approved provided that the request for approval is in writing. The request must be accompanied by supporting data, and be submitted in ample time to permit investigations without delaying the work. Unless substitutions have received prior approval, no deviation from the Standards will be allowed.

- 7-1.5 Quality of Workmanship: All work will be done by persons experienced in the specific work, under competent supervision and in a first class manner to the City's complete satisfaction. When work is being done directly for the City, the contractor in the proposal shall name each subcontractor and no substitutions will be permitted without prior approval.

- 7-1.6 Defective Work: Any defective materials or workmanship which shall become evident within one year after council acceptance of completed work shall be replaced or repaired without cost to the City, and a new one-year period will begin for that corrected work. Refusal of the contractor to correct defective work which is clearly his responsibility will be considered just cause for exclusion from performing future work to be

connected to the City's system. Such exclusion does not impair the City's right to bring legal action to correct the deficiencies as well as to withhold exoneration of performance and payment bonds.

7-1.7 City Inspection, Field Acceptance and Guarantee Period:

7-1.7.1 City Inspection: The Public Works Department is responsible for inspection of all excavation and pipe laying including appurtenant structures, trench backfill, and testing. All such work shall be available for inspection at all times. It will be the contractor's responsibility to provide a five working day notice to the Public Works Department prior to the start of any work. Such notification will allow for scheduling a pre-construction meeting between interested parties. Failure to provide proper notification may delay the starting date since the Public Works Department may not be able to inspect the work and cannot accept any work for which inspection has not been arranged. It must be emphasized that the primary responsibility for compliance with all City requirements and standards rests with the applicant and/or contractor. Any acceptance of a portion of the work by a Public Works inspector does not relieve the applicant/contractor of this basic responsibility.

All holiday or weekend inspection will be subject to additional charges.

7-1.7.2 Field Acceptance: Upon completion of the improvements as shown on the approved construction documents, the applicant/contractor shall request a final inspection from the Public Works inspector. The inspector will prepare a final list of items to be corrected prior to field acceptance. Field acceptance will not coincide with the date of City Council acceptance of the work.

7-1.7.3 Guarantee Period: The maintenance and guarantee period is one year from the date of City Council acceptance. The applicant/contractor is responsible during the guarantee period for the proper performance and maintenance of the water system improvements.

7-1.8 Public Relations: The contractor shall conduct its affairs in a manner which will lessen the disturbance to residents in the vicinity of the work. In this regard, standard working hours as specified in the Municipal Code (currently 7:00 a.m. to 7:00 p.m., Monday through Saturday) shall be observed unless prior approval is received. The job site shall be maintained in a condition which shall bring no discredit to the City or its personnel, and all affected private improvements shall be restored to their original or better condition.

7-2 PERMITS

7-2.1 General: It is the responsibility of the applicant/contractor to obtain all necessary permits required to construct the water facilities. The following permits may be required of the contractor:

7-2.1.1 Water Permit: A water permit may be required by the Public Works Department prior to construction of water facilities. Prior to issuance of a water permit, all connection fees must be paid by the applicant.

7-2.1.2 Encroachment: Where construction will encroach into the public right-of-way or an easement dedicated to the City, the contractor shall obtain an encroachment permit from the Public Works Department. Encroachments within public right-of-ways in areas outside of City limits require a similar permit from the County.

7-3 SHIPMENT AND DELIVERY

All pipe shall be braced and studded to prevent damage during shipment. Any damaged pipe or fittings delivered and unloaded at trench side shall be removed by the contractor from the work site.

With steel CML&C pipe, the off loading of the pipe as well as placement in the trench shall be done with straps at each end. Chains shall not be allowed to come into contact with the pipe.

7-4 CLEARING AND GRUBBING

7-4.1 General: "Clearing and grubbing" refers to the removal of objectionable material from a water easement or right-of-way. All clearing and grubbing shall be done with caution and in such a manner that existing water improvements, adjacent property, and trees and shrubbery that are not to be removed shall be protected from injury or damage.

Within water easements or rights-of-way, trees, shrubs, fences and all other improvements that have to be removed to permit construction and which are intended for replacement, shall be replaced in kind or size (excluding native trees under 2 inches in diameter or native brush) or with approved substitutes unless permission to exclude such replacement is obtained from the owner/agency or granted by the Public Works Department.

7-4.2 Removal and Disposal of Material: The contractor shall be responsible for leaving the site in a neat and finished appearance, free from debris or inflammable material.

7-4.3 Oak Tree Ordinance: The developer and contractor should be aware of the City's oak tree ordinance which governs the trimming and removal of oak trees, as well as the limits of construction around the oak trees. In

general, any work under or within the drip line of an oak tree may be subject to special requirements. If a question exists, the City's Planning and Community Development Department should be contacted.

7-5 ABANDONMENT OF EXISTING WATER LINES, REPAIR OF EXISTING FACILITIES, CONNECTING TO EXISTING AC PIPE, AND CONCRETE REMOVAL

7-5.1 Abandonment: Refer to Section 8 regarding the requirements of abandonment of existing water lines and/or structures.

7-5.2 Existing Utilities and Facilities: The existing utilities and/or facilities shown on the drawings or the location of which is made known to the contractor prior to excavation shall be protected from damage during the excavation and backfilling of trenches and, if damaged, shall be repaired by and at the contractor's expense. Any existing utility or facility not shown on the drawings or the location of which is not shown to the contractor in sufficient time to avoid damage, if inadvertently damaged during excavation, shall be repaired by the contractor, and adjustment in payment, if any, is subject to negotiation between the contractor and the applicant without any City liability, unless it is a City sponsored project.

Whether expressly indicated on the drawings or not, all contractors shall call Dig Alert (811) two days prior to any construction of pipelines.

In case it shall be necessary to remove any such utilities, facilities or any portions thereof, the contractor shall notify both the Public Works Department and the owner of the structure. The contractor shall not interfere with said utility and/or facility structures until disposition of the obstruction to the work has been determined and/or notice to relocate or remove has been given by the Public Works Department or authorized agent of the owner of the utility and/or facility so affected.

The fact that any underground utility and/or facility is not shown on plans shall not relieve the contractor's responsibility to comply with these standards. It shall be the contractor's responsibility to ascertain prior to commencing work the existence of any underground utilities or facilities which may be subject to damage by reason of his operations.

7-5.3 Connecting to AC Pipe: The City of Thousand Oaks no longer allows asbestos cement (AC) pipe to be installed in the water distribution system. There is, however, a substantial quantity of serviceable AC pipe presently in use. It is, therefore, often necessary to connect water services, blow-offs, fire hydrant runs, fire sprinkler lines, etc. to an existing AC main line. Similarly, it is often necessary to repair damaged AC water mains. Since AC pipe is disallowed, any revisions or repairs can only be made by transitioning to another pipe type, such as AWWA C900 PVC.

The transition to a different pipe type must be made at valves and fittings, or by means of couplings. It is best to remove an entire section from joint to joint in order to minimize the necessity of cutting the AC pipe.

When it is necessary to cut AC pipe, a device such as a snap cutter should be used to produce a smooth square-cut end. Carbide tipped blade cutters and high speed abrasive disk saws are prohibited. Snap cutting AC pipe shall be avoided if possible by removing an entire section of pipe at the joints. When connecting to an existing AC mainline, tapping sleeves are preferable to drop-in tees.

Service connections shall be pressure or "wet" tapped and shall be performed in the trench while the pipe is under pressure.

When it is necessary to cut and remove a section of AC pipe, the portion to be removed shall be left intact and double bagged in 6-mil thick plastic bags and disposed of at a disposal facility certified to accept asbestos. The contractor shall provide proof to the inspector that the material was delivered to a certified disposal facility.

AC pipe shall not be crushed and left in the trench or mixed into wet concrete.

AC chips and cuttings from field operations should be properly disposed of and in a manner that will not contribute airborne dust to the atmosphere. Dry material should never be swept or shoveled.

In all instances, the contractor's practices shall conform to the following requirements:

1. U.S. Department Of Energy, Office of Environmental Policy and Assistance, Regulatory Requirements Affecting Disposal of Asbestos-Containing Waste, EH-413-062/1195 (November 1995).
2. The California Code of Regulations, Title 8, Section 1529, Asbestos.
3. California Occupational Safety and Health Administration (aka: CAL OSHA) Construction Safety Orders, Title 29, Section 1926.58, Asbestos.
4. AWWA Manual, "Work Practices for Asbestos Cement" 1995 Edition, ISBN 0-89867-795-5; Catalog Number 20406).

7-5.4 Concrete, Masonry, Brick and Block Removal: At locations shown on plans, portions of existing concrete pavement, curbs, gutters, sidewalks, foundations and other concrete or mortared structures shall be removed to the lines and elevations specified. Concrete structures or objects not shown or noted on the plans shall be removed where necessary and disposed of by the contractor.

Concrete removal operations in connection with the reconstruction of existing structures shall be performed without damage to any portion of the structure that is to remain in place. If damage occurs, the contractor shall repair any such damage at his own expense, to the satisfaction of

the Public Works Department. Repair/replacement of any sidewalks, curbs and/or gutters shall be to the satisfaction of the City or County Public Works Department, as appropriate. Where existing reinforcement is to be incorporated in new work, such reinforcement shall be protected from damage and shall be thoroughly cleaned of all adhering material before being embedded in new concrete.

7-6 EXCAVATION AND TRENCHING

7-6.1 General: The term "trenching" refers to all grading and excavation pertaining to the construction and/or installation of a water line as shown on a set of plans. The contractor shall perform all excavation of every description and of whatever substances encountered, to depths indicated on the drawings or otherwise specified or required. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins. Sheeting and shoring shall be done as necessary for the protection of the work and for the safety of personnel. Material piles shall not obstruct existing sidewalks or driveways unless it cannot be avoided. All excavated materials not required or unsuitable for backfill shall be removed. Such grading shall be done as may be necessary to prevent surface water from flowing into trenches or other excavations.

7-6.2 Trench De-Watering: Any water from any source accumulating in the trench shall be removed by pumping or other approved method. Note that ground water cannot be pumped and discharged into the street, storm drain, or drainage channel without a permit from the Regional Water Quality Control Board. Ground water cannot be pumped and discharged into the wastewater system. Ground water can, however, be pumped and captured providing that the captured ground water is hauled to a legal disposal site.

7-6.3 Excavation: Excavation for water lines shall be made only after pipe and other necessary materials are delivered on the work site. After such delivery, trench excavation shall proceed as rapidly as possible, and the pipe installed and the trench backfilled without undue delay.

Unless otherwise indicated, excavation shall be by open cut except that short sections of a trench may be tunneled if, in the opinion of the Public Works Department, the pipe or duct can be safely and properly installed and backfill can be properly tamped in such tunnel sections.

Where rock excavation is required, the applicant/contractor shall notify the Public Works Department and submit a procedure for removal of the rock prior to excavation. The rock shall be excavated to a minimum overdepth of 6 inches below the trench depths indicated on the drawings or as specified. Overdepths in the rock excavation and unauthorized overdepths shall be backfilled with the same material as the bedding zone. Whenever wet or otherwise unstable soil incapable of properly supporting the pipe, as determined by the Public Works Department, is

encountered in the bottom of the trench, such soil shall be removed to the depth required and the trench backfilled to the proper grade with an appropriate material between a course sand and a crushed rock to provide a stable foundation.

- 7-6.4 Shoring: All shoring for open excavations shall conform to the State of California, Department of Industrial Relations, Division of Occupational Safety and Health "Construction Safety Orders."

The contractor shall be responsible for adequately shored and braced excavations so that the earth will not slide, move, or settle and so that all existing improvements of any kind will be fully protected from damage.

No shoring once installed shall be removed until the trench has been approved for backfill operations. Removal of shoring shall only be accomplished during backfill operations and in such a manner as to prevent any movement of the ground or damage to the pipe or other structures.

The contractor shall obtain and pay for all permits for any excavations over five feet in depth into which a person is required to descend or any excavation less than five feet in depth in soils where hazardous ground movement may be expected and into which a person is required to descend.

- 7-6.5 Trench Width: The width of the trench within the pipe zone shall be such that the clear space between the barrel of the pipe and the trench wall shall not exceed the amount detailed on the standard plates.

Trench widths in excess of those shown on the standard plates may be as wide as necessary if for the explicit purpose of installing sheeting and bracing.

- 7-6.6 Pipe Subgrade. The trench bottom shall have a flat or semi-circular cross section. The bottom of the trench shall be graded and prepared to provide a firm and uniform bearing throughout the entire length of each joint except for required "bell holes" at joints. A coupling hole shall be excavated as necessary with sufficient length, width and depth to permit assembly and provide a minimum clearance of 3 inches below the coupling for a length of 6 inches beyond the coupling.

7-7 PIPE BEDDING AND LAYING

- 7-7.1 General: This portion of the work includes both the furnishing of all materials and their proper assembly. Only those materials and methods that will result in a first class waterline installation shall be used. The contractor shall prepare the pipe bedding and lay the pipe in such a manner as to ensure a waterline which is true to line and grade, and free from leaks, cracks and obstructions. Where choices are allowed, the contractor shall select such materials and construction methods as will result in a completed project in full accordance with these Standards.

The contractor is warned that the approved water pipeline design is based upon a proper combination of pipe strength and pipe support. No acceptance will be given unless the work of trenching, bedding, laying, backfilling and compaction is conscientiously done in accordance with the procedures outlined in these Standards.

Except as otherwise approved or included in permits, the maximum length of open trench at any one time shall be 600 feet, or the distance necessary to accommodate the amount of pipe installed in a single day, whichever is the greater.

Grades shall be transferred from ground surface to the bottom of the trench by experienced workmen, using not less than three consecutive grade points in common, so that variations from a straight grade may be readily detected. Each length of pipe shall be laid on firm approved bedding material as specified, and shall have full bearing for its entire length between bell holes excavated in said bedding material to allow for unobstructed assembly of all joints. Adjustments of pipe to line and grade shall be made by scraping away or filling in and tamping approved material under the body of the pipe. No wedging or blocking with wood or soil to support the pipe will be permitted. Under no circumstances will a contractor be allowed to dump backfill materials on top of a pipe which is not continuously supported in its final grade position.

Each pipe shall be laid true to line and grade and in such manner as to form a closed concentric joint with the adjoining pipe, following manufacturer's instructions for the specific jointing method being used. Pipe shall not be laid when the engineer or inspector determines that the condition of the trench or weather is unstable. As the work progresses, the interior of the water line shall be cleared of all dirt and superfluous materials of every description. If the maximum width of the trench at the top of the pipe is exceeded, the contractor shall install such concrete cradling, pipe encasement or other bedding as may be required to support the added load of the backfill. Trenches shall be kept free from water until sufficient backfill has been applied to keep the pipe in place. At times when work is not in progress, open ends of pipe and fittings shall be securely closed to the satisfaction of the inspector so that no trench water, earth or other substance will enter the pipe or fittings. Whenever water is absent from the interior of the pipe, enough backfill shall be placed on the pipe to prevent floatation. Any pipe that has floated shall be removed from the trench and the bedding corrected.

Pipe or fittings damaged during assembly shall be removed and replaced.

7-7.2 Pipe Laid on Bedding vs. Earth Mounds: The key elements to the pipe bedding are that the pipe ultimately be continuously supported and that the full 4 inches of bedding material (imported sand or better) be placed under the pipe. Where pipe is to be laid where considerable amounts of rock or cobble stone or groundwater are present, then the continuous bedding method shall be used. Earth mounds may be used, if specifically approved by the Public Works inspector, in areas exhibiting ideal pipe laying conditions where there is clear demonstration that the 4

inches of bedding material will be placed after the pipe is laid in the trench.

For the continuous bedding method, the trench bottom shall be overexcavated a minimum of 4 inches and brought back to grade with imported bedding material. Prior to lowering pipe into the trench, coupling holes shall be excavated in the bedding with sufficient length, width and depth to permit assembly and provide a minimum of 2 inches below the coupling.

For the earth mound method, the mounds shall be compacted firmly and of a size adequate to suspend the pipe 4 inches above the trench bottom while maintaining the pipe true to grade. Each length of pipe shall be laid on two mounds with the center of each placed at approximately one-fifth the distance from each end. Coupling holes shall provide a minimum clearance of 2 inches. After assembly, the trench zone shall be properly backfilled with imported bedding material. The bedding material shall then be compacted utilizing appropriate methods to provide a firm and uniform bedding throughout the entire length of pipe.

7-7.3 Pipe Laying For Steel Pipe: Pipe laying of steel pipe shall be in accordance with the requirements of AWWA Manual M11 – “Steel Water Pipe: A Guide for Design and Installation”, and the following conditions:

7-7.3.1 Handling: CML&C steel pipe shall be handled with straps. Chains or bare cinch or choker type cables shall not be used. The slings shall be of sufficient width to prevent damage to the lining or coating.

7-7.3.2 Inspection: No welded joint shall be backfilled until it has been inspected by the Public Works Department. Sufficient trench space shall be left open in the vicinity of each joint to permit visual inspection around the entire periphery of the joint.

7-7.3.3 Joints – Interior and Outside: Mortar lining and coating of the joints, interior and outside, shall be in accordance with the requirements of AWWA C205.

No pipe shall be placed into service or filled with water until at least 24 hours after the joints have been mortared.

7-7.3.4 Welded Joints: Field welding of joints shall be in accordance with the requirements of AWWA C206. This specification pertains to automatic field welding by the metal arc-welding process and covers lap joints, butt joints and butt strap joints.

7-7.4 Pipe Laying For PVC Pipe: Pipe laying of PVC C900 pipe shall be in accordance with the requirements of AWWA C605, and the following conditions:

- 7-7.4.1 Trench: Pipe bedding, backfill, and compaction shall be in accordance with the requirements of these Design and Construction Standards.
- 7-7.4.2 Storage: Pipe stored outdoors and expected to be exposed to direct sunlight for periods of 45 days or more after delivery shall be covered with canvas or other opaque material with provision for adequate air circulation.
- 7-7.4.3 Bending: The longitudinal bending in the PVC pipe barrel shall not result in a bending radius less than the minimum limits established in Section 2 of these Standards. The contractor shall block or brace pipe joints to ensure that bending of PVC pipe does not occur in the gasketed or mechanical joint.
- 7-7.4.4 Tracing Wire: Tracing wire shall be installed on all buried pipe. All buried pipe shall have a No. 14 gage insulated copper wire placed along its entire length in order to facilitate locating the pipeline after the trench is backfilled and/or the street is paved. The wire shall be continuous between successive valve boxes (including all adjacent valve boxes and valve boxes associated with fire hydrant assemblies). The wire shall be terminated inside each valve box within easy reach of finish ground surface, and shall be periodically tied to the water pipe at intervals of 25 feet.
- 7-7.5 Pipe Laying For Ductile Iron Pipe: Pipe laying for ductile iron pipe shall be in accordance with the requirements of AWWA C600. Where specified, the Public Works Department may request a specification for such installation practices. Specific attention shall be given to the placement of the polyethylene encasement wrap and any tapping of the pipeline for services and/or other main connections.

7-8 THRUST BLOCKS, SUPPORTING OF VALVES

- 7-8.1 Thrust Blocks: Thrust blocks shall be placed as shown on the plans or as required by the Standard Plates. Concrete shall be in accordance with the requirements of Section 3-13 of these Standards. Care shall be taken to insure that the concrete is poured against undisturbed ground and the fitting to be anchored. When pouring thrust blocks around a fitting, the concrete should be around the fitting and not the joint.
- 7-8.2 Supporting of Valves: Valves and fittings shall be supported by the trench bottom and shall be supported independent of the pipe.

7-9 HOT TAPPING

Hot tapping shall only be done in the presence of the Public Works Department representative. The tapping mechanism shall be of the self purging type so that

cutting chips are removed from the tapping machine and do not enter the pipeline.

7-10 SERVICE CONNECTIONS AND SERVICE LINES

Service connections, fittings and service lines shall be in accordance with the requirements of these Design and Construction Specifications and shall also be in accordance with the requirements of AWWA C800.

Service connections on the opposite sides of the pipe are not allowed. There shall be a minimum of 18 inches between service connections.

In all metal to metal threaded connections, use either Teflon tape or sealing compound.

Service lines shall be one continuous length "snaked" within the trench to allow for expansion or contraction. Care must be taken to ensure that the service line remains within and fully encased in the sand bedding of the trench.

7-11 INSTALLATION OF VALVES AND FITTINGS

7-11.1 General: Valves and fittings shall be installed to be in accordance with the requirements of AWWA C500, C504, C509, and C110 at the locations and grades shown on the plans.

7-11.2 Support: The weight of the valve or fitting is to be supported by firm ground or blocking and not the pipe.

7-11.3 Plastic Wrap: Valves and all bolted connections shall receive a polyethylene plastic wrap installed as follows: The valves shall be wrapped by passing the flat sheet of plastic under the valve bottom and bringing the ends up around the body to the stem and securing it in place with 2 inch strips of plastic adhesive tape. The plastic shall be secured around the valve stem in such a manner as to leave the stem free to operate. The plastic shall be brought completely around the flanges and secured to the pipe with a plastic adhesive tape on either side of the valve, flange or fitting.

7-11.4 Bolt Tightening: All bolts on bolted connections shall be tightened in an even manner by a series of tightening steps so that no portion of the bolted connection is overstressed.

7-12 INSTALLATION OF AIR RELEASE AND BLOWOFF ASSEMBLIES

Combination air release and blowoff assemblies shall be installed at the locations and grades shown on the plans. The contractor shall locate the combination air release enclosures and blowoff vaults in a suitable location with respect to the adjacent properties. This shall include locating them closer to property lines rather than in the middle of a property where there could be future objections

from the property owner. The service line to the assembly shall have a positive grade to prevent accumulations of air.

7-13 INSTALLATION OF FIRE HYDRANT ASSEMBLIES

- 7-13.1 General: Fire hydrant assemblies are to be installed in accordance with the general instructions contained in AWWA C600 and AWWA Manual No. M17. Special attention is called to the following:
- 7-13.2 Painting: All metal surfaces above ground shall be painted including the break-away spool. It is suggested that the break-away piece be painted before pouring the sidewalk or concrete pad.
- 7-13.3 Setback: The setback of 2 feet from the curb face must be adhered to regardless of whether the curb is next to a private street or within a private street parking lot. The dimension of 2 feet is from the curb face to the nearest portion of the fire hydrant, and is not to the fire hydrant centerline.
- 7-13.4 Thrust Block: The elbow of the fire hydrant bury must be anchored in the concrete thrust block.
- 7-13.5 Plastic Wrap: All underground flanges and fittings shall be wrapped with plastic.

7-14 INSTALLATION OF METER BOXES AND PRESSURE REGULATORS

- 7-14.1 General: In all cases, the Public Works Department will select the meter type and install the meter after proper arrangements have been made.
- 7-14.2 Jurisdiction: All pipes on the customer side of the meter box are under the jurisdiction of the City of Thousand Oaks Community Development Department if the property is within the City. If it is within the County, then the Ventura County Building & Safety Department has jurisdiction.
- 7-14.3 Meter Boxes: Meter boxes shall not be located within driveways. In instances where meter boxes must be within the traveled right-of-way, special written approval is required and the cover must be a traffic rated iron traffic lid approved by the City.

Spacers (or jumpers) are to be placed within the meter box until the Public Works Department installs the meter. Care must be taken to avoid placing a strain on the spacer through misalignment of the house or service line.

- 7-14.4 Pressure Regulators: Wherever the normal operating pressure at the house or building exceeds 80 psi a pressure regulator is required. For convenience, the houses or buildings requiring regulators are shown on

the plans, but this does not relieve the applicant's/contractor's responsibility to check the pressure of each house or building. The types of regulators and their installation are as specified by the respective Building & Safety Department.

7-15 BACKFILL AND COMPACTION

7-15.1 General: There are two distinct zones to be considered in the backfilling and compaction procedure.

7-15.1.1 Pipe Zone: This is the area from 4 inches below the pipe to 12 inches above the pipe. This zone is to be backfilled under the strict jurisdiction of the Public Works Department.

7-15.1.2 Trench Zone: This is the area above the pipe zone but below the pavement subgrade or to the finished surface in areas without pavement.

7-15.1.3 Compaction Tests: Compaction tests for the pipe and trench zone shall be taken as determined by the Public Works Department and the soils engineer. The applicant/contractor shall make all necessary excavations for the tests at locations selected by the Public Works Department, and shall refill and recompact these excavations to the specified densities.

7-15.2 Backfilling and Compacting Pipe Zone: Bedding placement and compaction shall be in accordance with SSPWC Section 306-1.2.1, with the following exceptions:

7-15.2.1 Material: Bedding material within the pipe zone shall be imported fill sand.

7-15.2.2 Compaction: Compaction of bedding material may only be accomplished through jetting or hand-directed mechanical compactors.

Bedding compacted by mechanical compaction methods shall be compacted to 90% relative compaction or as specified by the soils engineer or Public Works inspector.

Bedding compacted by jetting shall be compacted to 90 percent relative compaction or as specified by the soils engineer or by visual inspection and probing by the Public Works inspector.

7-15.3 Backfilling and Compacting Trench Zone: Backfill and compaction shall be in accordance with the City's Road Design and Construction Standards and with SSPWC Section 306-1.3, except that jetting or flooding is not allowed within the trench zone, 90 percent relative compaction is required throughout the trench zone, and a compaction report is required at each maximum lift thickness.

Backfill and compaction in existing streets shall be in full accordance with the City or County encroachment permit issued for the specific work. In both cases, the filling of trenches shall be subject to approval by the City or County Public Works inspector who shall have full authority to order compaction tests to demonstrate the actual backfill density.

The sequence of backfilling and compaction above the pipe zone shall be as directed by the City or County Public Works inspector. Backfill, compaction and resurfacing shall be scheduled so that existing public streets may be opened to normal traffic in accordance with the City or County encroachment permit, and so that the backfill operations closely follow the pipe laying, avoiding open trenches overnight.

The trenches or excavations shall not be backfilled without prior inspection by the Public Works Department. Such inspection does not relieve contractor from compliance with the testing of the waterline which should be conducted after final assembly of main and service lines and consolidation of backfill. Contractor shall assume the cost of removal and replacement of backfill necessary for correction of defective conditions revealed by testing.

If the work is in private property, excavations shall be backfilled and compacted to be in accordance with the requirements of these Design and Construction Standards, and the City's Road Design and Construction Standards. The finished surface shall be finished to match original conditions, and/or as shown on the plans, and/or as interpreted by the Public Works Department.

In traffic areas within public right-of-way or easements where pavement is to be replaced, the City requires a cement/sand slurry mixture to be used for trench backfill.

7-16 RESURFACING AND RESTORATION

If the work occurs in streets where no paving exists, the contractor shall, in accordance with City and County requirements, leave the completed trenches in a suitably compacted condition for finish grading and placement of base and sub-base material and paving.

If the work is within existing City or County streets, any required surfacing shall be in accordance with the City or County encroachment permit and the City's Road Design and Construction Standards.

If the work has disturbed or damaged existing private streets, alleys, driveways or other improved surfaces, the damaged portions shall be removed and restored, including the provision of adequate subgrade where these operations have disturbed the original material.

All plants and substructures that have been removed or damaged (whether on public or private property) shall be restored or replaced to the original condition. This requirement includes, but is not limited to, trees, bushes, plantings, groundcover, mailboxes, walls, fences and sprinkler systems. The obvious exception is any pipeline or structure designated "to be abandoned".

Any temporary paving, barricades, traffic control, or special provisions required by public agencies shall be furnished by the applicant/contractor as required.

7-17 BORING AND JACKING OPERATIONS

7-17.1 General. Placement of pipe by boring or jacking methods requires special Public Works Department approval for each instance and shall be in accordance with SSPWC Section 306-2. However, as a general guideline, the following shall pertain:

7-17.2 Methods: The methods and equipment used in boring and jacking operations shall be optional to the contractor, provided that the Public Works Department reviews them prior to any work.

7-17.3 Casing Pipe: Where a casing pipe is used, it shall be no less than 8 inches greater in diameter than the carrier pipe.

The placement of the carrier pipe in the casing shall be supported with redwood skids, shims or wedges to the lines and grades shown on the plans.

The annular space between the carrier pipe and the casing, and any voids around the outside face of the casing shall be filled in accordance with SSPWC Section 306-2.

Prior to filling the annular space between the carrier pipe and casing, the pipeline shall be tested in accordance with Section 9.

7-18 CONCRETE AND MORTAR WORK

7-18.1 Concrete: Concrete specifications and requirements shall be in accordance with SSPWC Section 201. Concrete used for encasements, filling, blocking, piers and other typical water construction applications shall be transit-mixed concrete from a supervised batch plant which issues certified delivery tickets with each load, showing the mix proportions, mixing time, truck departure time and water added. Such certified tickets will be handed to the inspector at the time of delivery. Job mixed concrete shall be limited to that needed for patching and minor non-structural uses requiring one cubic yard or less. In these cases, the materials and workmanship shall be the same as if transit-mixed concrete had been used. The 28 day compressive design strength of concrete shall be chosen according to its intended use and be in accordance with the requirements of these Design and Construction Standards.

7-18.1.1 Placement: Concrete shall be placed in clean forms before its initial set begins, using the minimum amount of mixing water required for good workability. Concrete shall be worked into forms by rodding or vibrating to secure a dense homogeneous mass free from voids and rock pockets. All concrete shall be vibrated unless the inspector approves solely rodding to avoid having the concrete run out of the forms or trench.

7-18.1.2 Finish: Concrete surfaces, where required to be trowelled, shall be steel trowelled to a smooth hard surface free from ridges, holes and surface roughness. Exposed walls shall be left with a surface finish comparable to that obtained with new plywood forms. Slabs and walkways shall be finished with a wood float unless otherwise specified. Corners and edges shall be neatly beveled. Surface defects shall be repaired to match the surrounding concrete.

7-18.2 Mortar: Mortar specifications and requirements shall be in accordance with SSPWC Section 201-5. Mortar for general work (exclusive of CML&C steel pipe) shall be Class C, consisting of one part Type II Portland cement and two parts of sand, by volume, thoroughly mixed in a dry state before adding sufficient water to give the mortar a proper trowelling consistency.

7-19 CONSTRUCTION WATER

The applicant/contractor shall not take unmetered water from the City's water system. The applicant/contractor must apply at the Public Works Department for

a construction meter. After receipt of a deposit, the Public Works Department will install the meter at the fire hydrant selected by the applicant/contractor. Hoses or pipes running from the fire hydrant to the project site will not be allowed to cross the street or impede the path of travel in sidewalks. Upon request, and for a fee, the Public Works Department will move the hydrant meter to another location. The applicant/contractor is not to move construction meters. Charges for construction water are covered by Councilmanic Resolution. The applicant/contractor is put on notice that unpaid invoices will result in removal of the construction meter.

7-20 PAINTING

Paint shall be opened and mixed at the job site. Workmanship shall be of a kind and quality meeting the requirements of the best standards of the painting industry. All work shall be done by skilled and experienced painters. Surfaces to be painted shall first be thoroughly cleaned to remove dirt, loose scale, rust, oil, grease and/or other foreign matter immediately prior to painting. Cleaning shall be done with abrasives, scrapers, wire brushes and/or other approved means. Each coat shall be applied in such a manner as to assure an even, smooth, uniform adhering coat free from dirt, runs, brush marks and laps, and shall be applied as recommended by the manufacturer. Painting will not be permitted when freshly painted surfaces may become damaged by rain, fog or condensation or when inclement weather can be anticipated. Fresh paint damaged by the elements shall be replaced by the contractor at his expense. Drop cloths shall be used to protect floors, equipment, piping and other exposed surfaces from spattering and spillage. Paint shall be allowed to dry thoroughly between applications of successive coats. The manufacturer's recommended time between coats will be used as a guide by the inspector as to when the next coat of paint may be applied. The Public Works Department must give approval before successive coats are applied, unless otherwise approved.

The contractor shall notify the Public Works Department after surface preparation and after the application of each successive coat of paint. Spray painting will not be permitted unless specifically authorized by the Public Works Department.

7-21 SAFETY

Wherever the contractor is aware of unsafe operations, such should be discontinued immediately. Also, if the inspector is aware of such conditions and informs the contractor of same, it will be the contractor's responsibility to comply. In such instances, the advice shall not be construed as implying any City liability.

Essential to proper safety is adherence to all Public Works Department traffic control requirements.

Contractor is to submit to the City a copy of their annual Cal/OSHA permit and the letter notifying Cal/OSHA of their work on the City's project.

