

INDIAN WELLS VALLEY WATER DISTRICT

**STANDARD CONSTRUCTION
SPECIFICATIONS & DRAWINGS**



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APPROVED PAINT SYSTEMS

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SPECIFICATIONS

GENERAL REQUIREMENTS

1. Definitions

Whenever the terms herein defined occur in these Specifications or other related documents, they shall have the meanings here given.

- a. "District" or "Owner" shall mean the INDIAN WELLS VALLEY WATER DISTRICT, 500 West Ridgecrest Boulevard, Ridgecrest, California 93555, its Manager, and any other person or persons designated by the District to act on its behalf.
- b. "Manager" shall mean the person designated by the Board of Directors of the INDIAN WELLS VALLEY WATER DISTRICT to have charge, supervision, and administration of said District.
- c. "Contractor" and/or "Developer" shall mean the person, firm, or corporation responsible for the construction of Domestic Water System facilities or any portions thereof to be integrated into the District's Domestic Water System either on behalf of the District or on behalf of a developer. Contractor shall at all times be represented on the Work in person or by a duly designated agent or superintendent.

Contractor shall hold a valid Contractor's License in accordance with the provisions of Division 3, Chapter 9 of the Business and Professions Code of the State of California, and any amendments thereto.

- d. "Work" shall mean all work to be performed by Contractor and shall be as specified by Construction Drawings, Special Provisions, or Directions of Owner for any particular project.

Owner may at any time during Work, by written order, make such changes as found necessary in the character, quality, or quantity of the Work to be furnished.

- e. "Construction Drawings" shall mean those drawings approved by Owner showing dimensions, details, features, and requirements of the Work. Said Construction Drawings shall be used in conjunction with Special Provisions or Directions of Owner and shall be augmented by the Specifications including the Standard Drawings.
- f. "Special Provisions" shall mean those provisions of Owner describing Work not specified by Construction Drawings or by Directions of Owner, clarifying Work as shown by Construction Drawings or as described by Directions of Owner, or supplementing or modifying the Specifications. Said requirements may be written or verbal.
- g. "Directions of Owner" shall mean those instructions of Owner supplementing or modifying the Construction Drawings, Special Provisions, or Specifications and shall include all Work not specified by Construction Drawings or Special Provisions. Said instructions may be written or verbal.
- h. "Specifications" shall mean the requirements contained herein and shall apply to all Work, where applicable, unless specified otherwise in the Construction Drawings, Special Provisions, or Directions of Owner. Said Specifications shall augment Construction Drawings, Special Provisions, or Directions of Owner and shall pertain to all methods and materials of construction.
- i. "Standard Drawings" shall mean all drawings referenced as such and bound with the Specifications. Said Standard Drawings shall be considered an integral part of the Specifications.

2. Abbreviations

Whenever used in these Specifications, the following abbreviations shall refer to the agency shown:

a.	AASHO	American Association of State Highway Officials
b.	ACI	American Concrete Institute
c.	AISC	American Institute of Steel Construction
d.	AISI	American Iron and Steel Institute
e.	API	American Petroleum Institute
f.	ASTM	American Society for Testing Materials
g.	ASA	American Standards Association
h.	AWWA	American Water Works Association
i.	AWS	American Welding Society
j.	IPCEA	Insulated Power Cable Engineers' Association
k.	NBFU	National Board of Fire Underwriters
l.	NEC	National Electrical Code
m.	NEMA	National Electrical Manufacturing Association
n.	REA	Rural Electrification Administration
o.	SSPC	Steel Structures Painting Council

All references to Specifications of any of the above agencies shall mean the latest editions thereof.

3. Permits, Certificates, Laws, and Ordinances

Unless specified otherwise, Contractor shall at no cost to Owner obtain all necessary permits, certificates, and licenses from such Federal, State, and local agencies as required to perform the Work. Contractor shall comply with all laws, ordinances, or rules and regulations of said agencies in performance of the Work.

4. Rights-of-Way

a. Permanent Rights-of-Way

Owner will obtain all permanent rights-of-way or permanent easements as required to perform the Work unless specified otherwise. Said rights-of-way will not include rights-of-way for which permits, certificates, and licenses are required from Federal, State, and local agencies having jurisdiction.

b. Access or Temporary Rights-of-Way

Contractor shall at no cost to Owner obtain all access or construction rights-of-way of a temporary nature other than specified.

5. Interferences

Any and all crossing of public utility facilities such as water mains, sewer lines, gas lines, telephone and/or telegraph cables and/or conduits shall be made by Contractor in accordance with requirements and specifications of appropriate agency. It shall be the responsibility of Contractor to obtain any necessary permits, licenses, and/or agreements required by said agency.

Whenever facilities are encountered by Contractor, he shall ascertain the ownership thereof and shall make all necessary arrangements with facility owners for the protection, removal, relocation, and/or replacement thereof. Contractor shall give facility owners due notice of his requirements and shall give them convenient access and cooperate with them in every way while any work of removal and/or replacement is being performed.

6. Sanitation

All parts of the Work shall be maintained in a neat, clean, sanitary condition. Fixed and portable toilets, which are made inaccessible to insects, shall be provided wherever needed for use by employees and their use shall be strictly enforced. All waste and refuse from sanitary facilities or from any source related to

Contractor's operations shall be disposed of in a sanitary manner satisfactory to Owner and in accordance with laws and regulations pertaining thereto. Contractor shall rigorously prohibit and prevent committing of nuisance within the Work area or upon Owner's right-of-way or adjacent private property. Contractor shall furnish all facilities and means for proper sanitation of Work and shall protect and save Owner harmless from any liability resulting from improper or insufficient sanitation.

7. Accident Prevention and First Aid

Precautions shall be exercised at all times for the protection of persons and property. The safety provisions of applicable laws and building and construction codes shall be observed. Machinery, equipment, and other hazards shall be guarded in accordance with safety provisions of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, the Construction Safety Orders and Trench Construction Safety Orders as issued by the Division of Industrial Safety of the Department of Industrial relations of the State of California, and Chapter 8 ("Traffic Control and Protection of Workmen") of the Manual of Instruction for the Maintenance Department of the California State Division of Highways, to the extent that such provisions are not inconsistent with applicable laws or regulations.

All warning signs, lights, barricades, and other measures designed to protect the traveling public shall be erected and maintained in good order by Contractor in accordance with applicable provisions of Chapter 21 ("Maintenance Signs, Barricades, and Traffic Control") of the Manual of Instruction for the Maintenance Department of the California State Division of Highways and of the applicable ordinances of the public agency having jurisdiction over the maintenance and policing of roads and streets. Special regard shall be given to the rights and convenience of the traveling public and the property owners and residents in the area of Work. Cross-over boards or steel plates approved by Owner shall be placed and other precautions taken whenever necessary to provide for at least one-way traffic along all traveled streets and to provide access to driveways and residences unless otherwise approved by Owner and agency having jurisdiction over the roads and streets.

8. First Aid Facilities

First aid facilities and supplies shall be kept on the jobsite and instruction in first aid shall be given as required by State regulations. Contractor shall provide emergency first aid treatment and supplies for his employees sufficient to comply with all legal requirements.

9. Materials

All materials to be furnished by Contractor shall be new and of the best quality for their intended use. All like materials shall be of one manufacture for any particular project. All materials shall be approved by Owner prior to purchase and only those materials approved by Owner shall be installed. Contractor who purchases unapproved materials shall do so at his own risk since Owner may reject any such materials.

Contractor shall submit a minimum of two (2) copies of all material lists to Owner for approval thereof. Said material lists shall include manufacturer's name, designation, description, and related information of all materials to be furnished and installed or otherwise used by Contractor in the performance of the Work. Said material lists shall be submitted at or prior to project preconstruction meeting and said lists shall be approved by Owner prior to beginning construction.

It is not the intent of these Specifications to prevent the use of any material not specifically prescribed by these Specifications. However, Owner must determine that substitutes are equivalent to those materials specified and approve any substitutions therefor.

To properly evaluate substitute materials, Owner may require Contractor to submit samples of such substitute materials together with two (2) copies each of any technical reports, design data, results of material and chemical analyses, and laboratory tests as may be available together with two (2) copies of all tests and

approvals, if any, from appropriate agencies such as those listed in Section 2, Page 1, of these General Requirements.

10. Construction

Contractor alone shall be responsible for the safety, efficiency, and adequacy of his plant, equipment, appliances, and methods and for any damage which may result from their failure or their improper construction, maintenance, or operation.

Contractor shall be responsible for examining all Construction Drawings, Specifications, Standard Drawings, work site, delivery routes, and local conditions which may affect the Work.

Before proceeding with the Work, Contractor shall furnish Owner any information required of him by the Construction Drawings, Specifications, Standard Drawings, Special Requirements, and Directions of Owner.

Contractor shall keep at jobsite a complete set of Construction Drawings, Specifications, Standard Drawings, permits, certificates and licenses for the Work, and all other data required by Owner. Contractor shall be responsible for checking all dimensions and quantities on said drawings or schedules and shall notify Owner of any errors and omissions found.

Until acceptance of the Work by Owner and throughout the guarantee period, Contractor shall bear the risk of injury or damage to any part of the Work by action of the elements or from any other cause and Contractor shall rebuild, repair, restore, and make good any injuries or damages to the Work except as limited in the Contract Appendix.

Contractor shall cooperate with other contractors who are working in the project area as Owner may specify and he shall comply with all orders of Owner. Contractor shall employ only competent and skillful persons to perform the Work. Said persons shall be qualified or certified to perform the Work in accordance with requirements of said person's trade.

Contractor shall submit to Owner for approval a construction schedule covering all work based on normal work periods. Contractor shall not deviate from approved schedule without prior permission from Owner. Whenever Contractor arranges to work at night or at any time other than normal work periods or to vary the period during which work is to be carried on each day, he shall obtain special permission from Owner to do so and he shall keep Owner properly informed of his activities. Construction schedule shall show the order in which Contractor proposes to carry out work, dates of anticipated commencement and completion of work and salient components thereof, and estimated percentage of work to be completed at any time during the construction period.

11. Records of Construction

Contractor shall maintain at least one complete set of Construction Drawings on the jobsite during the course of construction upon which he shall note any changes in the Work as they occur. Contractor shall maintain said Drawings so that Owner may at any time during the course of construction ascertain the changes that have occurred. Said Construction Drawings shall be the basis of the two sets of record drawings that Contractor shall provide Owner upon completion of Work.

12. Inspection

All materials and equipment furnished and all work performed shall be subject to rigid inspection by Owner. Contractor may be required to remove and replace under proper inspection any work performed in the absence of prescribed inspection with the entire cost being borne by Contractor irrespective of whether such work is found to be defective. Work covered up without authority of Owner shall, upon order of Owner, be uncovered to the extent required to permit inspection, repair, or replacement and thereafter be recovered, and Contractor shall bear entire cost.

13. Examination of Work

Contractor shall furnish Owner every reasonable facility for ascertaining whether Work is being accomplished in accordance with the requirements and intention of the Construction Drawings, Specifications, Standard Drawings, Special Requirements, and Directions of Owner.

14. Right to Occupy Work

Owner may wish to occupy or place in service portions of the Work before its final completion and shall be at liberty to do so. Such occupancy or placing in service of any portion of the Work shall not relieve Contractor of his responsibility of protection and care of all work until final completion and end of guarantee period and acceptance provided, however, that expense directly attributable to operation and placing portions of Work in service shall not be chargeable to Contractor.

15. Maintenance and Guarantee

Contractor shall guarantee that all work performed by him meets all requirements specified as to character, quality, and quantity of materials and workmanship. Contractor shall replace all materials and pay all installation costs made necessary by defects in materials or workmanship supplied by him that become evident within one year after acceptance of the facilities.

Contractor shall replace all defective materials promptly upon receipt of written notice from Owner. If Contractor fails to replace all defective materials promptly, Owner may secure the service of others to perform the work and Contractor shall be liable to Owner for any costs including removal and replacement thereof.

16. Construction Power

Contractor shall provide all necessary power required for his operations, and shall provide and maintain in good order such modern power equipment and installation as shall be adequate, in the opinion of the Owner, to perform the required Work in a safe and satisfactory manner.

17. Construction Water

Unless specified otherwise, Owner will provide construction water to Contractor from its existing system at established rates. Contractor shall furnish and install all necessary piping and appurtenances necessary to convey water from Owner's metered service connection to place of use.

18. Welding

Welding shall be done by the electric arc method using a process which excludes the atmosphere from the molten metal, except where otherwise approved by Owner. Welding electrodes used for manual welding shall be an approved type. Except as modified herein, welding process qualification and operator qualification shall comply with the applicable requirements of the "Code for Arc and Gas Welding in Building Construction" of the AWS.

Each weld shall be uniform in width and size throughout its entire length. Each layer shall be smooth, free from slag, cracks, pinholes, and undercut and shall be completely fused to adjacent weld beads and base metal. Cover pass shall be completely free of course ripples, irregular surfaces, non-uniform bead pattern, high crown, deep ridges or valleys between beads, and shall blend smoothly and gradually into surface of base metal. Butt welds shall be slightly convex, of uniform height, and shall have full penetration. Fillet welds shall be of size indicated, with full throat, and with each leg of equal length. Repair, chipping, or grinding of welds shall not gouge, groove, or reduce base metal thickness.

19. Environmental Factors

Contractor shall take all reasonable precautions to protect the environment.

a. Air Pollution

Contractor shall use only machinery and equipment which is equipped with suitable air pollution control devices so that undue quantities of pollutants are not added to the atmosphere in the vicinity of the work site. Contractor's equipment shall meet all Federal, State, and local requirements for air quality emissions and Contractor shall comply with all applicable Federal, State, and local air pollution control regulations.

Contractor shall also take all necessary precautions to control dust created by construction operations. Contractor shall be especially diligent in implementing his dust control program and he shall be prepared to respond immediately and positively to any instructions for corrective action given by Owner. Contractor shall use dust palliatives if necessary to satisfactorily control dust; however, Contractor shall secure Owner approval for use of dust palliatives other than water.

b. Explosives

Contractor shall handle, transport, store, and use explosives in accordance with applicable Federal, State, and local laws and regulations. Contractor shall be responsible for and make good any damage caused by his use of explosives.

c. Fires

Contractor shall exercise all precautions necessary to prevent unauthorized fires within or adjacent to the limits of the work. Contractor shall be responsible for all damage resulting from fire due directly or indirectly to his or his employees' activities or the activities of his subcontractors or their employees.

d. Drainage and Flooding

Contractor shall manage excavation and spoil banks such that existing drainage conditions are not impaired. Contractor shall provide drainage in all cases where the existing drainage conditions are being unavoidably altered or disturbed by his operations. Temporary diversions, ditches, checks, swales, or other drainage structures or features necessary to ensure proper drainage and flood control shall be provided by Contractor at no extra cost to Owner.

e. Historical and Archaeological Sites

If Contractor should encounter any evidence of historical or archaeological significance, he shall immediately cease construction, notify Owner, and refrain from any activity until Owner orders work to resume. For projects being constructed for the Indian Wells Valley Water District, Owner will assume full responsibility for any delays caused by historical or archaeological investigations. For projects being constructed for any party other than the Indian Wells Valley Water District, Owner will assume no responsibility for any delays caused by historical or archaeological investigations.

f. Noise Pollution

Contractor shall equip all machinery and equipment used for construction with noise control devices such as mufflers for internal combustion engines or other suitable noise suppressors. Noise produced by construction operations shall be kept to a minimum and shall be consistent with reasonable human health requirements considering time of day and location of work site. Contractor shall comply with all applicable Federal, State, and local noise pollution control regulations.

Unless specified otherwise, noise levels in connection with the work shall not exceed 75 dB(A) at a distance of one hundred (100) feet for relatively continuous exposure and they shall not exceed 90 dB(A) at that same distance for relatively infrequent intermittent exposure. Contractor shall be prepared to respond immediately and positively to any instructions for corrective action given by Owner particularly with respect to complaints from the public.

g. Public Relations

Contractor shall give due consideration to the comfort and convenience of the public and he shall instruct his employees to be polite and respectful in their dealings with the public at the work site and in traveling to and from the work site.

h. Traffic

Contractor shall adequately protect the public using any roads which are involved in Contractor's operations and he shall maintain safe traffic flow in the vicinity of the work. Contractor shall use signs, barricades, delineators, flashers, and flagmen, all in strict compliance with Federal, State, and local rules and regulations regarding traffic control. Public roadways shall not be barricaded or blockaded except in accordance with requirements of public agencies having jurisdiction over same. Contractor shall provide access to all walkways, sidewalks, driveways, and streets at all times. If requested by Owner, Contractor shall furnish a traffic control program for the Work.

i. Vegetation and Wildlife

Contractor shall not destroy or disturb any vegetation or habitat unless absolutely necessary for the performance of the Work. Contractor shall take all steps necessary to ensure that his employees do not destroy or disturb any vegetation or wildlife in the prosecution of the Work or incidental thereto, including travel to and from the work site.

j. Water Pollution

Contractor shall discard materials which might adversely affect ground or surface water at approved dump sites only. Chemicals and other water pollutants shall not be discharged into natural watercourses or on land tributary to said watercourses. Contractor shall comply with all applicable Federal, State, and local water pollution control regulations.

k. Cleanup

Contractor shall keep the premises occupied by him in a neat, clean condition free from unsightly accumulation of rubbish. Contractor shall maintain all work areas within or without the project limits free from dust which would cause a hazard to the Work, operations of other contractors, or other persons or property. Methods of dust control shall be as specified or approved by Owner. Upon completion of the Work, Contractor shall at his own expense satisfactorily dispose of or remove from the vicinity of the Work all plants, building materials, rubbish, unused materials, concrete forms, and other equipment and materials belonging to him or used under his direction during construction and, if he fails to do so, the same may be removed and disposed of by Owner at Contractor's expense.

BASIC PIPELINE SPECIFICATIONS

1. Scope

Contractor shall furnish all pipe, fittings, materials, equipment, and labor and perform all operations necessary to construct pipelines and appurtenances as specified by the Owner as shown by the Drawings. Drawings shall consist of construction drawings, installation drawings, laying drawings, standard drawings, detailed drawings, layout drawings, fabrication drawings, shop drawings, and clarifying diagrams or sketches.

The Work shall consist of all traffic control (including furnishing and installing all barricades, signs, delineators, arrow boards, and flagmen); all utility location and verification (excavating, exposing, and verifying locations, depths, and dimensions of utility facilities); all pavement removal and disposal; all earthwork (including trenching, shoring, dewatering if required, blasting if required, bedding, backfilling, and compacting); furnishing and installing all pipe, fittings, appurtenances, and making all related connections; protecting in place or removing and replacing all existing utilities and public and private improvements; removing and replacing all asphalt and Portland cement concrete pavement; pavement striping and restriping as required; disinfecting and testing all pipelines; disposing of excess soil and rock material; and restoring all areas and improvements to pre-construction conditions.

Contractor shall, upon completion of pipeline construction and appurtenances required herein, initially operate all components of the Work installed or furnished and installed by him, and make any additional adjustments, corrections, repairs, replacements, and reconstructions necessary to provide the Owner with complete, correctly operating pipelines and appurtenances.

2. Survey Monuments and Construction Stakes

Contractor shall not disturb or destroy any existing monuments or bench marks. If any survey monuments or bench marks need to be removed and replaced, Contractor shall have all necessary services performed by a registered civil engineer or a licensed land surveyor. If Contractor fails to comply, the Owner will have said services performed at Contractor's expense.

Before removing any monuments in preparation for construction, Contractor shall have a registered civil engineer or licensed land surveyor set at least four ties for each monument to be removed and replaced; after construction Contractor shall have the same registered civil engineer or licensed land surveyor replace each monument using the aforementioned ties and file a corner record for each replaced monument.

Unless specified otherwise, Contractor shall use construction stakes and cut sheets for pipeline construction and the Owner will use them for construction inspection. All construction stakes shall be set by a registered civil engineer or licensed land surveyor. The Owner must approve cut sheets before actual construction. Contractor shall protect all construction stakes set for construction and he shall restore any construction stakes destroyed or disturbed. If Contractor fails to comply, the Owner will have services performed at Contractor's expense.

3. Traffic Control

Contractor shall prepare, submit, and provide traffic control drawings for construction. Said traffic control drawings shall be approved by the Owner and agencies having jurisdiction over highways, thoroughfares, and streets prior to starting construction.

Traffic control requirements may be modified by the Owner or said agencies as conditions warrant. Contractor shall modify traffic control as required by the Owner or said agencies at no additional cost. Throughout the Work, Contractor shall inspect traffic control equipment (signs, barricades, arrowboards, and delineators) and shall maintain same in accordance with said traffic control drawings.

All construction signing, lighting, and barricading shall comply with State of California, Department of Transportation "Manual of Traffic Controls, Warning Signs, Lights, and Devices for Use in Performance of Work Upon Highways", latest edition.

4. Underground Utilities (Subsurface Installations)

Where underground utility facilities (conductors or conduits for water, gas, sewer, telephone, electric power, cable television, or other utilities) are shown on construction drawings, Contractor shall assume that service facilities (services or laterals for water, gas, sewer, telephone, electric power, cable television, or other utilities) extend from each utility facility to each parcel or property whether or not service facilities are shown.

At least two working days but no more than fourteen calendar days before commencing any excavation on the Work, Contractor shall request Underground Service Alert (1-800-227-2600) and non-member companies or utilities to mark or otherwise indicate the locations of their subsurface facilities including, but not limited to, structures including vaults, main conductors or conduits, and service connections or facilities.

Contractor shall comply with applicable laws pertaining to subsurface installations, especially with respect to excavations and permits. Contractor shall specifically comply with applicable provisions of Sections 4215 through 4216.9 of the Government Code. Contractor shall take all actions necessary to maintain a valid inquiry identification number during the Work.

At least ten days in advance, or 1,000 feet minimum ahead of pipeline trenching, Contractor shall excavate, expose, and determine ("pothole") the exact locations, depths, and dimensions of each and every potential interference, including, but not limited to, all facilities shown specifically (depth and location) on construction drawings, or which have been marked by their respective owners.

Upon learning of the existence or location of any utility facility omitted from or shown incorrectly on construction drawings, or improperly marked or otherwise indicated, Contractor shall immediately notify the Owner, providing full details as to depth, location, size, and function. Contractor shall immediately notify utility having jurisdiction over facility.

Contractor shall not interrupt or disturb any utility facility without written permission from the Utility or written order from the Owner. Where protection is required to ensure integrity of utility facilities located as shown on construction drawings or visible to Contractor or marked or

otherwise indicated as stated herein, Contractor shall, unless otherwise provided, furnish and place all necessary protection at his expense.

Contractor is advised that the Owner has no knowledge or information about trench backfill conditions of utility facilities adjacent to or parallel with pipeline being constructed pursuant to these Specifications; therefore, Contractor shall protect against adjacent or parallel trench backfill failure. If adjacent or parallel trench fails, Contractor shall, at his expense, remove and replace said backfill material in accordance with trench backfill requirements herein and remove and replace asphalt concrete pavement and any other improvements damaged in connection therewith.

5. Storage of Equipment and Materials

Contractor shall not store equipment or materials on private or public property without written permission from property owner(s) approving such use. Said permission shall be submitted to and approved by the Owner before Contractor moves equipment or materials onto site.

Contractor shall not park equipment or store materials in public right-of-way except while performing Work. Contractor shall remove equipment from public right-of-way and place it in Contractor's storage or construction yard by the end of each work day. Contractor shall keep materials in Contractor's storage or construction yard until they are needed for the Work.

Storage site or construction yard shall be completely fenced prior to moving any equipment or materials onto site or into yard. Contractor shall control dust in construction yard at all times, from establishing construction yard through construction, and until all Work has been completed and Contractor has moved all equipment, materials, and fencing from site.

6. Trench Excavation

A. General

Unless specified otherwise, pipelines and appurtenances shall be installed in open trench excavations to the depth and in the direction specified by the construction drawings. Excavation for trenches shall include removal of all material of any nature as required for installation of pipe, fittings, or appurtenances and shall include blasting, either sloping or shoring, and all necessary dewatering, if any, all at Contractor's expense.

Contractor is advised that unsuitable earth may be encountered during trenching operations. Where such material is encountered, Contractor shall, at his expense, remove such material, discard it at legal disposal site(s), and thereafter replace it with approved backfill material.

B. Excavation Safety Drawings

Before excavating any earth or soil to a depth of five (5) feet or more, Contractor shall, pursuant to Labor Code Section 6705, submit to the Owner detailed drawings (hereafter referred to as excavation safety drawings) showing design of shoring, bracing, sloping, or other provisions to be made for worker, individual, or property protection. Said excavation safety drawings shall comply with OSHA Construction Safety Orders (Cal/OSHA or Federal OSHA, whichever is applicable at time of construction) and shall be prepared and certified by a registered civil or structural engineer, engaged by

Contractor at his expense, who shall affix his signature and seal to each sheet of said excavation safety drawings. Contractor shall not excavate until the Owner has received and acknowledged properly certified excavation safety drawings. Contractor shall comply with all other applicable requirements of Labor Code Section 6705 and, as therein provided, no requirements of that Section shall be construed to impose tort liability on Owner or Owner's representatives, including Owner's Engineer.

C. Trench and Bell Hole Sloping or Shoring

Trenches and bell holes shall be adequately sloped or shored so that earth will not slide or settle into trench, so that all existing improvements and utilities (above and below ground) will be fully protected from damage, and so that workers and individuals are protected from injury. At minimum, Contractor shall keep toe of trench spoil at least 5 feet from top of trench. Contractor shall assume full responsibility for all damages caused by inadequate sloping or shoring. Contractor shall make all necessary repairs or perform all reconstruction at his expense and he shall bear all other expenses resulting from such damages.

D. Trench Length, Width, and Depth

Unless specified otherwise, trenches shall be excavated not more than 1,000 feet in advance of pipe laying and open trenches shall be properly barricaded and signed as required for individual and property protection. Trenches shall not be excavated or left open nights, weekends, or holidays.

Unless specified otherwise, all pipeline trenches within pipe zone shall, wherever possible, have vertical sides and minimum widths as specified on the standard drawings, however, trenches shall be sloped or shored as required for worker, individual, and property protection.

Whenever maximum allowable trench width, as shown by the Drawings, is exceeded for any reason, the Owner may, at its discretion, require Contractor, at his expense, to cradle pipe (Class B Portland cement concrete) or to provide higher class bedding to support pipe as required to limit load on pipe to allowable supporting strength. The Owner shall approve method of support prior to its use.

Trenches shall be excavated to depths specified by or shown on construction drawings or as otherwise directed by the Owner. If trench excavation is carried below grade without direction or permission, Contractor shall, at his expense, refill trench to proper grade with moist clean sand, sand and gravel, or other suitable material as approved by the Owner, tamped in place to 90 percent relative compaction minimum. Excess excavated material shall be incorporated in backfill or discarded at legal disposal site(s) by Contractor at his expense.

E. Excavated Materials

All material excavated from trench shall be placed for minimum obstruction to traffic (automobile and pedestrian). Gutters shall be kept clear and other provisions shall be made for street or road drainage. Excess excavated material, including material rejected

by the Owner for use as backfill, shall be discarded at legal disposal site(s) by Contractor at his expense.

If pipe, fittings, or appurtenances belonging to the Owner are uncovered or removed during excavation, they shall be salvaged and deposited as directed by the Owner. If the Owner determines that certain materials need not be salvaged, said materials shall be discarded at legal disposal site(s) by Contractor at his expense.

F. Blasting

Blasting for excavation will be permitted only with approval of the Owner and only after proper precautions have been taken for protection of persons and property, provided Contractor has secured all necessary permits. Blasting shall be limited to specific periods as approved by the Owner. Any damage caused by blasting shall be repaired by Contractor at his expense. Contractor's blasting methods and procedures shall conform with State and local laws and County and municipal ordinances. Contractor shall post signs warning radio equipment operators that blasting operations are in progress and advising that radio transmissions are prohibited during blasting operations.

7. Trench Bedding

A. General

Trenches shall have flat bottoms conforming with grades to which pipe is to be laid. Trench bottoms shall be uniform and provide firm and uniform bearing for installed pipeline.

Pipe shall be laid so that pipe barrel bears evenly on trench bottom. Bell holes shall be excavated in trench bottom and sides as necessary to permit satisfactory construction and inspection of pipe joints.

B. Unsuitable Soil

Where unstable soil consisting of loose, soft, spongy, or organic earth is encountered, it shall be removed from trench bottom to depth determined in field by the Owner and trench shall be refilled to proper grade with moist clean sand, sand and gravel, or other suitable material as approved by the Owner, tamped in place to 90 percent relative compaction minimum. Trench bottom shall be graded flat and prepared to provide firm and uniform bearing for pipe.

Where unyielding soil consisting of rock, rocky earth, or cemented earth is encountered, it shall be removed from trench bottom to at least 9 inches below grade and trench shall be refilled to proper grade with moist clean sand, sand and gravel, or other suitable material as approved by the Owner, tamped in place to 90 percent relative compaction minimum. Trench bottom shall be graded flat and prepared to provide firm and uniform bearing for pipe.

Unless specified otherwise, Contractor shall, at his expense, remove unsuitable soil, replace it with suitable soil, and discard unsuitable soil at legal disposal site(s). Contractor shall not deposit or store unsuitable soil on private or public property without

written permission of property owner(s) and without applicable governmental permits pertaining to earthwork, including compaction, and the environment. Before placing any material on private or public property, Contractor shall provide the Owner with evidence of written permission to do so and he shall then obtain the Owner's written approval for same.

8. Trench Backfill

A. General

In addition to meeting backfill requirements specified herein, Contractor shall also comply with backfill requirements established through permits issued by jurisdictions (State, County, City) having control over rights-of-way in which construction is taking place. Whenever the separate requirements conflict with one another, the more stringent shall apply. Backfill shall not commence without prior approval of the Owner.

Backfill material shall be either select excavated material, screened or washed if necessary, or commercially processed material. Backfill material shall meet separate specific requirements for backfill within pipe zone and backfill above pipe zone. Backfill material meeting pipe zone requirements may be used for above pipe zone backfill material but not the reverse.

After sheeting, shoring, or shields have been removed, all backfill material including pipe zone backfill material shall be compacted to 90 percent relative compaction minimum except that the upper 12 inches of backfill material shall be compacted to 95 percent relative compaction minimum, as verified by field compaction tests. Relative compaction shall be based on maximum dry density determined in accordance with ASTM D-1557, latest. The Owner will specify where (number & location) compaction tests are to be taken.

Unless specified otherwise, the Owner will have all necessary compaction tests performed by soils engineer of its choosing. The Owner will pay for all passing tests; Contractor shall pay for all failing tests. Contractor shall notify the Owner when any segment of backfill has been compacted and is ready for compaction testing and the Owner will then have such tests performed.

Unless determined otherwise, compaction tests will be taken along the pipeline, in the pipe zone, above the pipe zone, and at ground surface or subgrade at 300 foot intervals maximum and along all service runs and fire hydrant runs. Contractor shall assist, at no additional cost to the Owner, soils engineer in taking all compaction tests. Contractor shall furnish all equipment (including shoring), labor, and materials needed for such assistance. Compaction testing shall be completed and accepted by the Owner prior to hydrostatic and leakage testing of pipelines and appurtenances.

Within highways, thoroughfares, and streets, Contractor shall, at the end of each work day and by 5:00 PM, unless permitted otherwise, completely backfill trenches with material sufficiently compacted to support traffic. Contractor shall then place 2 inch minimum thickness temporary asphalt concrete pavement over trench; it shall be compacted, rolled smooth with a steel wheeled pavement roller and placed flush with adjacent pavement. Contractor shall maintain and repair backfilled and paved areas to

prevent potholes or pavement failures. Highways, thoroughfares, and streets shall be completely open to traffic at night (after 5:00 PM), on weekends, on holidays, and whenever Contractor is not actively working in specific area.

Contractor shall not excavate trenches or install pipe in highways, thoroughfares, and streets on weekends and holidays. Holidays include union holidays, Owner holidays, and County and municipal holidays. Contractor shall not leave any excavation open overnight or on weekends or holidays.

B. Backfill Within Pipe Zone

Unless specified otherwise, select excavated material, screened or washed if necessary, shall be used and it shall consist of moist clean, loose earth, sand, or gravel (1 inch maximum size) free of clay and silt as well as brush, roots, and organic substances.

Initial backfilling shall be performed as soon as possible after pipe has been laid. Loose, moist backfill material shall be placed in trench simultaneously on each side of pipe to a depth not greater than pipe centerline (springline) or 12 inches (loose measurement), whichever is less, and it shall then be tamped under pipe so that all voids are eliminated and material is compacted to 90 percent relative compaction minimum.

Subsequent backfilling shall be performed immediately following initial backfilling. Loose, moist backfill material shall continue to be placed in trench simultaneously on each side of pipe in lifts not exceeding 12 inches in thickness (loose measurement), with each lift being tamped, until the pipe has been covered by at least 12 inches of well compacted material. Alternatively, backfill material may be densified by water settlement until the pipe has been covered by at least 12 inches of well densified material. Backfilled material shall be tamped or settled to 90 percent relative compaction minimum.

Regardless of compaction or densification technique, care in backfilling shall be exercised to avoid any damage to pipe, fittings, and appurtenances, to avoid any damage to persons or property, and to achieve relative compaction of backfilled material of at least 90 percent minimum.

C. Backfill Above Pipe Zone

Backfill material shall consist of moist clean loose earth, sand, gravel, or rock free of clay and silt as well as brush, roots, and organic substances. From the top of selected backfill in the pipe zone to within 1 foot of ground surface or pavement subgrade, backfill material shall be free of material exceeding 8 inches in greatest dimension. It shall also be compacted to 90 percent relative compaction minimum. Within 1 foot of ground surface or pavement subgrade, backfill material shall be free of material exceeding 2 inches in greatest dimension and it shall be compacted to 95 percent relative compaction minimum. Rocks shall be mixed with suitable soil to eliminate voids; they shall not be nested. Backfill material shall be well graded.

Backfill material shall be placed in lifts not exceeding 12 inches in thickness (loose measurement) and each lift shall be compacted to 90 percent relative compaction minimum by hand tampers, pneumatic tampers, or mechanical compactors except that the

upper 12 inches of backfill shall be compacted with mechanical compactors or compaction equipment, excluding stompers, to 95 percent relative compaction. Alternatively and except for the upper 12 inches of backfill, sandy, granular soils may be densified by water settlement. Trench to be backfilled by water settlement shall be diked at suitable intervals not exceeding 100 feet. Impounded water shall be of sufficient depth so that earth pushed or shoveled into trench will at all times fall into water, becoming completely saturated. If necessary, jetting may augment flooding. Backfill densified by water settlement shall be densified to 90 percent relative compaction minimum. Contractor shall use mechanical compactors or compaction equipment, excluding stompers, to achieve required compaction if required densification is not achieved by water settlement.

D. Imported Backfill Material

Whenever excavated material is unsuitable as backfill material and Contractor is unable to process or screen such material for backfill material or whenever excavated material is insufficient to accomplish backfill and Contractor must secure additional material, Contractor shall import such material and the material and its source shall be approved by the Owner.

Unless specified otherwise, imported backfill material shall be commercially processed and it shall be selected, clean, loose earth, sand, or gravel (1 inch maximum size). Said material shall be granular and it shall be free of clay, silt, and fine sand. It shall be suitable for compaction with minimum effort.

E. Backfill Completion

Where pavement is not required, trench backfill shall be brought to grade of existing surface and dressed to provide firm, stable, and even surface without ruts or irregularities. It shall conform with grades of existing surface. Where pavement is required, trench backfill shall be brought to subgrade for pavement structure. Pavement shall then be placed in accordance with paving requirements.

9. Pipelines and Appurtenances

A. Construction Materials

Contractor shall furnish only approved materials as listed in the Owner's approved materials list. All materials shall be new and of the best quality for their intended use. All like materials shall be of one manufacture for any particular project.

Contractor shall, in addition to furnishing other data herein required, submit three signed and dated copies of the list of materials to be used in pipeline and appurtenance construction including but not limited to pipeline installations, pipeline valve installations, air valve installations, blowoff installations, manway installations, service installations, fire hydrant installations, and related appurtenances.

B. Pipeline Construction

1) Pipelines and Appurtenances

Pipelines and appurtenances shall be constructed in accordance with these Specifications and the Drawings and as specified by the Owner.

2) Valves and Appurtenances

Pipeline valves at pipeline intersections shall be connected directly to pipeline intersection fittings (cross or tee) and, unless specified otherwise, all mainline or side outlet valves shall be located 3 feet minimum from any curb face. Pipeline valves shall not be placed under curb or gutter or in parkway unless approved by the Owner.

All appurtenances, including but not limited to air valve installations, blowoff installations, and related facilities, such as fire hydrants, fire services, and water services, shall not be installed within 5 feet of curb returns, curb depressions, and driveway approaches, or in inaccessible locations or locations where interferences may restrict facility operation, unless permitted otherwise by the Owner.

Unless specified otherwise, air valve installations shall be constructed at all pipeline high spots and blowoff installations shall be constructed at all pipeline low spots. Contractor shall construct, at his expense, air valve installations and blowoff installations in addition to those specified, if necessary to accommodate his work and schedule.

3) Pipeline Length

All pipeline lengths noted by the construction drawings or otherwise specified or referenced shall mean net horizontal constructed lengths and said lengths shall extend through all fittings and appurtenances including bends, outlets, tees, flanges, and valves. Contractor shall provide all pipe necessary to accommodate any vertical alignment of the pipeline and said pipe shall be represented by the net horizontal constructed length.

4) Pipeline Alignment

All pipelines shall be constructed with no basic variation in horizontal alignment as shown by the Drawings or as specified by the Owner. Pipelines shall be constructed parallel with centerlines of streets or rights-of-way and appurtenances shall be constructed perpendicular thereto unless the construction drawings specify otherwise. Pipelines may be constructed by the use of pulled joints, short joints, bevels, bends, and elbows, provided pipelines are constructed as specified.

In all non-critical areas and subject to the Owner's approval, pipelines may be constructed at variance with vertical alignment as shown by the construction drawings by the use of pulled joints, short joints, bevels, bends, and elbows

provided pipelines are constructed as specified at pipeline connections and underground interferences, and where pipeline cover is limited. The Owner will not approve any variation in vertical alignment until it has determined that proposed alignment is proper and modifications are in order.

5) Pipeline Tolerances

With regard to vertical alignment, pipelines shall be constructed so that actual flow line elevations, measured at pipe joints, are within 0.1 foot of design flow line elevations. Pipelines, when installed, shall have continuous slope upgrade or downgrade, corresponding with design slope, without any high spots.

With regard to horizontal alignment, pipelines shall be constructed so that actual pipeline centerlines, measured at pipe joints, are within 0.1 foot of design pipeline centerlines. Pipelines, when installed, shall closely follow specified horizontal alignment.

Pipeline construction shall conform with construction drawings and layout, shop, fabrication, installation, or laying drawings (design drawings which show flow line elevations and pipeline centerlines) in accordance with the above specified tolerances. Contractor shall make or assist the Owner in making all necessary measurements, as determined by the Owner, to confirm or verify compliance with construction tolerances.

6) Pipeline Cover

Pipeline cover as shown by the construction drawings is hereby defined as design cover over pipeline. If field conditions determined during construction staking show that pipe grade changes are required to provide design cover, Contractor shall, at his expense, make required changes in pipeline grade and construct pipeline accordingly.

Pipeline cover from top of pipe to ground surface over pipeline shall not be less than 36 inches. Where future ground surface elevation over pipeline has been established and where actual ground surface is greater, pipeline cover shall be referenced to future (established) ground surface elevation, not actual ground surface elevation.

10. Pipe Materials and Pipe Installation

A. Ductile Iron Pipe

1) Scope

Ductile iron pipe and fittings shall conform with applicable provisions of AWWA C104, C105, C110, C111, C115, C150, C151, and C153, latest, as modified herein, by the Drawings, or by the Owner.

All ductile iron pipe shall be manufactured by organizations which have had not less than ten years successful experience in the manufacture of the type of pipe specified. The Owner shall approve manufacturer's product before its use.

2) Data to be Submitted by Contractor

Contractor shall furnish three copies of an Affidavit of Compliance in accordance with Section 51-5, AWWA C151, latest. Contractor shall also furnish certifications, three copies each, of the following:

a. Material Certification

- (1) Grade of iron (chemical requirements)
- (2) Flanges
- (3) Nuts and bolts
- (4) Flange gaskets
- (5) Rubber Gaskets

b. Manufacturing Certification

- (1) Hydrostatic Test Reports
- (2) Tensile Test Reports
- (3) Impact Test Reports

Unless specified otherwise, Contractor shall furnish detailed installation or laying drawings showing pipe, fittings, appurtenances, station, and elevation for each fitting, and each change in alignment or slope. Contractor shall submit the installation or laying drawings to the Owner for acceptance in all cases in time sufficient to allow review and acceptance as hereinafter specified and to accommodate the Contractor's construction schedule.

Installation or laying drawings shall be submitted in triplicate. Owner will return one (1) set of drawings to Contractor within fifteen (15) days marked either "Accepted", "Rejected", "Revise and Resubmit", "Submit Specified Item", or "Furnish as Corrected". In the last case, all revisions will be clearly shown on the returned set of drawings which shall be considered the accepted drawings and only drawings or prints so corrected shall be used for installation. Contractor shall furnish Owner five (5) sets of all accepted drawings.

3) Pipe

All pipe shall be ductile iron and shall conform with AWWA C151 (ANSI A21.5, and applicable portions of ASTM A536, Grade 60-42-10), latest, as modified herein by the Drawings, or by the Owner.

- a. Pipe, including standard, random, and special short lengths, shall be Class 150 minimum and, unless specified otherwise, shall have push on joints. Minimum pipe wall thickness shall be as noted by the construction drawings or specified by the Owner; it shall not be less than noted by the standard drawings. Pipe wall thickness shall be increased if

necessary to accommodate threads or grooves or if required for extremely shallow (less than 2.5 feet) or excessively deep (more than 14 feet) pipeline cover. 90 percent of all pipe of any specific class and size, excluding special short lengths, shall be furnished in standard lengths. The remaining 10 percent may be furnished in random lengths.

- b. Standard lengths shall have nominal lengths of 18 feet up to 36 inches in diameter and 20 feet above 36 inches in diameter, plus or minus 1 inch. Random lengths of pipe may be up to 2 feet shorter than standard lengths. Special short lengths shall only be furnished where needed to accommodate specified fittings.
- c. Pipe shall have an interior cement mortar lining of double thickness in accordance with AWWA C104 (ANSI A21.4), latest, except that interior mortar lining shall not be asphalt seal coated. Said lining shall be full thickness throughout pipe except for bell which shall be cleaned and lightly sprayed or brushed with an asphaltic or bituminous coating in accordance with AWWA C151 (ANSI A21.51). The interior cement mortar lining shall be moisture cured for at least two days before shipment. To prevent moisture loss during the curing period, ends of pipe shall be kept closed with plastic caps or covers which shall remain in place until installation.

Steam curing may be substituted for moisture curing, providing one hour of steam curing is equivalent to six hours moisture curing and ambient vapor is maintained at relative humidity of 85 percent with temperature ranging between 110 degrees Fahrenheit and 150 degrees Fahrenheit for minimum steam curing period of six hours, after which exterior coating may be applied. The lining shall then be cured for another twelve hours before shipment. Other methods of curing the cement mortar lining may be used providing they are acceptable to the Owner.

Temperature and shrinkage cracks in cement mortar lining less than 1/16 inch in width or 24 inches in length need not be repaired. Cracks wider than 1/16 inch or longer than 24 inches shall be repaired unless it can be demonstrated to the satisfaction of the Owner that the cracks will heal autogenously under continuous soaking in water.

- d. Pipe shall have an exterior asphaltic or bituminous coating in accordance with AWWA C151 (ANSI A21.51), latest.
- e. All pipe shall be furnished with rubber gasketed push-on type joints unless mechanical joints or flanged joints are otherwise specified or permitted. Joint restraints may be required as specified by the Owner. All joints shall comply with AWWA C111 (ANSI A21.11), latest, as approved by the Owner.
- f. Rubber gaskets shall conform AWWA C111 (ANSI A21.11) latest.

- g. Each pipe shall be marked with the weight, class, or nominal thickness and casting period. The manufacturers mark, year in which pipe was produced and the letters "DI" or "ductile" shall be cast or stamped on the pipe. All required markings shall be clear and legible and all cast marks shall be on or within 2 feet of bell ends.
- h. Where restrained joints are required, they shall be accomplished with boltless restrained joint gaskets or components. Restrained joints shall be ductile iron in accordance with applicable provisions of AWWA C111 and C151 (ANSI A21.11 and A21.51, respectively), latest, except as to manufacturer's proprietary dimensions. Set screws shall not be utilized for any application.

Each restrained joint for pipe 4 inches through 12 inches shall consist of a gasket system where stainless steel locking segments molded within the gasket provide restraint for pipe joints or fitting joints.

Each restrained joint for pipe 14 inches through 24 inches shall consist of a gasket system where stainless steel locking segments molded within the gasket provide restraint for pipe joints or fitting joints, or, alternatively, a boltless restrained push-on joint system where ductile iron locking segments inserted through slots in the bell face provide positive axial lock between the bell interior surface and the spigot retainer weldment or gripper ring.

Each restrained joint for pipe 27 inches and larger shall consist of a boltless restrained push-on joint system where ductile iron locking segments inserted through slots in the bell face provide positive axial lock between the bell interior surface and the spigot retainer weldment or gripper ring.

All restraining components must make full contact around the circumference of the pipe, even if it has deflected. Field cut kits shall be composed of full ring gripper rings with serrated edges and shall be compatible with the pipe joints and fitting joints.

4) Fittings

All fittings shall be ductile iron except where fabricated cement mortar lined and cement mortar coated welded steel pipe fittings are specifically permitted or specified. Fabricated cement mortar lined and cement mortar coated fittings shall be flanged and they shall conform with the cement mortar lined and cement mortar coated welded steel pipe fittings specified herein.

Ductile iron fittings shall conform with AWWA C110, C111, and C153 (ANSI A21.10, A21.11, and A21.53, respectively), latest. Unless specified otherwise, fittings shall be push-on joint and comply with AWWA C111 (ANSI A21.11).

Fittings shall have an asphaltic outside coating in accordance with AWWA C110 or C153 (ANSI A21.10 or A21.53), latest, and cement mortar lining in accordance with AWWA C104 (ANSI A21.4), latest. Fittings shall have standard lining thickness and shall be seal coated with asphaltic material or other approved material. The lining process must produce a dense, compacted lining that shall be bonded to the interior of the fitting and have a smooth surface.

Where restrained joints are required, they shall be accomplished with boltless restrained joint gaskets or components and shall comply with all requirements of Section 10.A.3.h. of the Basic Pipeline Specifications. Restrained joint fittings shall be of same joint design as the restrained joint pipe. Restrained joints shall be ductile iron in accordance with applicable provisions of AWWA C110 and C153 (ANSI A21.10 and A21.53), latest, except as to manufacturer's proprietary dimensions.

5) Testing

All pipe, including standard, random, and special short lengths, furnished shall be tested in the United States in accordance with AWWA C151, latest.

6) Inspection

The Owner shall at all times have the right to inspect all Work and materials during the course of manufacture. Manufacturer shall furnish the Owner reasonable facility for obtaining such information as he may desire regarding the progress and manner of the Work and the character and quality of materials used.

7) Loading, Transporting, and Unloading

After the pipe has been tested in accordance with Section 5 above, it shall be loaded on rubber-tired vehicles, and adequately supported and chocked to prevent any damage during transportation, and delivered to the Work site. During loading, unloading, and stringing operations, pipe and fittings shall be moved with care to prevent damage thereto. Unloading shall be accomplished in a workmanlike manner as directed by the manufacturer. Under no circumstances are pipe and fittings to be dropped or bumped in handling.

8) Defective or Damaged Material

Pipe and fittings shall be carefully inspected for defects. Any pipe found to be defective in workmanship or materials or so damaged as to make repair and use impossible shall be rejected and removed from the Work site.

In the event that pipe is damaged, damaged portions may be removed, as approved by the Owner, and discarded. Remaining sound portions may be used with ductile iron fittings. Contractor shall be responsible for any and all damage to material and he shall stand the expense of repairing or replacing same. Contractor shall take proper precautions to assure that rubber gaskets are protected from oxidation or undue deterioration.

9) Installation

Pipe manufacturer, fitting manufacturer, and material supplier, in addition to the Owner and the Owner's representative, shall have access to the Work during installation. Contractor shall use assistance provided by either manufacturer or supplier where required for proper installation of pipe, fittings, or materials; however, Contractor shall limit role of either manufacturer or supplier to advisory service.

All pipe shall be laid true to line and grade and at the locations shown by the construction drawings or as specified. Pipe shall be installed in accordance with applicable provisions of AWWA C600, latest, applicable provisions of Ductile Iron Pipe Research Association "Guide for the Installation of Ductile Iron Pipe", latest, and manufacturer's directions. Bell ends shall be placed uphill unless otherwise permitted.

After pipe has been set in trench, exterior of spigot and interior of bell shall be thoroughly cleaned. Lubricant recommended by pipe manufacturer and as approved by the Owner shall be applied to rubber gasket. Lubricant shall be water soluble, nontoxic, shall impart no objectionable taste or odor to the water, shall have no deteriorating effects on the rubber gaskets, and shall not support growth of bacteria. Excess lubricant shall be removed. Pipe ends shall be aligned, and spigot shall be pulled into bell with come-along devices, or hoists with chains and slings, unless permitted otherwise. If either the pry bar or the backhoe bucket method is permitted, a timber header shall be placed between the pipe and the pry bar or backhoe bucket before the spigot is pushed into bell.

Curved alignment by use of pulled joints will be permitted. Maximum joint deflection shall be 3 degrees. For purposes of reducing angular deflections at pipe joints, Contractor may install pipe sections of less than standard length.

Whenever cutting of pipe is required, it shall be done with a special cutting tool specifically made for cutting and machining ductile iron pipe. Cut ends and rough edges shall be ground smooth and beveled for push-on joints.

Whenever specified, pipe shall be encased with 8 mil (0.2 mm) thick minimum polyethylene tube lapped 1 foot minimum, and valves and fittings shall be wrapped with polyethylene tube or with polyethylene sheets lapped 1 foot minimum. Polyethylene tube and polyethylene sheets shall be secured in place with suitable adhesive tape. All polyethylene tube and polyethylene sheet encasements shall be installed in accordance with AWWA C105, latest.

As Work progresses, a pipe cleaning tool as approved by the Owner shall be drawn through pipe to remove dirt, rocks, or other foreign material. At the end of each day's work, all openings in the pipeline shall be plugged with watertight expandable plugs or approved equal.

B. Welded Steel Pipe (Cement Mortar Lined and Cement Mortar Coated)

1) Scope

All welded steel pipe shall conform with applicable provisions of AWWA C200, C205, C206, C207, and C208, latest, and applicable portions of M11 "Steel Pipe Manual", latest, as modified herein, by the Drawings, or by the Owner.

All welded steel pipe shall be manufactured by organizations with at least ten years successful experience in manufacturing, fabricating, lining, and coating the type of pipe specified. Owner shall approve manufacturer's methods, equipment, facilities, and operations before performance of any work and manufacturer's completed product before its use.

Standard or special pipe sections and standard or special connections, outlets, and fittings may be manufactured at a single plant, or they may be manufactured at two separate plants (Plant 1: manufacturing of standard sections of lined, coated, and cured steel pipe consisting of steel pipe cylinder formation and lining, coating, and curing; Plant 2: fabricating special pipe sections and standard or special connections, outlets, and fittings using standard sections of manufactured lined, coated, and cured steel pipe). Special pipe sections and standard or special connections, outlets, and fittings fabricated at a separate manufacturing plant shall be comprised of standard pipe cylinders that have been formed, lined, coated, and cured at a single manufacturing plant. The separate manufacturing plant shall use facilities and methods for lining and coating repair and curing equal to the facilities and methods of the manufacturer of the standard sections of lined, coated, and cured steel pipe.

2) Data to be Submitted by Contractor

Contractor shall furnish three copies of an affidavit of compliance in accordance with Section 1.12, AWWA C200, latest, and Section 1.7 AWWA C205, latest. Contractor shall also furnish certifications, three copies each, of the following:

a. Material Certification

- (1) Steel Skelp
- (2) Flanges
- (3) Nuts and Bolts
- (4) Flange Gaskets
- (5) Rubber Gaskets

b. Manufacturing Certification

- (1) Pipe Mill Reports
- (2) Production Weld Test Reports
- (3) Hydrostatic Test Reports
- (4) Outlet Reinforcement Calculations*
- (5) Pipe Wall Thickness Calculations*

* If not shown by the Drawings.

Unless specified otherwise, Contractor shall furnish detailed layout and shop or fabrication drawings showing pipe, lining, coating, reinforcement, joints, fittings, appurtenances, and station and elevation for each fitting and outlet and for each pipe joint at each change in pipe class, alignment, or slope. Contractor shall

submit detailed layout and shop or fabrication drawings to the Owner for acceptance in all cases in time sufficient to allow review and acceptance as hereinafter specified and to accommodate the Contractor's construction schedule.

Installation or laying drawings shall be submitted in triplicate. Owner will return one (1) set of drawings to Contractor within fifteen (15) days marked either "Accepted", "Rejected", "Revise and Resubmit", "Submit Specified Item", or "Furnish as Corrected". In the last case, all revisions will be clearly shown on the returned set of drawings which shall be considered the accepted drawings and only drawings or prints so corrected shall be used for installation. Contractor shall furnish Owner five (5) sets of all accepted drawings.

Revisions shown on the shop drawings shall be considered changes necessary to meet the requirements of these Specifications and shall not be taken as the basis of claims for extra charges. Contractor shall accept such revisions or submit others for acceptance. When delays are caused by resubmissions of shop drawings, Contractor shall not be entitled to any damages or extensions of time for such delays.

The Owner's acceptance of detailed layout and shop or fabrication drawings shall apply only to general arrangement and general compliance and not to specific details and dimensions and their correctness and compatibility. Contractor shall correct any misfits due to any errors in the detailed shop or fabrication drawings. Any fabrication in advance of receipt of detailed layout and shop or fabrication drawings marked "Accepted" or "Furnish as Corrected" shall be at Contractor's risk. Contractor shall furnish the Owner five sets of all accepted layout and shop or fabrication drawings.

3) Pipe and Fittings

All pipe and fittings furnished shall conform with applicable provisions of AWWA C200, C205, C206, C207, and C208, latest, and applicable portions of AWWA M11, "Steel Pipe Manual", latest, as modified herein, by the Drawings, or by the Owner.

- a. Pipe and fittings shall be Class 150 minimum. Minimum steel cylinder thickness shall be as noted by the construction drawings or specified by the Owner; it shall not be less than 10 gage or as noted by the standard drawings. All pipe and fittings shall be machine cement mortar lined and machine cement mortar coated.
- b. Curved alignment by use of pulled joints will be permitted. Maximum pull permitted from normal closure on one side of joint shall not exceed 1/2 inch for 8 inch pipe or smaller, 3/4 inch for 10 inch through 21 inch pipe, and 1 inch for 24 inch pipe and larger. Maximum joint deflections shall not exceed manufacturer's recommendation or 3 degrees; the more restrictive or lesser deflection shall apply.
- c. Where greater curvature is required, Contractor may use fabricated bends as specified by the construction drawings or ordered by the Owner. For

the purpose of reducing angular deflections at pipe joints, Contractor may use pipe sections of less than standard length. Closing courses and short sections of pipe shall be fabricated and installed by Contractor as found necessary in the field.

d. All fittings shall be shop fabricated unless the construction drawings indicate that fittings may be field fabricated, Contractor describes methods of fabrication, and the Owner specifically approves field fabrication. All fittings shall be fabricated from individual pipe sections, welded together, and lined and coated as described hereafter.

e. Lining of Fittings

(1) The application of cement mortar lining to miters, angles, bends, reducers, and other special sections, the shape of which precludes application by the machine spinning process, shall be accomplished by mechanical placement, pneumatic placement, or hand application and finished to produce a smooth, dense surface.

(2) If the interior of the fitting has not been previously machine lined, wire-fabric reinforcement or ribbon-mesh reinforcement shall be applied to the interior of fittings larger than 24 inches and shall be secured at frequent intervals by tack welding to pipe, by clips or by wire. Repaired areas of machine applied linings at miters, pipe ends, outlets, and other cuts made in the lining for fabrication of the fittings need not be reinforced if the width of the repair area does not exceed 12 inches. Repairs for widths exceeding 6 inches shall be bonded to the steel and adjacent faces of the lining with an approved bonding agent.

Immediately after lining has been completed, pipe and fittings shall be water cured without being disturbed for at least one day before applying the exterior coating, if such a coating is specified. If cement mortar coating is not specified, the lining shall be kept moist for four days before shipment. In either case, the lining shall be cured for at least four days before shipment. To prevent moisture loss during the curing period, ends of the pipe sections shall be kept closed with plastic end caps or covers which will remain in place until time of installation. The date of lining and class of pipe shall be plainly marked on the inside of each fitting.

f. Coatings of Fittings

Mortar coating for pipe bends and other special sections not adaptable to the application of spiral-wire coating reinforcement shall be reinforced with wire fabric or ribbon mesh. The wire fabric or ribbon mesh shall be applied over the surface of the pipe to be coated, and may be held away from the pipe shell with self-furring mesh, furring clips, or an equivalent method. The application of the mortar coating shall be by mechanical or

pneumatic means to the specified thickness, except that hand application may be substituted for all specials. After the outside coating has been applied, the pipe and fittings shall be kept continually moist by continuous spraying for at least four days. Provisions shall be made to protect the coating from erosion during sprinkling. The date of coating and class of pipe shall be plainly marked on the inside of each fitting.

4) Pipe Joints

Unless specified otherwise, joints shall conform to the following types. Joints shall be as specified on the construction drawings or by the Owner. All joints shall be continuity bonded.

a. Rubber Gasket Joints

All rubber gasket joints shall conform with AWWA C200, latest.

b. Flanged Joints

All flanges 4 inches through 12 inches shall conform with AWWA C207, latest, Class E (ring) or ANSI B16.5 Class 150. All flanges larger than 12 inches shall conform with AWWA C207, latest, Class E (ring). All flange bolts shall be standard hex head machine and conform with ASTM A325. All flange nuts shall be heavy hex cold pressed semi-finished steel and conform with ASTM A194-2, 2H.

All flanges shall be fully welded to pipe on both faces, one pass minimum on the inside, and two passes minimum on the outside. Pipe linings shall extend to mating faces of flanges. Bolt threads shall be lubricated with an approved anti-seize compound. Flanges together with bolts and nuts, shall be, once installed, coated with an approved bitumastic material.

c. Swedged Lap Welded Joints

Bell ends shall be formed integrally with pipe cylinders, being swedged out by machine. Bell ends shall be designed and fabricated to withstand design pressure of class of pipe specified and to permit spigot ends (plain end) to enter belled ends approximately 1 inch with clearance of approximately 1/32 inch.

d. Banded Lap Welded Joints

Where lap welded joints are required and swedged lap welded joints cannot be fabricated, belled ends shall be formed by welding steel bands to outside circumferences of plain ends of pipe. Bell ends shall be designed and fabricated to withstand design pressure of class of pipe specified and to permit spigot ends (plain ends) to enter belled ends approximately 1 inch with a clearance of approximately 1/32 inch.

e. Sleeve Couplings

Where sleeve couplings are required, they shall conform with the construction drawings. Pipe coatings at pipe ends shall be held back 12 inches and pipe shall have weld seams ground flush within 12 inches from pipe ends, unless specified otherwise. For above ground applications, pipe ends and sleeve couplings shall be painted. For below ground applications, pipe ends and sleeve couplings shall be coated with an approved bitumastic material. An approved bitumastic coating shall be substituted for mortar coating within 12 inches of pipe ends. After joints have been coupled, sleeve couplings shall be coated with an approved bitumastic material.

f. Cut-to-Fit Joints

Where cut-to-fit joints are required, they shall conform with the standard drawings and the construction drawings. Pipe coatings at cut-to-fit joints shall be held back as required to permit construction of joints; pipe coatings shall thereafter be added in the field. Field applied pipe coatings shall match manufactured pipe coatings. Contractor shall provide, at his expense, cut-to-fit joints, in addition to those specified, if necessary to accommodate his work and schedule.

g. Shop Testing of Joints and Joint Ends

Every pipe section, standard, or special, shall be hydrostatically tested after joint ends have been completely shop formed and attached in place by welding, as applicable, or dye check tested provided pipe cylinders had been previously hydrostatically tested.

5) Cement Mortar Lining and Cement Mortar Coating

a. General

Cement mortar lining and cement mortar coating shall conform with AWWA C205, latest.

b. Surface Preparation

Prior to lining and coating, pipe shall be cleaned of all loose mill scale, moisture, rust, sand, dust, oil, grease, and other deleterious or objectionable matter both inside and outside.

c. Cement Mortar Lining

(1) Mortar

Mortar shall consist of one part Portland cement to three parts (by weight) clean, sharp sand. Unless specified otherwise, cement used for cement mortar shall conform with ASTM C-

150, latest, Type II. Sand shall consist of clean, inert, sharp, durable material, maximum grain size being no more than one-half specified minimum lining thickness. Mortar shall be thoroughly mixed and made workable with clear, potable water. All cement mortar shall develop a minimum compressive strength of 2,600 psi minimum at seven days and 4,500 psi minimum at twenty-eight days.

(2) Application and Treatment

Cement mortar shall be applied to interior surfaces of pipe with equipment specifically designed for that purpose. Said equipment shall have a retracting feed line that will provide uniform cement mortar distribution throughout pipe length. Pipe shall be slowly rotated in horizontal position while cement mortar is being applied. Each end shall be provided with suitable end dam during spinning operation to control lining thickness and provide square-finished lining end.

Following application of mortar, pipe shall be rotated at sufficient speed to compact lining mortar. Said speed shall be maintained until all excess water has been forced to lining surface. During the spinning operation, surplus water shall be expelled from pipe by blower or other suitable means. Peripheral speed and spinning time shall be sufficient to obtain dense, well compacted lining with smooth surface free from defects. Minimum lining thickness shall be as shown by the standard drawings.

Immediately after lining has been completed, pipe shall be water cured without being disturbed for at least one day. Moisture loss shall be prevented during the curing period.

d. Cement Mortar Coating

(1) Mortar

Mortar shall consist of one part Portland cement to three parts (by weight) clean, sharp sand. Materials for cement mortar coating shall be the same as materials for cement mortar lining. All cement mortar shall develop a minimum compressive strength of 2,600 psi minimum at seven days and 4,500 psi minimum at twenty-eight days.

(2) Application and Treatment

After pipe interior has been lined, cement mortar shall be applied to outside of pipe through fixed nozzles to form an even, dense, and tightly adhering coating. During coating operation, pipe shall be rotated and moved beneath said fixed nozzles to obtain

uniform coating free from defects. Minimum coating thickness shall be as shown by the standard drawings.

Cement mortar coating shall be reinforced with spirally wound steel (reinforcing) wire embedded midway within coating. Reinforcing wire shall be bright basic wire comprised of low carbon, open hearth steel, unannealed after the last draw, with an approximate ultimate tensile strength of 80,000 psi. Said wire shall be No. 14 gage minimum and it shall be placed at a pitch of 1-1/2 inch maximum in the middle third of the coating.

Immediately after coating has been completed, each end of each section shall be cleansed to bare metal and cement mortar shall be troweled and shaped suitable for joint being used. All exposed bare metal shall be cleaned and coated and painted for protection against corrosion. Completed pipe shall then be water cured for at least four days without being disturbed.

6) Manufacturing Inspection

The Owner shall at all times have the right to inspect Work and materials during the course of manufacture. Manufacturer shall furnish the Owner reasonable facility for obtaining such information as it may desire regarding progress and manner of work and character and quality of materials used.

7) Loading, Transporting, and Unloading Pipe and Fittings

After pipe and fittings have been manufactured as set forth above, they shall be braced at the plant with wooden struts of adequate size to protect against excessive deflection. Each set of struts (two struts minimum to a set) shall be nailed together at right angles as a unit. Wooden wedges may be used to accomplish proper tight fit for the struts. Bracing shall be located 1 foot in from each end of each pipe section for pipe 24 inches and smaller, and additionally at mid point for pipe 30 inches and larger.

After the struts have been installed, pipe shall be loaded on rubber-tired vehicles, adequately supported and choked to prevent damage during transportation, and delivered to Work site. All bracing shall remain in place until each pipe section has been bedded and backfilled to at least 1 foot above the top of the pipe for pipe 24 inches and larger.

Plastic end caps or covers shall be placed over the ends of pipe following installation of braces to prevent moisture loss during loading, transporting, unloading, and installing; they shall remain in place until installation. If the plastic and caps or covers are damaged (perforated), they shall be replaced immediately.

During loading, unloading, and stringing operations, pipe and fittings shall be moved with care to prevent damage thereto. They shall be moved with nylon chokers or straps of sufficient width, placed at third points (one-third length of

pipe from each end), to prevent damage to exterior coating, and they shall be handled in such manner to prevent damage to interior lining. Steel slings shall not be used.

Unloading shall be accomplished in a workmanlike manner by Contractor and every precaution shall be taken to prevent damage to pipe and fittings. Under no circumstances are pipe sections to be dropped or bumped in handling. Any pipe section that becomes damaged shall be repaired if possible and, if not possible in the opinion of the Owner, it shall be replaced with an undamaged pipe section. When strung, pipe shall be adequately supported and chocked to avoid movement until it is installed. It shall also be placed to avoid damage during construction.

8) Pipe Installation

Pipe manufacturer, fitting manufacturer, and material supplier, in addition to the Owner and the Owner's representative, shall have access to the Work during installation. Contractor shall use assistance provided by either manufacturer or supplier where required for proper installation of pipe, fittings, or materials; however, Contractor shall limit role of either manufacturer or supplier to advisory service.

Contractor shall not move pipe using dozer blades, backhoe buckets, or the like (sharp metal surfaces). Contractor shall use nylon chokers or straps, not steel slings, in moving, placing, or setting pipe. Nylon chokers or straps shall be placed at third points (one-third length of pipe from each end).

All out-of-round pipe shall be rejected and removed from the Work site immediately. Rejected pipe shall be replaced immediately. Contractor shall not use hammers, bars, wrenches, or other tools to modify pipe ends to accommodate installation.

All pipe ends shall be secured with plastic covers. Said plastic covers shall be left in place until pipe is prepared for installation. If any plastic covers are damaged or destroyed before pipe has been installed, they shall be immediately replaced.

All pipe and fittings shall be laid true to line and grade and at the locations shown by the construction drawings or as specified. Pipe and fittings shall be installed in accordance with applicable sections of AWWA M11, "Steel Pipe Manual". Bell ends shall be placed uphill unless otherwise permitted.

All flanges shall be fully welded to pipe on both faces, one pass minimum on the inside and two passes minimum on the outside. Pipe linings shall extend to mating faces of flanges and pipe coatings shall extend to backs of flanges, tapered as necessary for installation of bolts and nuts. All exposed steel shall be field coated with an approved bitumastic material.

Special care shall be taken to avoid damaging lining or coating during lowering of pipe into trench and making of field joints. Unless specified otherwise, field

joints shall be bell and spigot rubber gasket joints, continuity bonded (two evenly spaced bonding clips per joint minimum). Flanged joints, welded joints, and mechanical joints may be required for particular applications.

After pipe has been set in trench, exterior of spigot and interior of bell shall be thoroughly cleaned. Lubricant as recommended by pipe manufacturer and as approved by the Owner shall be applied to rubber gasket, and said gasket shall then be snapped into place and excess lubricant removed. Lubricant shall be water soluble, nontoxic, shall impart no objectionable taste or odor to water, shall have no deteriorating effects on the rubber gaskets, and shall not support the growth of bacteria.

Before inserting spigots into bells, to make joints, bells shall be hand mortared with quick setting non-shrink commercial grout mixed with an approved bonding agent. Once spigots have been inserted into bells, joints shall be gauged to ensure that gaskets have been properly seated.

For pipe 24 inches and larger, Contractor shall relieve (equalize) gaskets before laying to prevent gaskets from being tight on one side of pipe and slack on the other side, and adversely affecting seal. Contractor shall lift gaskets with a round blunt tool (like the shaft of a screwdriver) and roll it around the circumference of the spigot end at least once and preferably twice.

For pipe less than 24 inches in diameter, sufficient quantities of moist cement mortar shall be placed on interior joining ends of pipe to completely fill space between respective mortar linings. Moist mortar shall be placed only after respective mortar linings have been properly wetted. Moist mortar shall not be placed against dry mortar linings. Excess mortar shall be removed by drawing an approved pipe cleaning tool through the pipe after joints have been made (pipe sections have been joined). For fully welded joints, pipe sections shall be pulled together and restrained with come-along devices, or hoists with chains and slings, and mortar shall be allowed to set for twenty minutes before welding joint. Once joint has been pulled closed and cleaning tool has been drawn through pipe sections, pipe alignment shall not be adjusted, nor shall pipe be bounced or hammered. Come-along devices, or hoists with chains and slings, shall be removed only after joint has been fully welded.

For pipe 24 inches in diameter and larger, cement mortar shall be placed on interior joining ends from inside pipe after it has been set. Moist mortar shall be applied only after mortar linings have been properly wetted. Moist mortar shall not be placed against dry mortar linings. Excess mortar and debris shall be removed by hand or by other means acceptable to and approved by the Owner.

For cement mortar coated pipe, joint exteriors shall be coated with cement mortar utilizing a joint diaper. Said diaper shall be furnished by pipe manufacturer and shall be centered over joint and securely fastened to pipe. Cement mortar joint mix consisting of one part Portland cement to two parts (by weight) clean, sharp sand, shall contain just enough water to allow mix to be poured into diaper and flow around circumference of joint. Said mix shall be allowed to set prior to backfilling around joint.

Joints shall be completed to provide continuous interior lining and exterior coating. Field lining and coating must equal or exceed shop lining and coating when completed with respect to strength, uniformity, and density and there shall be no voids between lining or coating and steel cylinder.

If cement mortar lining has to be removed, Contractor shall scribe, chisel, and remove the lining using appropriate tools. If cement mortar coating has to be removed, Contractor shall first scribe, then saw cut said coating 3/4 of its thickness, and then remove coating using a chisel driven by a hammer, chipping gun, or other suitable tool. Impact shall be applied parallel with pipe barrel, not perpendicular thereto.

At the end of each day's work, all openings in the pipeline shall be plugged with watertight, expandable plugs or approved equal. Said plugs shall be secured in place so that they cannot be removed by children or animals.

9) Field Welding

Whenever field welding is required, Contractor shall attach welding machine ground to pipe only with clamps or other means acceptable to the Owner unless an alternative means is specified.

Unless specified otherwise, field welded or thrust restrained joints shall consist of flanged joints or fully welded joints. All flanges shall be fully welded to pipe on both faces, one pass minimum on the inside and two passes minimum on the outside. Welded joints shall be made with pipe having ends belled for welding, or alternatively, ends belled for rubber gasket joints, provided pipe manufacturer furnished filler rods of proper diameter, length, and curvature are installed in accordance with pipe manufacturer's recommendations, as approved by Owner. Belled ends shall not be deformed to accomplish fully welded joints. Full welds for all joints shall be accomplished with two welding passes (beads) minimum.

10) Field Cement Mortar Lining and Cement Mortar Coating

Whenever field cement mortar lining and cement mortar coating is permitted by the Owner for either repair or fabrication, Contractor shall comply with the following procedures:

a. Cement Mortar Lining

- (1) Contractor shall square the edge of the remaining lining, leaving no feather edge, and shall clean metal surfaces with a stiff wire brush.
- (2) Contractor shall apply approved bonding agent to both steel area and edges of adjacent lining. Cement mortar shall then be applied to the area being patched and worked and finished with a trowel until smooth. Contractor shall brush on approved curing compound over the surface of the patch to prevent rapid

evaporation of moisture. Otherwise, Contractor shall keep the patched mortar moist by covering it with wet burlap. The pipe shall not be moved until the cement mortar achieves its initial set, not less than three hours.

- (3) Cement mortar shall consist of not less than one part cement to three parts sand, thoroughly mixed before any water addition. Cement mortar may be approved commercial, packaged dry mortar mix. Cement mortar shall be mixed separately for each area to be patched. Quantity of water shall be just sufficient so that when mortar is firmly compressed into a ball, it will hold its shape without slump.

b. Cement Mortar Coating

- (1) Exterior coating which requires removal around the complete circumference of the pipe shall be repaired by:
 - a) Removing the coating by chipping with a hammer or chisel, squaring the edges to accept repair patch.
 - b) Wrapping the area with 2 x 4 x 14 GA self-furring wire mesh or an approved stucco netting and guniting the area being patched.

or

Wrapping the mesh as above and hand troweling mortar onto the area being patched.

- c) Applying an approved curing compound to the patched area.
 - d) Avoiding movement and protecting the pipe until the cement mortar achieves its initial set, not less than three hours.
- (2) Exterior coating that does not extend around the entire circumference of the pipe shall be repaired by:
 - a) Removing the coating by chipping with a hammer and chisel, squaring the edges to accept repair patch.
 - b) Applying by brush an approved bonding agent to both the steel area and the edges of the remaining coating.
 - c) Applying cement mortar to the area being patched and thoroughly compacting it, with finished patch mounding up above and overlapping (at least 1 inch on all sides) the surrounding coating.

- d) Applying an approved curing compound to the patched area. If the repair patch is made on pipe in the ditch, it shall be covered with wet burlap, heavy cloth, or similar material, and dirt shall be placed around and over the patched area by hand before proceeding with placing backfill material.
 - (3) The cement mortar mix proportions shall be the same as for lining repair.
 - (4) If the area to be patched exceeds over half of the pipe circumference, 2 x 4 x 14 GA self-furring wire mesh or an approved stucco netting shall be attached to the pipe prior to the application of the cement mortar.
- c. Installation of Repaired Pipe

After the repaired area has achieved initial set, not less than six hours, the pipe section can be installed, providing the patched area of the coating is backfilled with water saturated or wetted soil.

C. Polyvinyl Chloride Pipe

1) Scope

Polyvinyl chloride (PVC) pipe furnished and installed under these Specifications shall conform to applicable AWWA Standards (latest), as modified herein, by the Drawings, or by Owner.

All pipe furnished shall be manufactured by an organization which has had not less than 10 years successful experience in the manufacture of the type of pipe specified. Owner shall approve manufacturer's product before its use.

2) Data to be Submitted by Contractor

Contractor shall furnish three (3) copies of an Affidavit of Compliance in accordance with Section 6.3, AWWA C900 and C905 (latest). Contractor shall also furnish three (3) certified copies of test reports containing results of all physical and chemical tests on pipe and coupling showing compliance with AWWA C900 and AWWA C905 (latest) as modified herein.

Unless specified otherwise, Contractor shall prepare detailed installation or laying drawings showing pipe, fittings, appurtenances, station and elevation for each fitting, and each change in alignment or slope. Contractor shall submit the detailed installation or laying drawings to Owner for approval in all cases in time sufficient to allow review and approval as hereinafter specified and to accommodate the Contractor's construction schedule.

Installation or laying drawings shall be submitted in triplicate. Owner will return one set of drawings to Contractor within 15 days marked either "Accepted", "Rejected", "Revise and Resubmit", "Submit Specified Item", or "Furnish as Corrected". In the last case, all revisions will be clearly shown on the returned set of drawings which shall be considered the approved drawings and only drawings or prints so corrected shall be used for installation. Unless specified otherwise, Contractor shall furnish Owner seven (7) sets of all approved drawings.

3) Pipe and Couplings

All pipe and couplings furnished shall conform to AWWA C900 and C905 (latest) and the following additional requirements:

- a. Unless otherwise specified or shown on Drawings, AWWA C900 pipe and couplings (4" through 12" diameter) shall be minimum Class 150 (maximum dimension ratio of 18). Polyvinyl chloride pipe shall have same dimensions as ductile iron pipe and pipe bell and pipe spigot shall have same thickness as pipe barrel.

Standard lengths of pipe shall have nominal length of 20 feet, 0 inches, plus or minus 1 inch. Standard lengths of pipe shall be furnished with integral bells and spigots and with rubber gaskets. Couplings may be used for closures and curved alignments where permitted by Owner.

Pipe shall have sufficient strength to withstand an internal hydrostatic pressure of four times rated operating pressure for its class per AWWA C900 (latest).

- b. Unless otherwise specified or shown on the Drawings, AWWA C905 pipe and couplings (14" through 36" diameter) shall have maximum dimension ratio of 25 (Class 165). Polyvinyl chloride pipe shall have same dimensions as ductile iron pipe and pipe bell and pipe spigot shall have same thickness as pipe barrel.

Standard lengths of pipe shall have nominal length of 20 feet, 0 inches, plus or minus 1 inch. Standard lengths of pipe shall be furnished with integral bells and spigots and with rubber gaskets. Couplings may be used for closures and curved alignments where permitted by Owner.

Pipe shall have sufficient strength to withstand an internal hydrostatic pressure of two times rated operating pressure for its class per AWWA C905 (latest).

4) Fittings

All fittings shall be Class 150 ductile iron unless otherwise specified or shown on the Drawings.

Ductile iron fittings shall conform with AWWA C110, C111, and C153 (ANSI A21.10, A 21.11, and A21.53, respectively), latest. Unless specified otherwise, fittings shall be push-on joint and comply with AWWA C111 (ANSI A21.11).

Fittings shall have an asphaltic outside coating in accordance with AWWA C110 or C153 (ANSI A21.10 or A21.53), latest, and cement mortar lining in accordance with AWWA C104 (ANSI A21.4), latest. Fittings shall have standard lining thickness and shall be seal coated with asphaltic material or other approved material. The lining process must produce a dense, compacted lining that shall be bonded to the interior of the fitting and have a smooth surface.

Where PVC fittings are specified on the Drawings or permitted as an alternative as specified on the Drawings, fittings shall be in compliance with AWWA C907 (4" through 8"). Affidavits and testing results shall be submitted as required for PVC pipe.

Where "special lining" is specified, it shall be provided in accordance with Section 14, herein.

5) Testing

All pipe and couplings furnished shall be tested in the United States in accordance with Section 4, AWWA C900 and AWWA C905.

6) Manufacturing Inspection and Certification

Owner shall at all times have the right to inspect all work and materials in the course of manufacture. Manufacturer shall furnish Owner reasonable facility for obtaining such information as he may desire regarding the progress and manner of the work and the character and quality of materials used.

Where "special lined" ductile iron pipe and fittings are provided, manufacturer shall furnish Owner with a certificate of compliance for the following:

- a. Surface preparation completed in accordance with SSPC-SP10 (near white blast cleaning).
- b. Minimum dry film thickness (MDFT) of lining prime coat completed per system requirements (6 mils, unless noted otherwise).
- c. MDFT of finish system completed per system requirements (35 mils, unless noted otherwise).
- d. Finished lining has been inspected for defects with holiday detection equipment and is free of pinholes.

7) Loading, Transporting, and Unloading

After the pipe has been tested in accordance with Section 5 above, it shall be loaded on rubber-tired vehicles, adequately supported and chocked to prevent

any damage during transportation, and delivered to job site. All pipe and couplings (AWWA C900 and C905) shall be unloaded and stored in accordance with AWWA manual M23 (latest). During the unloading and stringing operations, the pipe shall be moved in such a manner as to prevent injury to the pipe and/or couplings. Unloading shall be accomplished in a workmanlike manner as directed by the manufacturer. Under no circumstances are pipe sections to be dropped or bumped in handling.

8) Defective or Damaged Material

The pipe and couplings shall be carefully inspected for defects. Any pipe, coupling, sleeve, or rubber ring found to be defective in workmanship or material or so damaged as to make repair and use impossible shall be rejected and removed from the job site.

In the event that pipe is damaged, the damaged portion may be removed, as approved by Owner, and discarded. Remaining sound portions may be used with ductile iron fittings or with couplings. Contractor shall be responsible for any and all damage to material and he shall stand expense of repairing or replacing same. Contractor shall take proper precautions to assure that the rubber gaskets are protected from oxidation or undue deterioration.

9) Installation

Pipe manufacturer, fitting manufacturer, and material supplier, in addition to the Owner and the Owner's representative, shall have access to the Work during installation. Contractor shall use assistance provided by either manufacturer or supplier where required for proper installation of pipe, fittings, or materials; however, Contractor shall limit role of either manufacturer or supplier to advisory service.

All pipe shall be laid true to line and grade and at the locations as shown by the Construction Drawings or as specified. Pipe shall be installed in accordance with AWWA C605 and Manual M23 (latest) (including AWWA C905 pipe and couplings), applicable provisions of manufacturers installation guides (latest) and manufacturer's directions. Owner shall approve manufacturer's product before its use. Contractor shall furnish Owner with two manufacturers installation guides for use during construction. Bell ends shall be placed uphill unless otherwise specified.

Unless otherwise specified or shown on the Drawings, backfill within the pipe zone shall have a minimum sand equivalent of 50 as determined by ASTM D2419 (latest).

After pipe has been set in trench, exterior of spigot and interior of bell shall be thoroughly cleaned. Lubricant recommended by pipe manufacturer and as approved by the Owner shall be applied to rubber gasket. Lubricant shall be water soluble, nontoxic, shall impart no objectionable taste or odor to the water, shall have no deteriorating effects on the rubber gaskets, and shall not support growth of bacteria. Excess lubricant shall be removed. Pipe ends shall be

aligned, and spigot shall be pulled into bell with come-along devices, or hoists with chains and slings, unless permitted otherwise. If either the pry bar or the backhoe bucket method is permitted, a timber header shall be placed between the pipe and the pry bar or backhoe bucket before the spigot is pushed into bell.

Curved alignment of AWWA C900 pipe shall be accomplished by longitudinal bending of the pipe. Minimum allowable bend radii shall be as specified by the pipe manufacturer. Unless otherwise allowed by the pipe manufacturer and approved by the Owner, axial deflection at the pipe joints of AWWA C900 pipe is prohibited. Where closing sections are required, Contractor shall make all necessary measurements to select appropriate pipe lengths and closure couplings for correct installation.

Curved alignment of AWWA C905 pipe by use of longitudinal bending is prohibited; however, curved alignment by use of pulled joints will be permitted. Unless otherwise allowed by the pipe manufacturer and approved by the Owner, maximum joint deflection shall be one (1) degree. For purposes of reducing angular deflections at pipe joints and for closure sections, Contractor may install pipe sections of less than standard length. Where closing sections are required, Contractor shall make all necessary measurements to select appropriate pipe lengths and closure couplings for correct installation.

Whenever cutting of pipe is required, it shall be done with a special cutting tool specifically made for cutting and machining PVC pipe. Cut ends and rough edges shall be ground smooth and beveled for push-on joints.

Pipe locator wire (No. 14 AWS insulated copper) shall be installed in trench with pipe where shown by the Standard Drawings unless it is specifically deleted by the Construction Drawings or by Owner. It shall be held in place by looping the pipe at 20 foot intervals maximum, or as specified.

As work progresses, a pipe cleaning tool as approved by Owner shall be drawn through the pipe to remove dirt, rocks, or other foreign material. At the end of each day's work, all openings in the pipeline shall be plugged with watertight expandable plugs or Owner approved equal.

Unless specified otherwise, polyvinyl chloride pipe shall not be encased with concrete. If protection is necessary it shall be accomplished by the use of conductor casing(s) as approved by Owner.

11. Valves

A. Air Valves

Air valves shall be manufactured in accordance with AWWA C512, latest, except as specified herein or as shown by the standard drawings.

Unless specified otherwise, air valves shall be combination air or combination air and vacuum valves (air, vacuum, and automatic release). They shall permit automatic escape of large quantities of air from pipeline when it is being filled, permit large quantities of

air to enter pipeline when it is being emptied, and allow accumulating air to escape while pipeline is in operation and under pressure.

Air valves shall have ductile iron bodies and covers, stainless steel floats rated 1,000 psi minimum, stainless steel internal working parts, stainless steel pressure seats, and white Viton "O" rings or seats. Unless specified otherwise, air valves shall be service rated at cold water working pressure of 300 psi minimum. Unless specified otherwise, resilient seats shall be service rated for 150 psi maximum operating pressure.

Air valve interiors shall be completely fusion bonded epoxy coated (12 mils minimum) in accordance with AWWA C550, latest. The Owner shall approve epoxy coating material and methods before application. Completed coating shall be free from all defects and shall be inspected by use of low voltage holiday detectors and non-destructive thickness gauges.

Air valve inlets shall be flanged or threaded as specified and outlets shall be threaded at the same nominal sizes as the inlets, minimum. Air valves shall be subjected to factory hydrostatic test at pressure equal to 200 percent rated working pressure with no harmful deflections or other defects.

Air valve outlets shall be adequately screened to prevent entrance of foreign substances or materials. Screens shall be installed in accordance with the standard drawings. Where valves contain more than a single outlet, each outlet shall be adequately screened.

Air valves shall be tagged or labeled with the manufacturer's name, size, model number, pressure rating and other specialty features as listed above or as specified by the Owner. Contractor shall provide manufacturer's certification that all materials used in valves produced under AWWA 512, latest, conform with Section 2.1 of said standard.

Air valves shall be kept clean and free from dirt, earth, debris, and other deleterious materials prior to, during, and after installation and construction. Until in operation, each valve shall be protected by the use of an approved canvas or plastic bag or sack completely covering valve and securely fastened to valve riser.

B. Butterfly Valves (Buried Service)

Butterfly valves shall be manufactured in accordance with AWWA C504, latest, except as specified herein or as shown by the standard drawings. Butterfly valves shall be capable of buried service; they shall be equipped with valve boxes in accordance with the standard drawings.

Unless specified otherwise, butterfly valves shall be short laying length pattern with ANSI B16.1 Class 125 flanges. Butterfly valves shall have heavy duty ductile or grey iron bodies in accordance with ASTM A536 and 316 stainless steel edged ductile or grey iron discs. Valve stems, each with 2 inch square operating nut, shall turn counterclockwise to open. Unless specified otherwise, butterfly valves shall be service rated at cold water working pressure of 150 psi minimum.

Valve shafts shall be manufactured of Type 304 stainless steel with stainless steel journals. Valves shall contain synthetic rubber seats (Buna N or equal) mounted in valve

bodies. Internal retaining rings and screws used with rubber seats shall be Type 304 (18-8) stainless steel.

Butterfly valves shall be epoxy coated (8 mils minimum) inside and outside in accordance with AWWA C550, latest. The Owner shall approve epoxy coating materials and methods before application. Completed coating shall be free from all defects and shall be inspected by use of low voltage holiday detectors and non-destructive thickness gages.

Butterfly valves shall be tagged or labeled with the manufacturer's name, size, model number, pressure rating and other specialty features as listed above or as specified by the Owner. Contractor shall provide manufacturer's certification that all material used in valves produced under AWWA C504, latest, conform with Section 2.2 of said standard.

C. Gate Valves (Buried Service)

Gate valves shall be manufactured in accordance with AWWA C509, latest, except as specified herein or as shown by the standard drawings. Gate valves shall be capable of buried service; they shall be equipped with valve boxes in accordance with the standard drawings.

Gate valves shall have ductile iron bodies, resilient seats, and ANSI B16.1 Class 125 flanges. Valve stems, each with 2 inch square operating nut, shall be nonrising and shall turn counterclockwise to open. Gate valves shall have "O" ring seals, non-shock cold water working pressure of 200 psi, minimum.

Gate valves shall be fusion bonded epoxy coated (8 mils minimum) inside and outside in accordance with AWWA C550, latest. The Owner shall approve epoxy coating materials and methods before application. Completed coating shall be free from all defects and shall be inspected by use of low voltage holiday detecting and non-destructive thickness gauges.

Gate valves shall be tagged or labeled by the manufacturer with the manufacturer's name, size, model number, pressure rating and other specialty features as listed above or as specified by the Owner. Contractor shall provide manufacturers certification that all materials used in valves produced under AWWA C509, latest, conform with Section 2.1 of said standard.

12. Services

A. Service Taps

Service taps shall be on line with meter boxes which shall be perpendicular to mains. Service and other taps shall be made not closer than 2 feet to a bell, coupling, joint, fitting, or other service. Service taps will be permitted only where complete services are to be installed. Under no circumstances will Contractor be allowed to tap existing mains which are in service. Contractor shall tap existing mains only when said mains are out of service and only when specifically permitted by the Owner.

1) Ductile Iron Pipe Mains

Service outlets may be directly tapped and threaded (AWWA tapered threads) into mains for 1 inch outlets on all mains, regardless of size, and for 2 inch outlets on mains 16 inches and larger. Service outlets for 2 inch outlets on mains 12 inches and smaller shall be accomplished with double strap bronze service saddles with iron pipe threads. Alternatively, double strap bronze service saddles with iron pipe threads may be used on all mains, regardless of size, subject to Owner's approval.

2) Welded Steel Pipe Mains

Service taps shall be made with couplings welded to the pipe, either during pipe fabrication or field construction, as shown by the standard drawings. Tapping shall be accomplished with a shell cutter. Care shall be exercised to minimize damage to linings and coatings. Damaged linings and coatings shall be repaired or replaced.

3) Testing and Disinfection

Service taps used for testing and disinfection shall comply with service tap requirements for ductile iron or welded steel pipe, whichever is applicable. Unless specified otherwise, they shall be made at top of pipe. Once testing and disinfection have been completed, they shall be plugged. Plug threads shall be wrapped with Teflon tape and plugged tap shall then be coated with approved bitumastic material.

B. Services Extensions

In addition to a service tap, each service shall include a corporation stop, service pipe, a meter stop, a meter box, and all other materials specified by the standard drawings. Unless specified otherwise, service piping shall be continuous from corporation stop to meter stop; it shall not be spliced.

C. Meter Boxes

Meter boxes shall be equal to and interchangeable with those shown on the standard drawings and shall be installed as shown on the standard drawings. They shall be set true to line and grade and shall be flush with concrete curbs and sidewalks.

Meter boxes shall be installed whenever services are installed, even prior to construction of street improvements including concrete curbs and sidewalks. Meter boxes shall be brought to grade upon construction of concrete curbs and sidewalks.

D. Meter Installation

Except as otherwise indicated on the construction drawings or as specified by the Owner, all meters shall be installed by the Owner following application for service in accordance with the Owner's regulations governing water service and any amendments thereto.

13. Field Hydrostatic Test and Leakage Test

A. Hydrostatic Test

Upon completion of pipeline construction and at least seven days after last concrete thrust device has been placed, pipelines and appurtenances constituting the Work shall be filled with water for twenty-four hours minimum. During filling, Contractor shall see that all air valves are open and operating. After pipelines have been completely filled, they shall be allowed to stand for twelve hours minimum under slight pressure for sufficient time to permit all air to escape. During that same period, Contractor shall examine all fittings, flanges, handholes, and connections for leaks. If any leaks are found, they shall be eliminated.

Test pressure, 225 psi minimum for Class 150 pipe and 150 percent of pipe class for other classes of pipe, shall then be applied to test sections as directed by the Owner. Test pressures shall be maintained for four hours minimum. Test sections will be selected which give, as nearly as possible, constant pressure throughout section being tested. Normally test pressures will be measured at lowest elevations.

B. Leakage Test

After pressure test has been satisfactorily completed, pipelines and appurtenances shall be tested for leakage at pressure equal to the pressure class of pipe. Contractor shall test pipelines and appurtenances in test sections as designated by the Owner and required pressures shall be maintained for two hours minimum during which time leakage shall be accurately measured.

Measured leakage shall not exceed the limits set by the following formula unless otherwise specified by the construction drawings.

$$L = \frac{ND(P)^{1/2}}{5000}$$

L is the allowable leakage in gallons per hour for section of pipeline being tested; N is the number of joints (rubber gasket, flanged, or mechanical joints, not swedged or banded lap welded joints) where leakage could occur in the section of pipeline being tested; D is the nominal diameter (inches) of the pipeline being tested; and P is the weighted average test pressure (psi gauge) within the section of pipeline being tested during the leakage test.

C. General Requirements

- 1) Required test pressures shall be applied by pump connected to pipeline sections being tested. The Owner shall approve pump connections to pipeline before testing begins. As part of the Work, and unless specified otherwise, Contractor shall install, at his expense, top outlets (service taps) required for testing.

Contractor shall provide calibrated meters for measurement of leakage, and all pumps, piping, fittings, bulkheads, plugs, valves, gages, power equipment, and manpower necessary for conducting all tests required, all at his expense. Contractor shall furnish the Owner three copies of all records of all tests performed.

- 2) Unless specified otherwise, Contractor shall test against test plates for pipelines 12 inches and smaller. Contractor shall not remove said test plates until pipelines have been tested, disinfected, and accepted by the Owner.
- 3) Contractor, at his expense, shall locate and repair leaks or other defects which may develop or become apparent during test. Contractor shall excavate, including removal of backfill already placed, and make all repairs necessary for required water tightness, and then replace all excavated material, after which Contractor shall retest repaired pipeline section. Pipeline sections shall be repeatedly repaired and tested until they meet requirements set forth herein.
- 4) Pipe manufacturer and fitting manufacturer shall have free access to the Work during testing. Any improper act on the part of Contractor which the pipe and fitting manufacturer may observe shall be reported to the Owner. Pipe and fitting manufacturer shall be free to observe and verify all tests.
- 5) After completed pipeline and appurtenances or test sections have successfully met test requirements to the satisfaction of the Owner, the entire pipeline or each test section shall be filled or shall remain filled with water until completion of the Work, unless otherwise ordered by the Owner.

14. Disinfection of Pipelines and Appurtenances

Contractor shall furnish all equipment, labor, and materials for the proper disinfection (chlorination and flushing) of all pipelines and appurtenances. As part of the Work, and unless specified otherwise, Contractor shall install, at his expense, top outlets (service taps) for required disinfection and sampling. Testing and disinfection must be completed before any pipelines are connected to the existing system.

Contractor may disinfect pipelines and appurtenances either before or after they have been subjected to hydrostatic and leakage tests, unless specified otherwise. If Contractor elects to disinfect before hydrostatic and leakage tests, and he must repair or replace pipelines as a result of said hydrostatic or leakage tests, Contractor shall again disinfect all or portions of the previously tested pipelines.

Disinfection shall conform with provisions of AWWA C651, latest. The chlorinating agent, liquid chlorine or chlorine gas, shall be applied or injected as approved by the Owner at locations no more than 10 feet from existing water system as selected by or designated by the Owner. Concentration of the dosage applied to the water within the pipeline shall be at least 50 ppm and it shall not exceed 200 ppm.

Chlorinated water must be retained in the pipeline long enough to destroy all non-spore-forming bacteria. Said period shall be at least 24 hours but not more than 72 hours. After the chlorine-treated water has been retained for the required time, the chlorine residual at the pipe extremities and at other representative locations shall be at least 25 ppm.

Following chlorination, Contractor shall flush all pipelines and appurtenances in the manner and with the procedure prescribed or approved by the Owner. During flushing, all valves shall be in

full open free discharge position. Flushing shall continue until all chlorine, debris, and foreign materials have been removed from pipelines and appurtenances.

If so directed by the Owner, Contractor shall remove portions of certain appurtenances such as air valve installations, blowoff installations, and service installations in order to accomplish complete flushing; Contractor shall replace same without adversely affecting disinfected pipelines and appurtenances.

Following flushing, water shall be maintained in the pipeline for at least twenty-four hours, thereafter, bacteriological samples shall be taken and analyzed by a certified independent laboratory as approved by the Owner. If initial treatment fails to produce satisfactory disinfection as evidenced by bacteriological analysis, chlorination and flushing shall be repeated until acceptable results have been obtained.

Contractor shall arrange and pay for chlorine residual and bacteriological quality tests. Contractor shall obtain the Owner's prior approval of the times, places, locations, and numbers of samples or tests. The Owner shall witness all sampling. Contractor shall provide an Affidavit of Compliance (in triplicate) to the Owner evidencing satisfactory disinfection.

Following disinfection, pipelines and appurtenances shall remain isolated from any operational water system facilities until evidence has been submitted to the Owner demonstrating that said pipelines and appurtenances have been adequately and properly disinfected. Said evidence shall consist of aforementioned Affidavits of Compliance together with said bacteriological test results, as submitted by the approved certified laboratory. Normally, said pipelines and appurtenances shall be isolated for at least 48 hours, longer if so determined by the Owner.

15. Conductor Casings and Carrier Pipes

Wherever required, conductor casings shall be installed. Said casings shall be comprised of either welded steel pipe or reinforced concrete pipe, as specified. Conductor casings shall be bored and jacked into place unless open trench installations are permitted; conductor casings shall not be sluiced or jetted into place. Conductor casings shall be bored and jacked into place from one direction only.

Conductor casings shall be installed to the lines, grades, and depths specified. Unless specified otherwise, Contractor will be permitted a tolerance from horizontal alignment and from vertical alignment of 0.5 percent of conductor length but no more than 1 foot maximum regardless of conductor length.

Unless specified otherwise, methods and equipment used shall be as selected by Contractor and as approved by the Owner. Said approval shall not relieve Contractor of any responsibility with regard to conductor casing construction. Conductor casings shall have minimum inside diameters at least 12 inches larger than maximum outside diameters of carrier pipes.

Prior to any boring and jacking operations, Contractor shall submit to the Owner a construction plan consisting of a schedule of operations, details of methods of construction, types of equipment to be used, details of boring and jacking pit including lengths, widths and depths, and shoring and bracing. Said construction plan shall be approved as to sufficiency by the Owner before any construction is commenced.

Boring and receiving pits shall be shored in accordance with OSHA standards. A 6 foot high chain link fence shall be erected around said pits and said pits shall be protected with Type K barriers. Barriers shall be placed to direct traffic around the pits.

Prior to constructing pits, Contractor shall excavate both sides of each crossing to determine exact locations of facilities to be crossed (horizontal and vertical). Contractor shall adjust casing locations to accommodate crossings based on Contractor's field measurements.

Contractor shall schedule his operation to prevent pits from being open on weekends or holidays. Contractor shall provide traffic control around the pits in accordance with Contractor's approved traffic control drawings.

Contractor shall take all necessary precautions to prevent subsidence of or lifting of existing roadbeds, roadways, and pavements during or following installation of conductor casings. Material excavated during boring and jacking operations shall be removed carefully so as to avoid caving. Voids created during boring and jacking shall be grouted with an approved grout from within the casing once the casing has been installed. Couplings shall be welded to steel casing to permit grouting. Following grouting, threaded plugs shall be inserted into said couplings.

After conductor casing has been constructed, carrier pipe shall be equipped with approved plastic or steel casing isolators or spacers of uniform size and spacing and then installed in conductor casing in accordance with aforementioned construction plan as approved by the Owner. Annulus between conductor casing and carrier pipe shall be filled with sand and the ends shall be capped with plastic or steel end seals or plugged with brick and mortar. Weepholes shall be placed in the bottoms of the end seals or brick and mortar plugs.

Contractor shall backfill boring and jacking pits with material specified for pipeline backfill. Said backfill material shall be compacted to the relative compaction specified which shall be not less than 90%. Contractor shall remove conductor casing and carrier pipe remnants, shoring materials, asphalt, concrete and all other Work related debris. Contractor shall restore paved surfaces.

16. Miscellaneous Requirements

A. Connections to Existing Watermains

The Owner will make all connections to existing watermains except where otherwise specified. Where a gate valve is required but not specified, the Owner will install gate valve but will not guarantee it against field hydrostatic and leakage test.

To safeguard against failure of the Owner's valve, Contractor may at his option install a test plate for the aforementioned test and, after satisfactory test, remove said test plate and replace it with a 1/8 inch thick minimum ring gasket. The use of any other test appurtenances shall be as approved by the Owner.

B. Field Painting

Contractor shall field paint all aboveground, bare, or exposed piping and appurtenances in accordance with the applicable specifications and drawings.

DRAWINGS

GENERAL DRAWING REQUIREMENTS

WATER SYSTEM FACILITY DRAWINGS SHALL BE ON 24" X 36" SHEETS. THE ORIGINAL DRAWING PRODUCED BY THE DESIGN ENGINEER SHALL BE ON MYLAR.

THE FORMAT AND CONTENT OF ALL DRAWINGS SHALL ESSENTIALLY CONFORM TO THE ATTACHED SAMPLE TITLE SHEET AND SAMPLE PLAN/PROFILE SHEET.

AFTER FINAL APPROVAL BY THE DISTRICT, THE ENGINEER OF WORK SHALL SUBMIT CLEARLY REPRODUCIBLE MYLAR RECORD DRAWINGS ANNOTATED FOR RECORD PURPOSES FOR THE DISTRICT'S PERMANENT RECORDS.

THE FINAL RECORD DRAWINGS SUBMITTED TO THE DISTRICT FOR APPROVAL MUST BE SUITABLE (AS DETERMINED BY THE DISTRICT) FOR MICROFILM REPRODUCTION.

NO PROJECT WILL BE CONSIDERED FOR ACCEPTANCE UNTIL STANDARD DRAWING G-6 FORMS (AS PROVIDED BY THE DISTRICT) ARE COMPLETED BY THE ENGINEER OF WORK FOR EACH INTERSECTION FOLLOWING CONSTRUCTION.

TITLE SHEET

A TITLE SHEET SHALL BE PREPARED FOR ALL WATER SYSTEM FACILITY EXTENSIONS REQUIRING TWO OR MORE PLAN/PROFILE SHEETS. FOR SHORT MAIN EXTENSION PROJECTS, WHERE SUFFICIENT ROOM IS AVAILABLE AND AS APPROVED BY THE DISTRICT, THE ESSENTIAL INFORMATION REQUIRED ON THE TITLE SHEET MAY BE PLACED DIRECTLY ON THE PLAN/PROFILE SHEET, THEREBY AVOIDING A SEPARATE TITLE SHEET.

THE TITLE SHEET SHALL CONTAIN THE FOLLOWING:

1. A LOCATION MAP, TO SCALE, BETWEEN 1" = 1,000' AND 1" = 5,000'.
2. PROJECT BOUNDARY MAP AND DRAWING SHEET INDEX MAP, SCALE FROM 1" = 200' TO 1" = 1,000', DEPENDING ON PROJECT SIZE. CLARITY OF THIS MAP IS IMPORTANT AND IT MUST SHOW BENCH MARKS, SECTION, TOWNSHIP, RANGE, AND BASIS OF BEARINGS FOR THE PROJECT WORK.
3. SYMBOL LEGEND AND RELATED INSTRUCTIONAL NOTES PERTINENT TO THE PROJECT, PER STANDARD DRAWING G-2.
4. REQUIRED DISTRICT GENERAL NOTES, PER STANDARD DRAWING G-3.
5. STATEMENTS AND SIGNATURES OF COMPLIANCE AND NOTIFICATIONS PER STANDARD DRAWINGS G-4 AND G-5.
6. DETAILED QUANTITY TAKEOFF TABULATION.

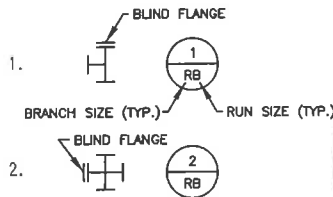
PLAN/PROFILE SHEET CONTENTS

PLAN/PROFILE CONTENTS SHALL SHOW ALL OF THE FOLLOWING:

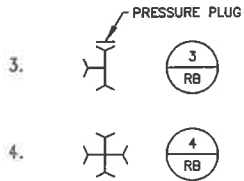
1. NORTH ARROW.
2. CENTERLINE OF ROAD, EASEMENT, ETC.
3. EDGE OF PAVEMENT OR CURB.
4. LOCATION OF FUTURE CURB AND OTHER IMPROVEMENTS PER PLANNING AUTHORITY.
5. ALL UTILITIES (INCLUDING EXISTING AND PROPOSED UNDERGROUND AND OVERHEAD NEAR THE CONSTRUCTION AREA) IN THE GENERAL AREA.
6. STATIONS, DISTANCES, AND BEARINGS OF PROPOSED WATERLINES.
7. ALL TREES, CURBS, WALLS, SIDEWALKS, IN THE GENERAL AREA OF CONSTRUCTION.
8. ENCASEMENT ZONES OR AREAS OF SPECIAL CONSTRUCTION AS REQUIRED BY STANDARD DRAWINGS P-3A OR P-3B.
9. EASEMENTS, INCLUDING WIDTHS, BEARINGS, AND DISTANCES.
10. LOT LINES, LOT NUMBERS, TRACT NUMBERS, RECORDS OF SURVEY NUMBERS, ETC.
11. EXISTING AND PROPOSED STRUCTURES WHERE PERTINENT TO THE PROPOSED CONSTRUCTION.
12. ALL UTILITY CROSSINGS.
13. LOCATION, TYPE, AND SIZE OF EXISTING WATERLINE AND APPURTENANCES.
14. LOCATION, TYPE, AND SIZE OF PROPOSED WATERLINE AND APPURTENANCES PER THE SYMBOLS REQUIRED PER STANDARD DRAWING G-2.
15. LOCATIONS OF FIRE HYDRANTS, VALVES, SERVICES, AND APPURTENANCES PER THE SYMBOLS REQUIRED PER STANDARD DRAWING G-2.
16. STREET, ROAD, AVENUE, HIGHWAY, ETC. NAMES.
17. DRIVEWAYS PERTINENT TO THE LOCATION OF SERVICES AND APPURTENANCES.
18. STEEP ZONES WHERE SLOPE PROTECTION IS NECESSARY PER STANDARD DRAWINGS P-4 OR P-5.
19. DETAILS OF CONNECTIONS TO EXISTING SYSTEM, AS DIRECTED BY DISTRICT.
20. TYPE OF STREET SURFACE EXISTING AND REFERENCE TO REPLACEMENT SPECIFICATIONS OF STREET AUTHORITY.

INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	WATER PLAN PREPARATION INSTRUCTIONS	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED <u>March 12, 2012</u> DATE		G-1



1. FLANGED (OR PARTIALLY FLANGED) TEE OR CROSS FOR USE WHERE FLANGED GATE VALVE(S) OR BLIND FLANGE(S) ARE REQUIRED. ENDS WITHOUT GATE VALVE(S) OR BLIND FLANGE(S) MAY BE HUB SPIGOT ENDS FOR RUBBER RING-GASKET TYPE JOINT. THRUST BLOCKS SHALL BE PLACED FOR TEES PER STANDARD DRAWING P-6C, UNLESS MODIFIED TO MEET SPECIAL CONDITIONS. REMOVABLE (TWO REBAR HANDLES OR EQUAL) THRUST BLOCK(S) ARE REQUIRED ON CROSSES OR TEES WHENEVER DESIGN CALLS FOR A POINT OF UNRESTRAINED THRUST WHICH IS FLANGED OR PLUGGED FOR A FUTURE PIPELINE. SUITABLE HEADERS OF A MATERIAL STRONG ENOUGH TO CONTAIN THE THRUST BLOCK CONCRETE SHALL BE SET IN PLACE PRIOR TO PLACING THE THRUST BLOCK TO PROTECT THE BLIND FLANGE AND BOLTS PROVIDED FOR FUTURE PIPELINE EXTENSIONS, SO THAT THERE IS ABSOLUTELY NO CONCRETE IN CONTACT WITH FLANGES, BOLTS, OR NUTS.



2. HUB-END OR SPIGOT (RUBBER RING-GASKET JOINTS) TEE OR CROSS FOR USE WHERE FLANGED GATE VALVE(S) OR BLIND FLANGE(S) ARE NOT REQUIRED. THRUST BLOCKS FOR TEES SHALL BE PLACED PER STANDARD DRAWING P-6C UNLESS MODIFIED TO MEET SPECIAL CONDITIONS. REMOVABLE (TWO REBAR HANDLES OR EQUAL) THRUST BLOCKS ARE REQUIRED ON CROSSES OR TEES. WHENEVER DESIGN CALLS FOR A PLUGGED END (USE PRESSURE PLUGS) POINT OF UNRESTRAINED THRUST SUITABLE HEADERS OF MATERIAL STRONG ENOUGH TO HOLD BACK THE CONCRETE SHALL BE PLACED PRIOR TO THE PLACEMENT OF THRUST BLOCK CONCRETE SO THAT THE HUB-END FOR FUTURE EXTENSION IS MAINTAINED FREE OF CONCRETE.



3. FLANGED GATE VALVE. COMPLETE INSTALLATION PER STANDARD DRAWING P-9. ELIMINATE COUPLING ADAPTER(S) AS SHOWN IN STANDARD DRAWING P-9 WHEN A SPECIFIC SITUATION DOES NOT REQUIRE THEM. WHEN BUTTERFLY VALVES ARE ALLOWED THE SYMBOL WILL BE THE SAME EXCEPT THAT STANDARD DRAWING P-10 SHALL APPLY.



4. ALL HUB-END GATE VALVE FOR RUBBER RING-GASKET JOINTS, COMPLETE INSTALLATION PER STANDARD DRAWING P-9. SAME SYMBOL WILL BE USED FOR BUTTERFLY VALVES EXCEPT THAT STANDARD DRAWING P-10 SHALL APPLY.



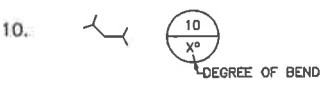
5. FLANGED BY HUB-END GATE VALVE COMPLETE INSTALLATION PER STANDARD DRAWING P-9. WHEN BUTTERFLY VALVES ARE ALLOWED THE SYMBOL WILL BE THE SAME EXCEPT THAT STANDARD DRAWING P-10 SHALL APPLY.



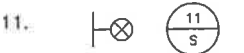
6. WET BARREL FIRE HYDRANT, COMPLETE INSTALLATION PER STANDARD DRAWING P-29. EXACT STATION LOCATION SHALL BE FIELD DETERMINED SUCH THAT PROPERTY INTERFERENCES ARE MINIMIZED. INDICATE COMMERCIAL(C) OR RESIDENTIAL(R).



7. STATION-FITTER CLOSING PIECE FOR USE WHERE HUB-END GATE VALVE(S) ARE USED ADJACENT TO TEES OR CROSSES OR WHERE STATION MUST FIT EXACTLY. CLOSING PIECE SHALL BE 3'-3" MAXIMUM AND MAY BE M.O.A. OR M.E.E.



8. BEND FITTING. DEGREE OF BEND AS REQUIRED. END TYPES AS SYMBOLIZED ON THE DRAWINGS. INSTALL THRUST BLOCKS PER STANDARD DRAWING P-6.



9. HOT TAP EXISTING LINE USING TAPPING SADDLE AND TAPPING GATE VALVE. MASTIC AND TAPE WRAP (50 MIL. TAPE, 60% LAPPED) OR REPAIR CEMENT MORTAR COATING (PER BASIC PIPELINE SPECS) ALL EXPOSED SURFACES TO MATCH ORIGINAL PROTECTIVE COATING.



10. AIR VALVE, COMPLETE INSTALLATION PER STANDARD DRAWING P-15. EXACT LOCATION SHALL BE FIELD LOCATED AT HIGH POINT (OR NEARLY SO, ON THE SIDE OF LEAST SLOPE).



11. FLANGED BY HUB-END RUBBER RING-GASKET PIPE ADAPTER.



12. FLANGED BY FLEXIBLE COUPLING ADAPTER, SIZE SPECIFIED IS NOMINAL.




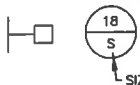

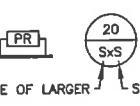
13. FLEXIBLE COUPLING AS SPECIFIED.




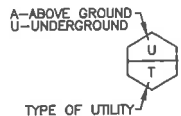




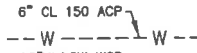
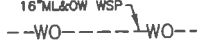
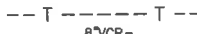
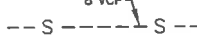
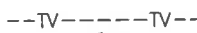
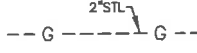





14. REDUCER, END TYPES AS SYMBOLIZED ON DRAWINGS.

INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	STANDARD WATERMAIN SYMBOL LEGEND AND RELATED INSTRUCTIONAL NOTES	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED March 12, 2012 DATE		G-2 PG.1

17.  BLOWOFF 2" AND LARGER PER STANDARD DRAWING P-13 OR P-14, COMPLETE INSTALLATION.
18.  PROPOSED REGULAR CUSTOMER SERVICE INSTALLATION. SIZE AND APPLICABLE STANDARD DRAWING NOTED.
19.  DETECTOR CHECK SERVICE INSTALLATION (FOR PRIVATE FIRE PROTECTION SERVICES). SIZE AND APPLICABLE STANDARD DRAWING NOTED.
20.  PRESSURE REGULATOR INSTALLATION PER CONSTRUCTION DRAWINGS DETAILS. SIZE, TYPE, AND FEATURES OF REGULATOR VALVES NOTED. REGULATORS SHALL BE CLA-VAL OR APPROVED EQUAL. 2" AND SMALLER SIZES SHALL HAVE STAINLESS STEEL SEATS. SIZE AND TYPE OF HEADERS AND VALVE LINES SHALL BE NOT LESS THAN 2" IN DIAMETER GREATER THAN NOMINAL DIAMETER GREATER THAN NOMINAL DIAMETER OF THE LARGEST VALVE LINE. CONSTRUCTION DRAWINGS SHALL INDICATE WHETHER OR NOT THE OPTIONAL GATE VALVES, AS DETERMINED BY DISTRICT, ARE REQUIRED FOR A PARTICULAR INSTALLATION.

NOTE: THE ABOVE SYMBOLS SHALL ALSO BE USED TO DENOTE EXISTING FITTINGS AND APPURTENANCES WHERE THE EXISTENCE OF SAME IS RELATED TO THE PROPOSED FACILITY. EXISTING FEATURES SHALL BE SHOWN IN A MUCH LIGHTER LINE WEIGHT AND DENOTED AS EXISTING, IF REQUIRED FOR CLARITY.

-  PROPOSED PIPELINE (SIZE AND TYPE NOTED).
-  LOCATION OF UNDERGROUND OR ABOVE GROUND UTILITY, OR OTHER INTERFERENCES, WITH LETTER DESIGNATING UTILITY OR INTERFERENCE AS SHOWN IN THE FOLLOWING LEGEND OF EXISTING FACILITIES. SEE STATEMENT OF CONTRACTOR'S RESPONSIBILITY WITH REGARD TO UNDERGROUND INTERFERENCES IN THE GENERAL NOTES.
-  ZONE OF SPECIAL CONSTRUCTION REQUIREMENTS WITH REGARD TO CLOSE PROXIMITY OF WATER AND SEWER FACILITIES, PER APPLICABLE PROVISIONS OF STANDARD DRAWING P-3A OR P-3B.
-  EXISTING FIRE HYDRANT INSTALLATION. CHARACTERISTICS NOTED IF PERTINENT.
-  EXISTING BLOWOFF INSTALLATION. CHARACTERISTICS NOTED IF PERTINENT.
-  EXISTING AIR VALVE INSTALLATION. CHARACTERISTICS NOTED IF PERTINENT.
-  EXISTING DISTRICT WATER LINE. SIZE AND TYPE SHOWN.
-  EXISTING WATERLINES OF OTHERS. OWNER, SIZE, AND TYPE SHOWN.
-  EXISTING UNDERGROUND TELEPHONE CABLE OR CONDUIT. SIZE AND TYPE SHOWN.
-  EXISTING SEWER. SIZE AND TYPE SHOWN.
-  EXISTING UNDERGROUND CABLE TELEVISION. SIZE AND TYPE SHOWN.
-  EXISTING UNDERGROUND GAS LINE. SIZE AND TYPE SHOWN.
-  EXISTING UNDERGROUND ELECTRICAL. SIZE AND TYPE SHOWN.
-  EXISTING SEWER MANHOLES.
-  EXISTING SEWER LATERALS.
-  BOUNDARY OF THE CITY OF RIDGECREST.
-  BOUNDARY OF INDIAN WELLS VALLEY WATER DISTRICT.

INDIAN WELLS VALLEY WATER DISTRICT

<p>Renee E. Morquecho R.C.E. 79344</p>	<p>STANDARD WATERMAIN SYMBOL LEGEND AND RELATED INSTRUCTIONAL NOTES</p>	<p>STANDARD DRAWING</p>
<p>CHIEF ENGINEER APPROVED March 12, 2012 DATE</p>		<p>G-2 PG.2</p>

GENERAL NOTES

1. THRUST BLOCKS ARE REQUIRED ON ALL TYPES OF PIPE UTILIZING RUBBER RING-GASKET JOINTS FOR ALL CHANGES OF HORIZONTAL OR VERTICAL DIRECTION IN EXCESS OF 2.5". AT DEAD ENDS, TEES (INCLUDING CROSSES TEMPORARILY FUNCTIONING AS TEES), TEES WHICH ARE INSTALLED WITH A BLIND FLANGE FOR FUTURE EXTENSION, AND ON ALL FIRE HYDRANT TEES INCLUDING INCOMPLETE INSTALLATIONS CONSISTING OF A BLIND FLANGED TEE OR SIDE OUTLET. THRUST BLOCKS PLACED AGAINST BLIND FLANGES SHALL BE CONSTRUCTED TO ALLOW REMOVAL OF SAID THRUST BLOCK AND BLIND FLANGE WITHOUT DISTURBING ALL ADJACENT THRUST BLOCKS.

2. CONTRACTOR SHALL VERIFY LOCATION AND DEPTHS OF ALL UNDERGROUND AND ABOVEGROUND INTERFERENCES (UNDER SUPERVISION OF THE AFFECTED UTILITY, AGENCY, OR PERSON) AND TAKE PROPER PROTECTIVE AND PRECAUTIONARY MEASURES. THE PRESENCE, LOCATION, AND DEPTH (WHERE GIVEN) AS SHOWN BY THESE DRAWINGS IS BASED ON THE RECORD INFORMATION OF THE AFFECTED UTILITIES. CONTRACTORS SHALL NOT ASSUME THAT SUCH INFORMATION IS BASED ON POTHOILING AND FIELD MEASUREMENTS UNLESS SPECIFICALLY NOTED ON THE DRAWINGS. ALL SUCH RECORD DATA IS REPRESENTED ON THESE DRAWINGS IN GOOD FAITH AND WITH NORMAL DILIGENCE. CONTRACTOR SHALL RECOGNIZE THE PROBABILITY THAT SOME EXISTING UNDERGROUND FACILITIES WILL BE ENCOUNTERED WHICH ARE NOT SHOWN HEREON OR IDENTIFIED BY THE AFFECTED UTILITY, AGENCY, OR PERSON. SUCH PROBABILITY IS NORMAL IN PROJECTS OF THIS TYPE, AND SHALL BE RECOGNIZED AS SUCH BY CONTRACTORS (BIDDERS) AND APPROPRIATELY INCLUDED IN THE BIDS OFFERED AND ULTIMATELY MADE A PART OF CONTRACT WORK. WHERE SEWER, GAS, WATER, AND OTHER UTILITY LATERALS ARE MARKED, SUCH INFORMATION IS CONSIDERED APPROXIMATE. SUCH LATERALS ARE NOT MARKED WHERE THE INFORMATION INDICATING LOCATION IS UNKNOWN OR IS CONSIDERED TO BE OF QUESTIONABLE RELIABILITY. WHENEVER CONSTRUCTION IS BEING DONE AND THE ABOVE UTILITIES FACILITIES ARE EXISTING IN THE AREA, CONTRACTOR SHALL ASSUME THAT ALL LOTS OR PARCELS HAVE LATERALS OF SUCH UTILITIES TO THE PROPERTY LINE AND CONTRACTORS SHALL BE RESPONSIBLE FOR LOCATING (WITH THE HELP OF THE AFFECTED UTILITY) AND AVOIDING AND PROTECTING SAME. ALL DAMAGE TO ALL UNDERGROUND UTILITIES AND INTERFERENCES SHALL BE REPAIRED PROMPTLY BY THE CONTRACTOR. CONTRACTOR SHALL REFER SPECIFICALLY TO SECTION 1540(A)(1) OF THE CONSTRUCTION SAFETY ORDERS. TITLE 8 CALIFORNIA ADMINISTRATIVE CODE SECTION 1540, ISSUED BY THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1973.

3. DEEP TRENCHES (5' OR GREATER DEPTH) SHALL BE SHORED OR SLOPED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AFORESAID CONSTRUCTION SAFETY ORDERS. COMPLIANCE IS THE RESPONSIBILITY OF THE CONTRACTOR, INCLUDING OBTAINING AND MAINTAINING REQUIRED PERMITS. CERTAIN AREAS WHERE SLOPE TRENCHING SHALL NOT BE PERMITTED MAY BE DENOTED ON THE DRAWINGS. IF NO NOTATIONS ARE MADE IN REGARD TO SHORING OR SLOPE TRENCHING, CONTRACTOR SHALL ASSUME THAT SHORING IS REQUIRED UNLESS HE OBTAINS THE PERMISSION OF THE ENGINEER OF WORK TO USE SLOPE TRENCHING.

4. PRIOR TO CONSTRUCTION OF PROPOSED PIPELINES, CONTRACTOR SHALL EXPOSE EXISTING PIPELINES AND APPURTENANCES AND VERIFY ALL FEATURES, ELEVATIONS, AND LOCATIONS WHICH ARE PERTINENT TO THE CONSTRUCTION. ALL INFORMATION SHOWN BY THE DRAWINGS WITH RESPECT TO THE DISTRICT'S EXISTING FACILITIES SHALL BE CONSIDERED AS "RECORD" INFORMATION AND REQUIRE VERIFICATION. CONTRACTOR SHALL ALLOW FOR APPROPRIATE CUTS-TO-FIT, AND FITTINGS AND ADAPTERS, AS REQUIRED AT POINTS OF CONNECTION.

INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	<u>REQUIRED GENERAL NOTES</u> (REQUIRED ON ALL CONSTRUCTION DRAWINGS)	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED <u>March 12, 2012</u> DATE		G-3 PG.1

5. UNLESS OTHERWISE SPECIFIED, ALL APPURTENANCES SHALL BE CONSTRUCTED AT RIGHT ANGLES TO PIPELINE AT STATION NOTED (SYMBOL LOCATIONS ARE APPROXIMATE ONLY).
6. CONTRACTOR SHALL CONFORM TO SPECIAL CONSTRUCTION REQUIREMENTS OF WATER FACILITIES IN PROXIMITY WITH SEWER FACILITIES AS REQUIRED BY STANDARD DRAWINGS P-3A AND P-3B AND THE STATE OF CALIFORNIA, WHETHER OR NOT SUCH AREAS ARE DESIGNATED SPECIFICALLY ON THE DRAWINGS. IF NO NOTATIONS ARE SHOWN ON THE CONSTRUCTION DRAWINGS AND SUCH SPECIAL CONSTRUCTION IS NECESSARY PER SAID STANDARDS, CONTRACTOR SHALL NOTE SUCH AREAS IN WRITING AND NOTIFY THE ENGINEER OF WORK PRIOR TO ENTERING CONTRACT.
7. CONTRACTOR SHALL INITIALLY OPERATE ALL FIRE HYDRANTS, VALVES, AND OTHER APPURTENANCES TO DEMONSTRATE ALL ARE IN PROPER OPERATING CONDITION BEFORE THE WORK WILL BE ACCEPTED. ALL NORMALLY OPEN VALVES SHALL BE LEFT OPEN AND NORMALLY CLOSED VALVES SHALL BE LEFT CLOSED. AN AFFIDAVIT OF COMPLIANCE SHALL BE REQUIRED BY THE ENGINEER OF WORK AND DELIVERED BY HIM TO THE DISTRICT.
8. PIPELINE PROFILE AND ALIGNMENT AS SHOWN BY THESE DRAWINGS HAVE BEEN REVIEWED AND ACCEPTED BY THE DISTRICT. ALIGNMENT AND PROFILE CHANGES WILL BE MADE DURING CONSTRUCTION ONLY IF UNFORESEEN CIRCUMSTANCES OR INTERFERENCES ARE ENCOUNTERED, IN WHICH CASE THE ENGINEER OF WORK SHALL MAKE A WRITTEN REQUEST TO THE DISTRICT FOR VARIATION FROM THE DRAWINGS. ANY INCREASED COST RESULTING FROM REQUIRED CHANGES IN PROFILE OR ALIGNMENT SHALL NOT BE THE RESPONSIBILITY OF THE DISTRICT.
9. THE MINIMUM COVER OVER FACILITIES SHALL BE AS SHOWN ON THE DRAWING OR IN OTHER GENERAL NOTES. IN NO EVENT SHALL THE MINIMUM COVER BE LESS THAN 36" IN IMPROVED ROADS AND 48" IN UNIMPROVED ROADS WITHOUT WRITTEN PERMISSION FROM THE DISTRICT.
10. THE SPECIFIED GRADES SHALL BE CONSIDERED MET IF FIELD MEASUREMENT SHOWS COMPLIANCE TO NEAREST 0.1' OF THE COMPUTED GRADE, EXCEPT WHERE ROUNDING UP CAUSES VIOLATION OF MINIMUM COVER REQUIREMENTS AND AT CRITICAL POINTS SUCH AS MEETING EXISTING FACILITIES AND AVOIDING INTERFERENCES. DISTRICT INSPECTOR SHALL HAVE DISCRETIONARY AUTHORITY TO ACCEPT VARIATIONS UP TO 0.2' FROM THE COMPUTED GRADE IN NONCRITICAL AREAS IF SAGS AND HUMPS ARE NOT INTRODUCED INTO THE PROFILE THEREBY.
11. CONTRACTOR SHALL PERFORM HIS OPERATIONS SO THAT (EXCEPT PER PLAN) EXISTING ROAD AND OTHER SURFACES ADJACENT TO OR IN THE VICINITY OF HIS WORK SITES ARE NOT DAMAGED. IF THE CHOSEN ALIGNMENT FOR A PARTICULAR PIPELINE IS SUCH THAT PAVEMENT REMOVAL AND REPLACEMENT IS NECESSARY, OR SUCH THAT INCIDENTAL DAMAGE OF THE ROADWAY PAVING IS UNAVOIDABLE DURING THE EXCAVATION OR BACKFILLING OPERATIONS, THE CONTRACTOR SHALL INCLUDE PROVISIONS FOR THE COST OF REPAIRS TO THE ROADWAY IN HIS CONTRACT ALL TO THE FULL SATISFACTION OF THE DISTRICT'S STANDARD SPECIFICATIONS AND THE STANDARDS OF THE PUBLIC AGENCY WITH JURISDICTION.
12. CONTRACTOR SHALL ADHERE STRICTLY TO THE ENVIRONMENTAL CONTROL PROVISIONS OF THE DISTRICT STANDARD SPECIFICATIONS IN THE GENERAL REQUIREMENTS SECTION OF THESE SPECIFICATIONS. IF ANY VIOLATION OF SAID PROVISIONS OCCURS, DISTRICT INSPECTOR MAY ORDER THE WORK STOPPED UNTIL THE VIOLATION IS CORRECTED.

INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	<u>REQUIRED GENERAL NOTES</u> (REQUIRED ON ALL CONSTRUCTION DRAWINGS)	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED <u>March 12, 2012</u> DATE		G-3 PG.2

13. IT SHALL BE CONTRACTOR'S RESPONSIBILITY TO CHECK AND VERIFY, TO HIS SATISFACTION, THE QUANTITY TAKEOFFS PRESENTED HIM BY THE ENGINEER OF WORK. ANY QUANTITY TAKEOFFS SHOWN ARE FOR THE CONVENIENCE OF THE DISTRICT AND NOT TO BE CONSTRUED BY THE CONTRACTOR AS A DEFINITIVE STATEMENT OF THE WORK QUANTITIES.
14. WHERE TECHNICAL REQUIREMENTS OF THE VARIOUS PHYSICAL ITEMS ARE ADDRESSED IN BOTH DISTRICT STANDARD SPECIFICATIONS AND STANDARD DRAWINGS, ALL NONCONFLICTING PORTIONS OF THE PROVISIONS SHALL APPLY. IN THE EVENT THAT PORTIONS OF SUCH DUPLICATE PROVISIONS ARE IN CONFLICT, THE STANDARD DRAWINGS SHALL PREVAIL.
15. CONTRACTOR SHALL BE REQUIRED TO SUBMIT WRITTEN EVIDENCE OF COMPLIANCE WITH ALL OF THE PROVISIONS OF THE PUBLIC AGENCY HAVING JURISDICTION OF THE PUBLIC ROADS AND STREETS. THE DISTRICT WILL NOT ACCEPT THE COMPLETED WORK UNTIL SUCH WRITTEN STATEMENT OF COMPLIANCE (SPECIFICALLY REFERENCING COMPACTION AND ROAD SURFACE RESTORATION REQUIREMENTS) IS RECEIVED.
16. CONTRACTOR SHALL BE RESPONSIBLE TO OBTAIN CONSTRUCTION WATER. CONTRACTOR MAY MAKE ARRANGEMENTS TO PURCHASE WATER FROM THE DISTRICT UNDER THE DISTRICT'S CURRENT ORDINANCE PROVISIONS.
17. THE DISTRICT WILL WORK DILIGENTLY AND COOPERATIVELY WITH THE CITY, COUNTY, AND STATE TO PROPERLY SAFEGUARD THE PUBLIC INTEREST AND CONTRACTOR SHALL STRICTLY ADHERE TO ALL OF THE REQUIREMENTS OF THE LAWS, RULES, REGULATIONS, AND ORDINANCES OF SUCH AGENCIES AND THE ENCROACHMENT PERMITS AND LICENSES ISSUED BY THEM FOR THE PERFORMANCE OF THIS WORK. ALL APPLICABLE PROVISIONS OF SUCH AGENCIES ARE HEREBY INCORPORATED BY REFERENCE AND SHALL BE FULLY MET AS IF SET FORTH HEREIN IN FULL.
18. ALL OPERATIONS OF DISTRICT'S SYSTEM SHALL BE PERFORMED BY AUTHORIZED DISTRICT PERSONNEL. ALL CONNECTIONS TO EXISTING SYSTEM MADE BY CONTRACTOR SHALL BE UNDER DIRECT SUPERVISION OF THE DISTRICT INSPECTOR.
19. THE DISTRICT REQUIRES APPROVED METER BOXES FOR ALL SERVICE LATERALS. SAID METER BOXES SHALL BE INSTALLED BY THE CONTRACTOR.
20. PRIOR TO SERVICE INSTALLATIONS, THE CONTRACTOR MUST RECEIVE DISTRICT APPROVAL OF ALL MATERIALS TO BE INSTALLED.
21. BOLTS SHALL BE STANDARD HEX HEAD MACHINE PER APPROVED MATERIALS LIST. NUTS SHALL BE HEAVY COLD-PRESSED SEMI-FINISHED STEEL PER APPROVED MATERIALS LIST. THREADS SHALL BE LUBRICATED WITH AN OWNER APPROVED ANTI-SEIZE COMPOUND. ALL BELOW GROUND EXPOSED STEEL SHALL BE COATED WITH AN OWNER APPROVED BITUMASTIC. ALL ABOVEGROUND EXPOSED STEEL SHALL BE PAINTED IN ACCORDANCE WITH THE DISTRICT APPROVED PAINT SYSTEMS.

INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	<u>REQUIRED GENERAL NOTES</u> (REQUIRED ON ALL CONSTRUCTION DRAWINGS)	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED <u>March 12, 2012</u> DATE		G-3 PG.3

1. District's Statement

The Indian Wells Valley Water District Staff and Board have reviewed these Water System Facility Plans and Drawings and hereby certify them to be in essential conformance with applicable provisions of the District's Water Service Ordinance(s).

_____	_____
President of Board of Directors	Date
_____	_____
General Manager/Secretary	Date
_____	_____
Engineer, RCE No. _____	Date

2. Engineer's Statements

- A. The Water System Facilities represented by these drawings meet the requirements of all applicable laws, rules and regulations, ordinances and standards of professional practice.
- B. All existing or future underground or aboveground interferences and existing, proposed, or planned street features and grades (actual or potential) which may affect the construction, maintenance, or operation of the facilities or the public health and safety or cause them to have to be disturbed or relocated in the future are appropriately considered and represented and the owners/operators thereof have been consulted during the design process.
- C. All necessary encroachment permits, licenses, agreements, and design approvals have been obtained, and all owners/operators will be appropriately notified as they require, but not less than 48 hours in advance of any construction affecting their facilities or property.
- D. The proposed development has been fully disclosed to the District and the District Engineer has been provided with all the necessary facts to determine Fire Flow Requirements.

_____	_____
Engineer of Work, RCE No. _____	Date

INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	<u>STATEMENTS OF COMPLIANCE</u> (REQUIRED ON ALL CONSTRUCTION DRAWINGS)	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED March 12, 2012 DATE		G-4

The Engineer of Work shall determine all applicable entities and shall require the Contractor to notify the following persons, public entities, or utilities within the required notification period in advance of construction affecting its facilities or property.

<u>Person, Public Entity or Utility</u>	<u>Responsible Person</u>	<u>Telephone No.</u>	<u>Notice Required (Hours)</u>
1. Kern Co. Road Dept.	_____	_____	_____
2. San Bernardino Co. Road Department	_____	_____	_____
3. State of California CALTRANS	_____	_____	_____
4. Kern Co. Flood Control District	_____	_____	_____
5. San Bernardino Co. Flood Control District	_____	_____	_____
6. City of Ridgecrest	_____	_____	_____
7. Indian Wells Valley Water District	_____	_____	_____
8. Southern California Edison Company	_____	_____	_____
9. Pacific Gas and Electric Company	_____	_____	_____
10. Continental Telephone Company	_____	_____	_____
11. Cable T.V.	_____	_____	_____
12. China Lake Naval Air Weapons Station	_____	_____	_____
13. Searles Valley Minerals	_____	_____	_____
14. Kern Co. Fire Department	_____	_____	_____
15. Others	_____	_____	_____

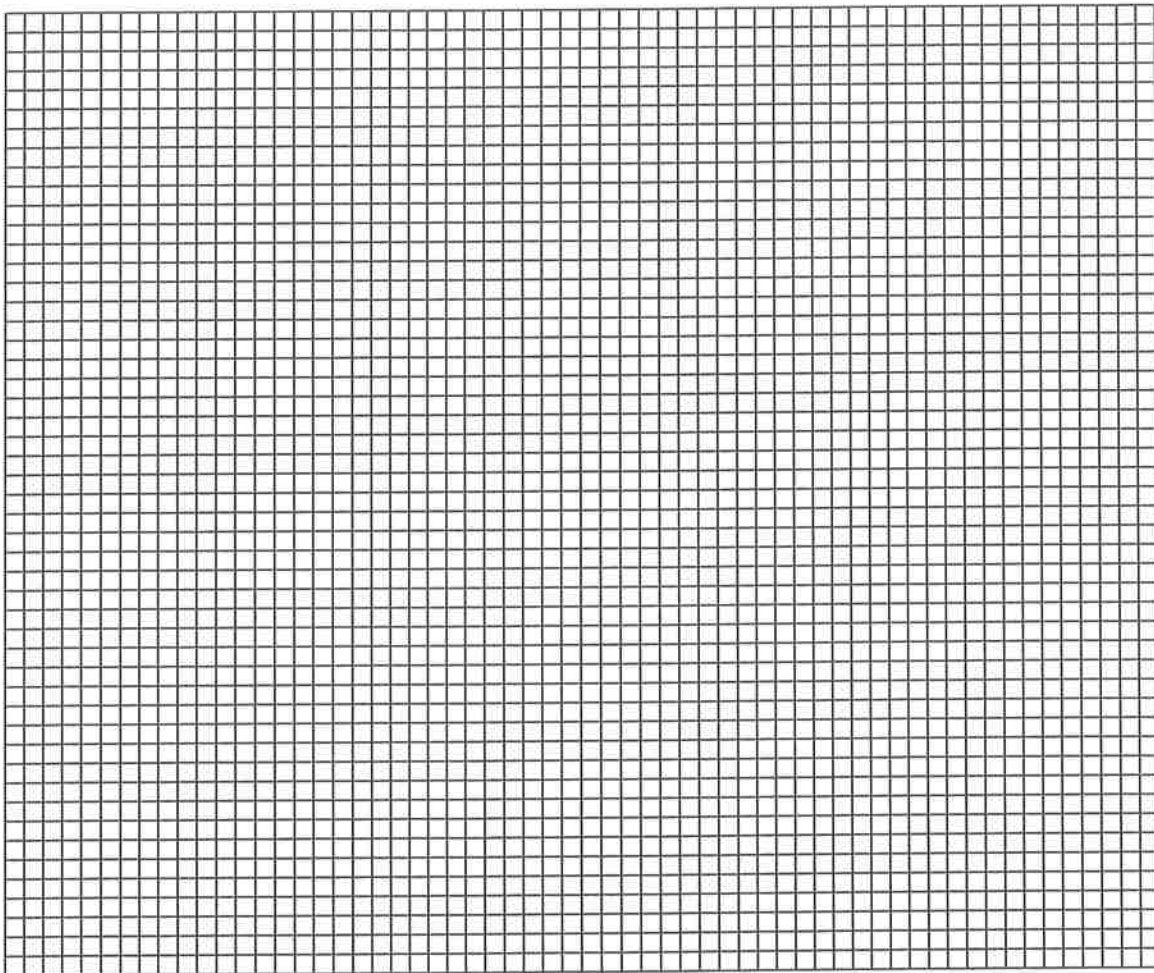
INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	<u>NOTIFICATIONS</u> (REQUIRED ON ALL CONSTRUCTION DRAWINGS)	STANDARD DRAWING G-5
<u>CHIEF ENGINEER</u> APPROVED March 12, 2012 DATE		

LOCATION: _____

VALVE DATA:(IF MORE THAN 6 USE A SECOND SHEET)

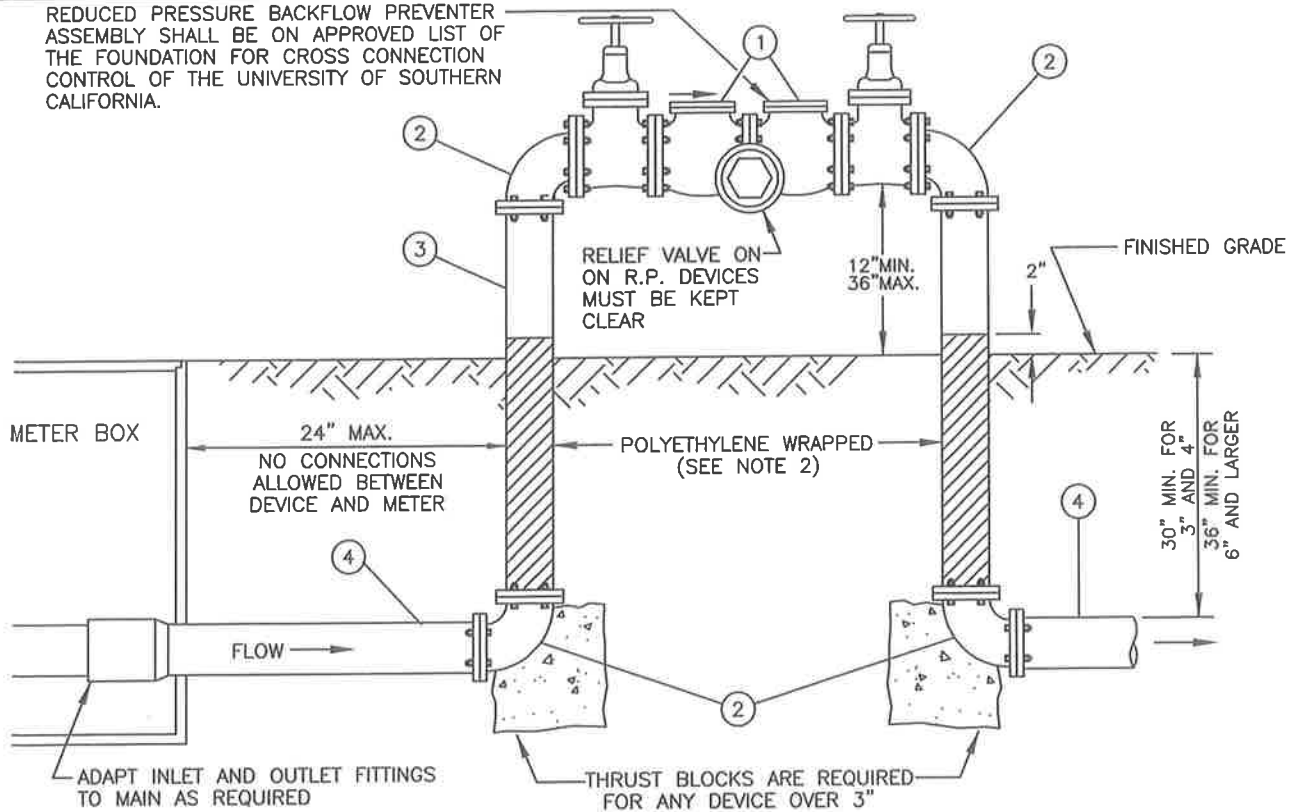
NO.	SIZE	TYPE	TURNS TO CLOSE	BOX TYPE	DEPTH TO NUT	MAKE	CATALOG NO.	NORMALLY OPEN OR CLOSED	
								OPEN	CLOSE
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INDIAN WELLS VALLEY WATER DISTRICT

<p>Renee E. Morquecho R.C.E. 79344</p>	<p>VALVE AND INTERSECTION RECORD</p>	<p>STANDARD DRAWING</p>
<p>CHIEF ENGINEER APPROVED March 12, 2012 DATE</p>		<p>G-6</p>

REDUCED PRESSURE BACKFLOW PREVENTER ASSEMBLY SHALL BE ON APPROVED LIST OF THE FOUNDATION FOR CROSS CONNECTION CONTROL OF THE UNIVERSITY OF SOUTHERN CALIFORNIA.



ITEM	No. REQ'D.	DESCRIPTION	APPROVED MATERIALS LIST No.
1	1	DOUBLE CHECK VALVE AND REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLY.	G-01
2	4	DUCTILE IRON FLANGED 90° ELL - SIZE AS REQUIRED.	D-01
3	VARIABLES	DUCTILE IRON PIPE OR 10 GA. CML/CMC WSP.	D-03
4	2	2" AND BELOW MUST BE BRASS OR COPPER PIPE, 3"+ MUST BE DUCTILE IRON PIPE.	N/A

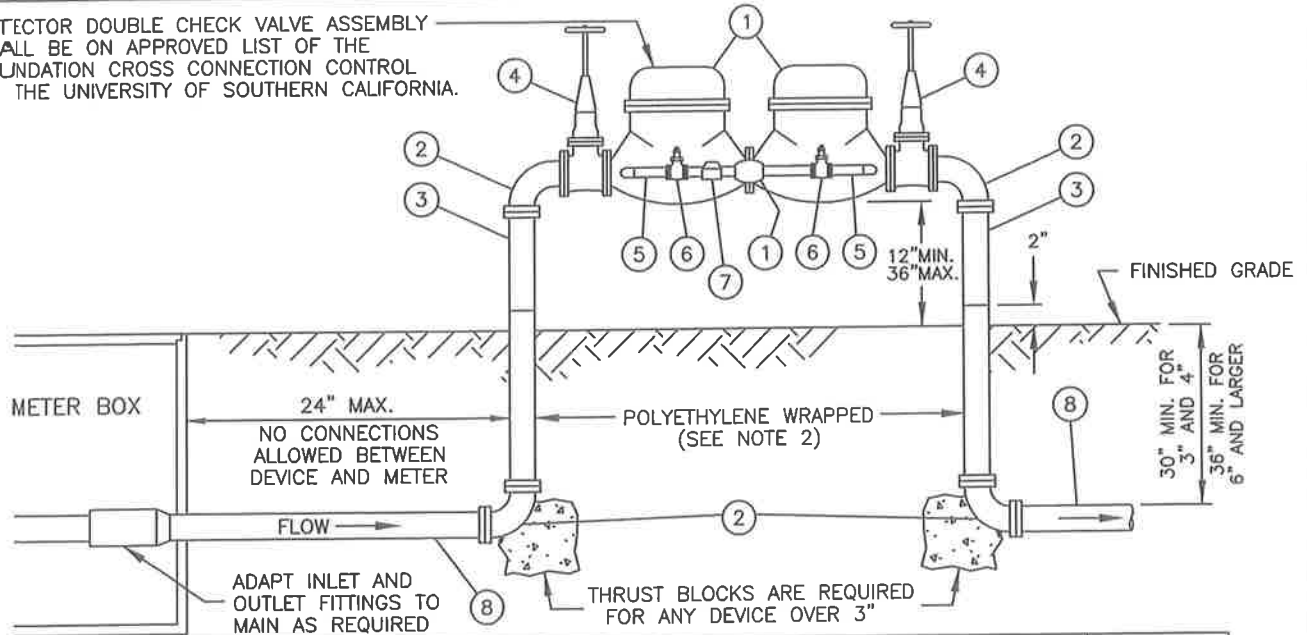
NOTES

- 1) ALL FITTINGS ON ASSEMBLY SHALL BE FLANGED.
- 2) DUCTILE IRON, COPPER, AND BRASS PIPE SHALL BE POLYETHYLENE WRAPPED WITH A 2" WIDE PLASTIC BACKED ADHESIVE TAPE. 60% LAPPED.
- 3) DUCTILE IRON PIPE AND FITTINGS SHALL BE CEMENT MORTAR LINED.
- 4) ALL EXPOSED PIPING SHALL BE PAINTED PER DISTRICT APPROVED PAINT SYSTEM.
- 5) OWNER OF DEVICE MUST HAVE BACKFLOW DEVICE TESTED BY THE DISTRICT AT INSTALLATION AND ANNUALLY THEREAFTER BY A STATE CERTIFIED TESTER.
- 6) UNDER NO CIRCUMSTANCES MAY A BYPASS BE CONSTRUCTED AROUND A BACKFLOW PREVENTION DEVICE.
- 7) IF INTERRUPTION OF WATER SERVICE TO FACILITY IS NOT PERMISSIBLE, TWO (2) IDENTICAL BACKFLOW PREVENTION DEVICES SHALL BE INSTALLED TO ALLOW TESTING AND SERVICE.
- 8) DEVICE MUST BE INSULATED OR COVERED TO PROTECT AGAINST FREEZING. (ACCESS FOR TESTING AND ACCESS TO TEST COCKS MUST BE MAINTAINED.)
- 9) SPRAY OR PAINT STEEL, CAST IRON, BRONZE AND OTHER METALLIC COMPONENTS (INCLUDING NUTS AND BOLTS) WITH A THICK COAT OF AN APPROVED BITUMASTIC. REPLACE ALL REMOVED WRAP OR COATING TO A THICKNESS, DENSITY, AND QUALITY EQUAL TO OR BETTER THAN THE ORIGINAL COATING.

INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	REDUCED PRESSURE BACKFLOW PREVENTER	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED <u>March 12, 2012</u> DATE		BF-1

DETECTOR DOUBLE CHECK VALVE ASSEMBLY SHALL BE ON APPROVED LIST OF THE FOUNDATION CROSS CONNECTION CONTROL OF THE UNIVERSITY OF SOUTHERN CALIFORNIA.



ITEM	No. REQ'D.	DESCRIPTION	APPROVED MATERIALS LIST No.
1	1	DETECTOR DOUBLE CHECK VALVE ASSEMBLY – SIZE AND TYPE AS SPECIFIED.	G-02
2	4	DUCTILE IRON FLANGED 90° ELL – SIZE AS REQUIRED.	D-03
3	VARIABLES	DUCTILE IRON PIPE OR 10 GA. CML/CMC WSP.	D-01 D-03
4	2	O.S. & Y GATE VALVE – SIZE AS SPECIFIED.	B-01
5	VARIABLES	STANDARD WEIGHT BRASS PIPE AND FITTINGS, 3/4" FOR 4", 6", AND 8" DETECTOR CHECKS AND 1" FOR 10" DETECTOR CHECK.	G-02
6	1	BALL VALVE, 3/4" FOR 4", 6", AND 8" DETECTOR CHECKS AND 1" FOR 10" DETECTOR CHECK.	B-14 B-15
7	1	METER – SIZE AND TYPE AS SPECIFIED	N/A
8	2	2" AND BELOW MUST BE BRASS OR COPPER PIPE, 3"+ MUST BE DUCTILE IRON PIPE.	N/A

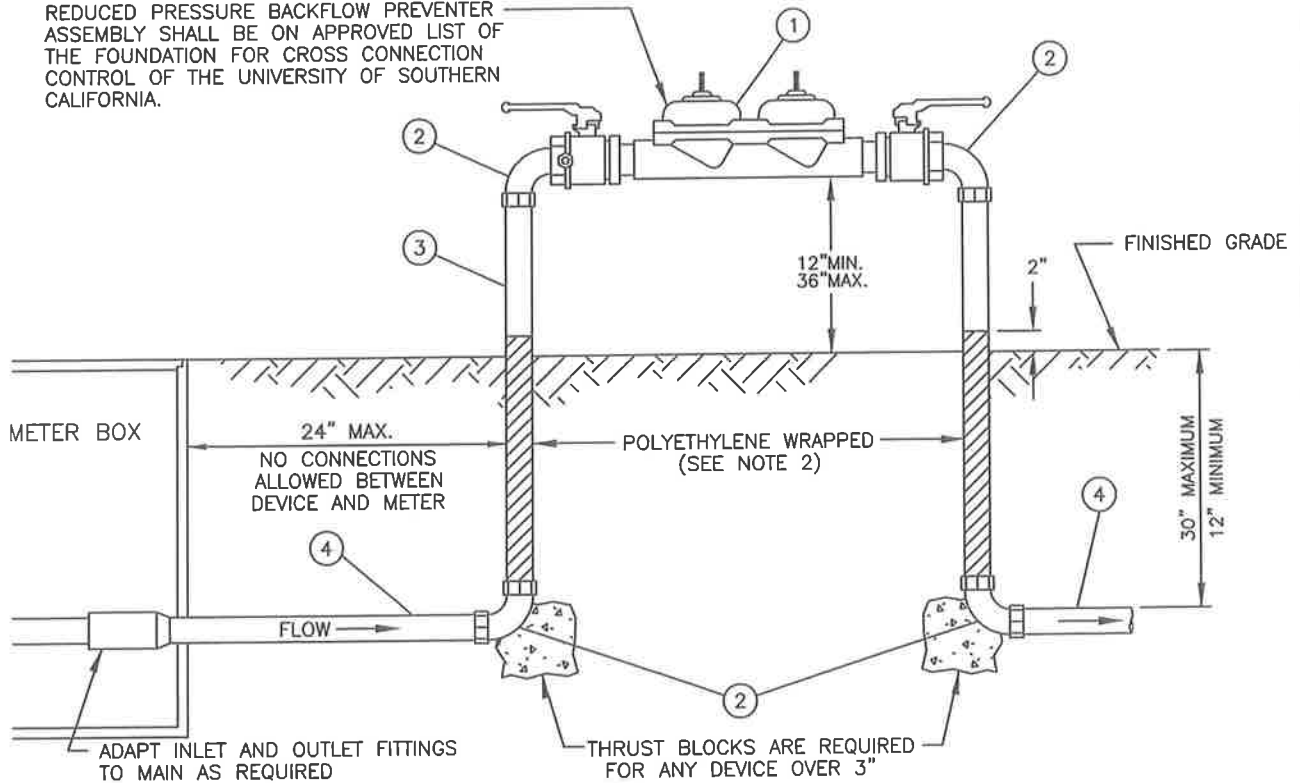
NOTES

- 1) ALL FITTINGS ON ASSEMBLY SHALL BE THREADED.
- 2) DUCTILE IRON, COPPER, AND BRASS PIPE SHALL BE POLYETHYLENE WRAPPED WITH A 2" WIDE PLASTIC BACKED ADHESIVE TAPE. 60% LAPPED.
- 3) DUCTILE IRON PIPE AND FITTINGS SHALL BE CEMENT MORTAR LINED.
- 4) ALL EXPOSED PIPING SHALL BE PAINTED PER DISTRICT APPROVED PAINT SYSTEM.
- 5) OWNER OF DEVICE MUST HAVE BACKFLOW DEVICE TESTED BY THE DISTRICT AT INSTALLATION AND ANNUALLY THEREAFTER BY A STATE CERTIFIED TESTER.
- 6) UNDER NO CIRCUMSTANCES MAY A BYPASS BE CONSTRUCTED AROUND A BACKFLOW PREVENTION DEVICE.
- 7) IF INTERRUPTION OF WATER SERVICE TO FACILITY IS NOT PERMISSIBLE, TWO (2) IDENTICAL BACKFLOW PREVENTION DEVICES SHALL BE INSTALLED TO ALLOW TESTING AND SERVICE.
- 8) DEVICE MUST BE INSULATED OR COVERED TO PROTECT AGAINST FREEZING. (ACCESS FOR TESTING AND ACCESS TO TEST COCKS MUST BE MAINTAINED.)
- 9) AT THE DIRECTION OF THE DISTRICT, CONTRACTOR SHALL INSTALL DETECTOR DOUBLE CHECK VALVE ASSEMBLY IN A VAULT PER STD. DWG. P-24.
- 10) SPRAY OR PAINT STEEL, CAST IRON, BRONZE AND OTHER METALLIC COMPONENTS (INCLUDING NUTS AND BOLTS) WITH A THICK COAT OF AN APPROVED BITUMASTIC. REPLACE ALL REMOVED WRAP OR COATING TO A THICKNESS, DENSITY, AND QUALITY EQUAL TO OR BETTER THAN THE ORIGINAL COATING.

INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	DETECTOR DOUBLE CHECK VALVE ASSEMBLY	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED March 12, 2012 DATE		BF-2

REDUCED PRESSURE BACKFLOW PREVENTER ASSEMBLY SHALL BE ON APPROVED LIST OF THE FOUNDATION FOR CROSS CONNECTION CONTROL OF THE UNIVERSITY OF SOUTHERN CALIFORNIA.



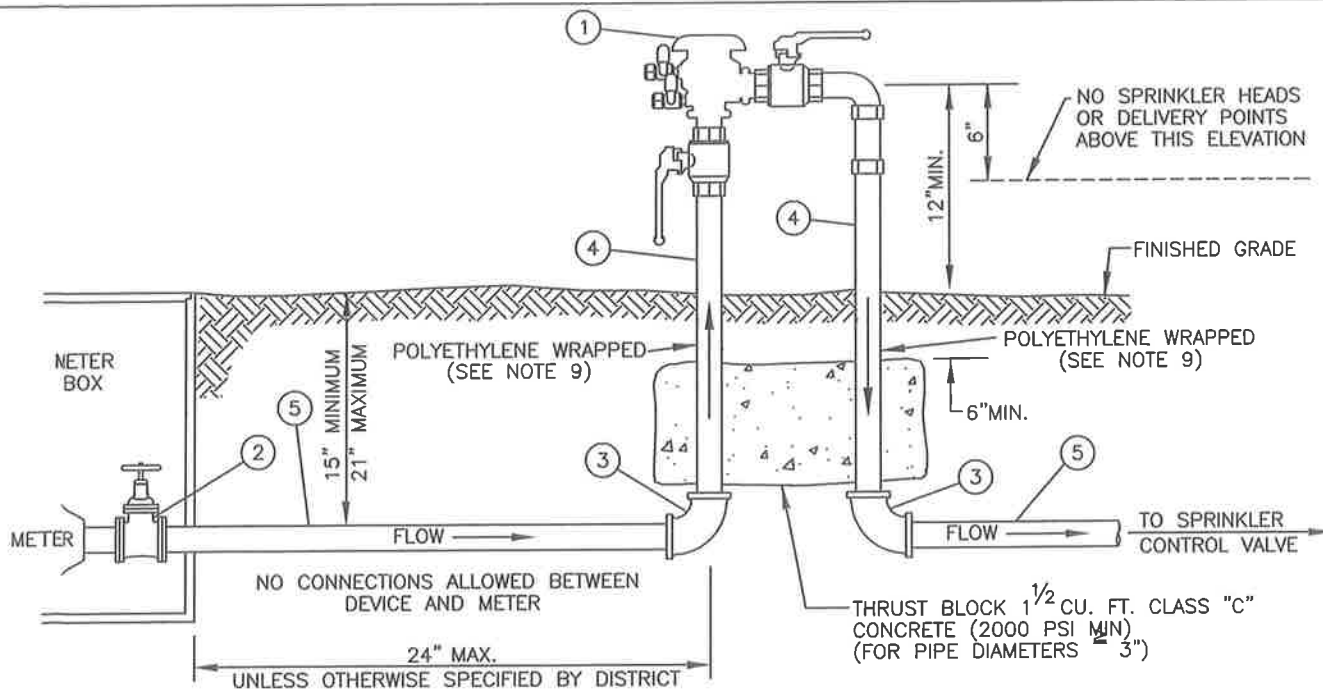
ITEM	No. REQ'D.	DESCRIPTION	APPROVED MATERIALS LIST No.
1	1	DOUBLE CHECK VALVE ASSEMBLY.	G-03
2	4	STANDARD WEIGHT 90° ELL - SIZE AS REQUIRED.	-
3	VARIES	STANDARD COPPER OR BRASS PIPE - SIZE AS REQUIRED	A-05 A-06
4	2	2" AND BELOW MUST BE BRASS OR COPPER PIPE, 3"+ MUST BE DUCTILE IRON PIPE.	A-03

NOTES

- 1) ALL FITTINGS ON ASSEMBLY SHALL BE THREADED.
- 2) DUCTILE IRON, COPPER, AND BRASS PIPE SHALL BE POLYETHYLENE WRAPPED WITH A 2" WIDE PLASTIC BACKED ADHESIVE TAPE. 60% LAPPED.
- 3) ALL EXPOSED PIPING SHALL BE PAINTED PER DISTRICT APPROVED PAINT SYSTEM.
- 4) OWNER OF DEVICE MUST HAVE BACKFLOW DEVICE TESTED BY THE DISTRICT AT INSTALLATION AND ANNUALLY THEREAFTER BY A STATE CERTIFIED TESTER.
- 5) UNDER NO CIRCUMSTANCES MAY A BYPASS BE CONSTRUCTED AROUND A BACKFLOW PREVENTION DEVICE.
- 6) DEVICE MUST BE INSULATED OR COVERED TO PROTECT AGAINST FREEZING. (ACCESS FOR TESTING AND ACCESS TO TEST COCKS MUST BE MAINTAINED.)
- 7) IF REQUIRED BY THE DISTRICT, CONTRACTOR WILL INSTALL DOUBLE CHECK VALVE ASSEMBLY IN A VAULT PER STD. DWG. P-24.
- 8) SPRAY OR PAINT STEEL, CAST IRON, BRONZE AND OTHER METALLIC COMPONENTS (INCLUDING NUTS AND BOLTS) WITH A THICK COAT OF AN APPROVED BITUMASTIC. REPLACE ALL REMOVED WRAP OR COATING TO A THICKNESS, DENSITY, AND QUALITY EQUAL TO OR BETTER THAN THE ORIGINAL COATING.

INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	DOUBLE CHECK VALVE ASSEMBLY	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED <u>March 12, 2012</u> DATE		BF-3



ITEM	No. REQ'D.	DESCRIPTION	APPROVED MATERIALS LIST No.
1	1	CONTINUOUS PRESSURE VACUUM BREAKER ASSEMBLY	G-04
2	1	GATE VALVE - SIZE AS REQUIRED	-
3	2	STANDARD WEIGHT 90° ELL - SIZE AS REQUIRED	-
4	VARIES	RED BRASS PIPE RISER	A-05
5	2	2" AND BELOW WILL BE COPPER OR BRASS PIPE, 3"+ WILL BE DUCTILE IRON PIPE.	-

NOTES

- 1.) CONTINUOUS PRESSURE VACUUM BREAKERS SHALL BE INSTALLED 12 INCHES (MINIMUM) ABOVE FINISHED GRADE.
- 2.) CONTINUOUS PRESSURE VACUUM BREAKERS SHALL NOT BE SUBJECTED TO BACK PRESSURE OR DRAINAGE.
- 3.) TEFLON TAPE 3/4" WIDE SHALL BE USED ON ALL THREADED CONNECTIONS.
- 4.) CLOSE NIPPLES SHALL NOT BE USED.
- 5.) DEVICE MUST BE INSULATED OR COVERED TO PROTECT AGAINST FREEZING. (ACCESS FOR TESTING MUST BE MAINTAINED)
- 6.) OWNER OF DEVICE MUST HAVE BACKFLOW DEVICE TESTED BY THE DISTRICT AT INSTALLATION AND ANNUALLY THERE AFTER BY A STATE CERTIFIED TESTER.
- 7.) WHEN DEVICE IS INSTALLED FOR LANDSCAPE PURPOSES, NO SPRINKLER HEAD OR DELIVERY POINT CAN BE HIGHER THAN AN ELEVATION POINT 6" BELOW THE HEIGHT OF THE VACUUM BREAKER ASSEMBLY.
- 8.) SPRAY OR PAINT STEEL, CAST IRON, BRONZE AND OTHER METALLIC COMPONENTS (INCLUDING NUTS AND BOLTS) WITH A THICK COAT OF AN APPROVED BITUMASTIC. REPLACE ALL REMOVED WRAP OR COATING TO A THICKNESS, DENSITY, AND QUALITY EQUAL TO OR BETTER THAN THE ORIGINAL COATING.
- 9.) DUCTILE IRON, COPPER, AND BRASS PIPE SHALL BE POLYETHYLENE WRAPPED WITH A 2" WIDE PLASTIC BACKED ADHESIVE TAPE. 60% LAPPED.

INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	CONTINUOUS PRESSURE VACUUM BREAKER ASSEMBLY	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED March 12, 2012 DATE		BF-4

PIPE ZONE BACKFILL OF SELECTED EXCAVATED MATERIAL OR IMPORTED BACKFILL MATERIAL, 1" MAXIMUM SIZE IN ACCORDANCE WITH BASIC PIPELINE SPECIFICATIONS OR AS SPECIFIED.

BALANCE OF TRENCH BACKFILL OF EXCAVATED MATERIAL 8" MAX. SIZE IN LAYERS NOT EXCEEDING 8" IN DEPTH ALL IN ACCORDANCE WITH BASIC PIPELINE SPECIFICATIONS, AS SPECIFIED.

CUT, TRIM, REPLACE PAVEMENT PER AGENCY WITH JURISDICTION

FINISHED GROUND SURFACE OR STREET SURFACE

"LOCATOR WIRE" (ALL PIPE) REFER TO NOTE 1 HEREON. LOCATE AS SHOWN

36" MIN. IF UNDER PAVING.
48" MIN. IF IN UNIMPROVED GROUND.

WATERMAIN

FLOWLINE GRADE (DESIGN)

PROVIDE UNIFORM BEARING FOR STEEL PIPE

BEDDING MATERIAL REFER TO NOTES 5 & 6 HEREON 8" MIN. DEPTH 1" MAX. SIZE - SEE BASIC PIPELINE SPECIFICATIONS

OUTSIDE DIAMETER

12" MIN.

PIPE ZONE

TRENCH WIDTH AT TOP OF PIPE MIN-MAX - SEE TABLE BELOW

EARTH MOUNDS (PVC, AND DIP ONLY) REFER TO NOTE 4 HEREON MOUNDS TO BE 2" HIGH MIN. - 6" MAX.

NOM. DIA.	MIN.	MAX.
4"	16"	22"
6"	18"	24"
8"	20"	26"
10"	22"	28"
12"	24"	30"
14"	29"	38"
16"	31"	40"

NOM. DIA. (CONT'D.)	MIN. (CONT'D.)	MAX. (CONT'D.)
18"	33"	42"
20"	35"	44"
24"	39"	48"
27"	45"	51"
30"	48"	54"
33"	51"	57"
36"	54"	60"

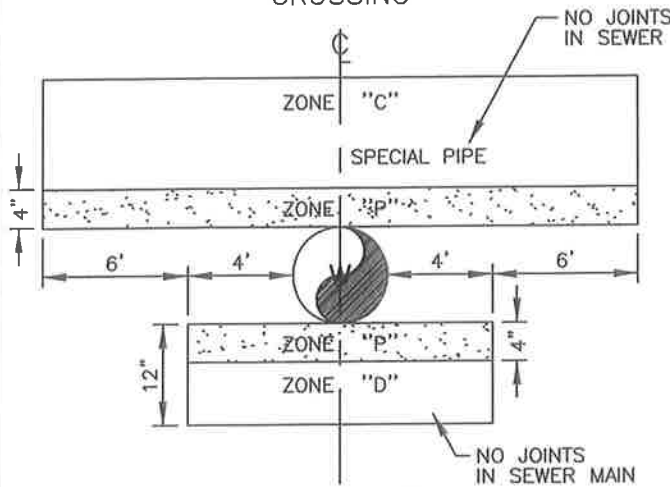
NOTES

- FOR ALL PIPE WITH THE EXCEPTION OF COPPER SERVICE PIPE, INSTALL A CONTINUOUS #14 GA. COPPER WIRE ALONG THE PIPELINE, LOOPED AROUND THE PIPE AT EACH JOINT.
- ALL EXISTING PAVEMENT SHALL BE CUT PRIOR TO TRENCHING, AND WHERE TRENCH SIDES SLUFF AND PAVEMENT BREAKS AWAY IT SHALL BE SAW CUT PRIOR TO PERMANENT PAVEMENT REPAIR.
- TRENCH SIDES MUST BE SLOPED OR SHORED IN ACCORDANCE WITH STATE SAFETY CODE FOR DEPTHS 5' AND GREATER (SEE CAL-OSHA CONSTRUCTION SAFETY ORDERS).
- PROVIDE MOUNDS OF SELECTED EXCAVATED MATERIAL FOR PVC, AND DIP UNLESS OWNER PERMITS UNIFORM BEARING AND BELL HOLES.
- WHERE BOTTOM OF EXCAVATION IS IN ROCK (ROCK MASS, BOULDERS OR STONES) OVEREXCAVATE 8" MIN. BELOW BOTTOM OF PIPE GRADE AND REFILL WITH SELECTED EXCAVATED MATERIAL; IF NOT AVAILABLE; PROVIDE IMPORTED BEDDING MATERIAL, OR AS SPECIFIED. COMPACT TO 90% MIN. RELATIVE COMPACTION.
- WHENEVER TRENCH BOTTOM IS INSUFFICIENTLY STABLE IN THE OPINION OF THE OWNER, CONTRACTOR SHALL OVEREXCAVATE 24" BELOW BOTTOM OF PIPE GRADE AND REFILL WITH SELECTED EXCAVATED MATERIAL, CRUSHED ROCK, IMPORTED BEDDING MATERIAL OR AS SPECIFIED. COMPACT TO 90% RELATIVE COMPACTION.

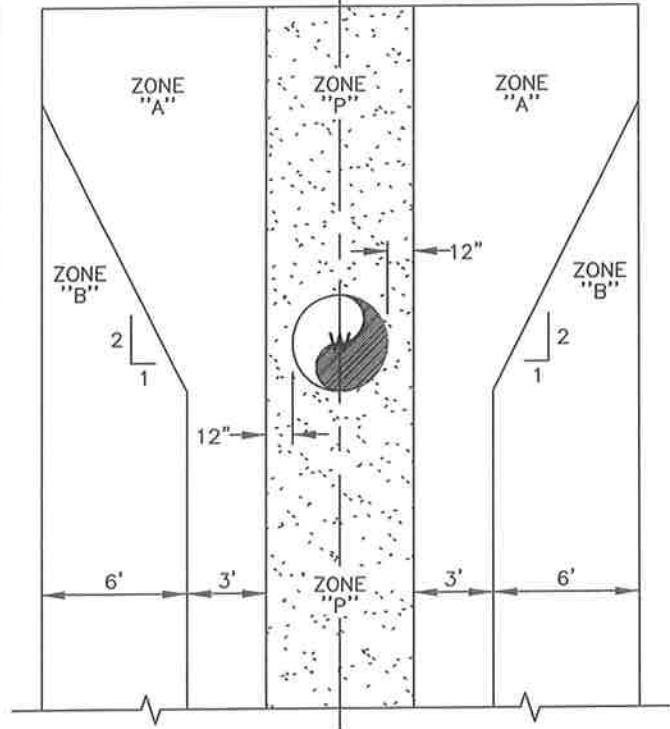
INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	GENERAL TRENCH DETAIL	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED March 12, 2012 DATE		P-1

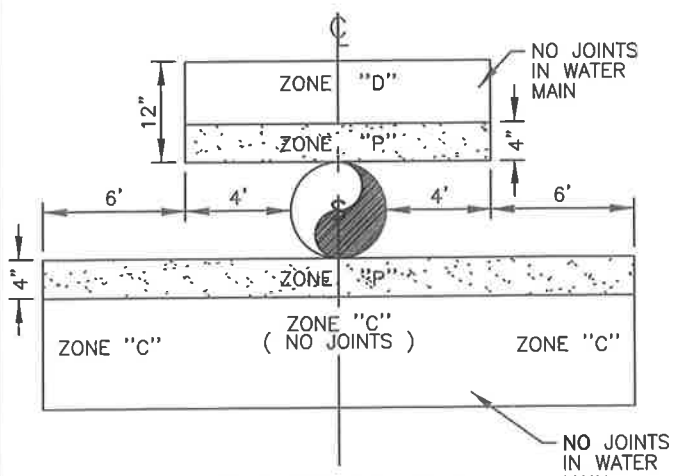
CASE 1
NEW SEWER CROSSING



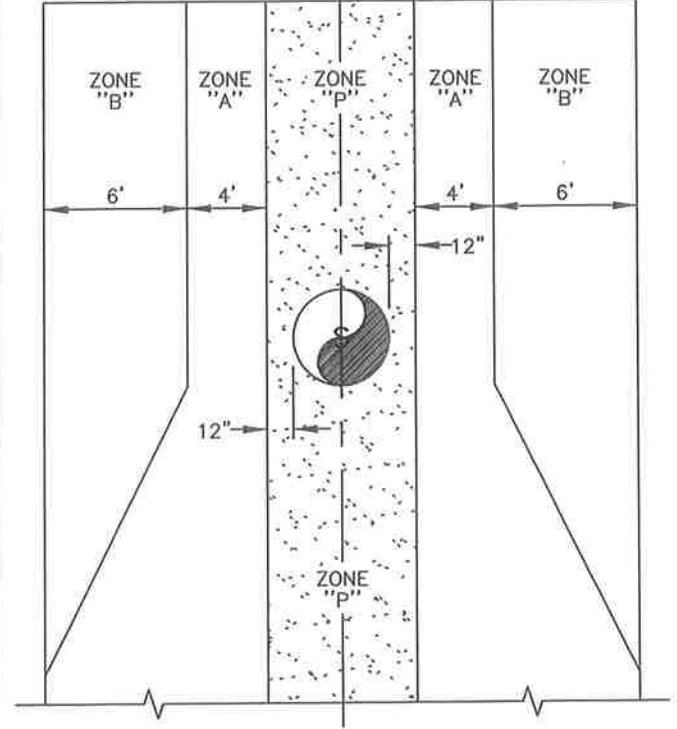
NEW SEWER PARALLEL CONSTRUCTION



CASE 2
NEW WATER MAIN CROSSING



NEW WATER MAIN PARALLEL CONSTRUCTION



SEE STD. DWG. P-3B FOR ZONE CONSTRUCTION CRITERIA.

INDIAN WELLS VALLEY WATER DISTRICT

<p>Renee E. Morquecho R.C.E. 79344</p>	<p>CRITERION FOR SEPARATION OF WATER MAINS AND SANITARY SEWERS</p>	<p>STANDARD DRAWING</p>
<p>CHIEF ENGINEER APPROVED March 12, 2012 DATE</p>		<p>P-3A</p>

CASE 1: NEW SEWER BEING INSTALLED

ZONE SPECIAL CONSTRUCTION REQUIRED FOR SEWER

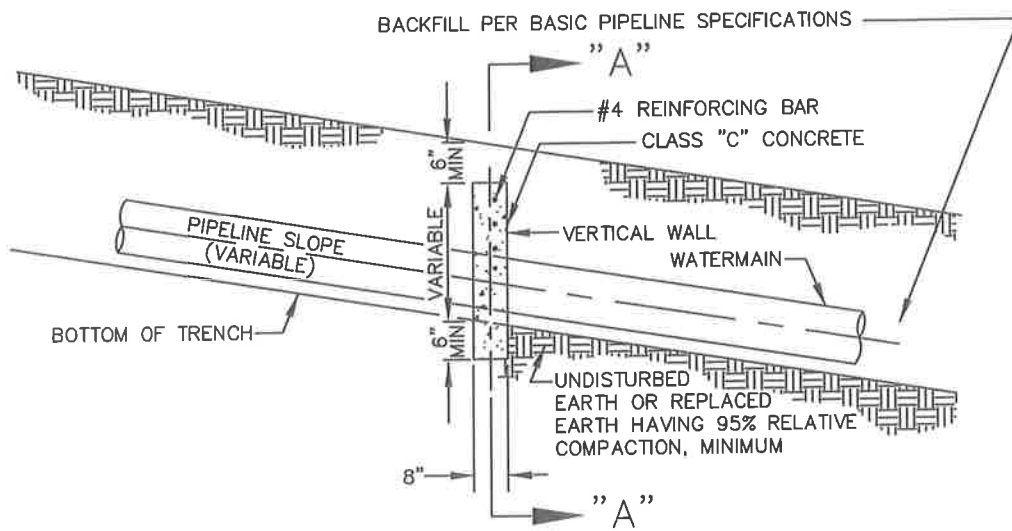
- A SEWER LINES PARALLEL TO WATER MAINS SHALL NOT BE PERMITTED IN THIS ZONE WITHOUT APPROVAL FROM THE STATE OF CALIFORNIA DEPARTMENT OF PUBLIC HEALTH AND THE WATER SUPPLIER.
- B A SEWER LINE PLACED PARALLEL TO A WATER LINE SHALL BE CONSTRUCTED OF:
 1. EXTRA STRENGTH VITRIFIED CLAY PIPE WITH COMPRESSION JOINTS.
 2. CLASS 4000, TYPE II, ASBESTOS-CEMENT PIPE WITH RUBBER GASKET JOINTS.
 3. PLASTIC SEWER PIPE WITH RUBBER RING JOINTS (PER ASTM D 3034) OR EQUIVALENT.
 4. CAST OR DUCTILE IRON PIPE WITH COMPRESSION JOINTS.
 5. REINFORCED CONCRETE PRESSURE PIPE WITH COMPRESSION JOINTS (PER AWWA C302-74).
- C A SEWER LINE CROSSING A WATER MAIN SHALL BE CONSTRUCTED OF:
 1. DUCTILE IRON PIPE WITH HOT DIP BITUMINOUS COATING AND MECHANICAL JOINTS.
 2. A CONTINUOUS SECTION OF CLASS 235 (DR 18 PER AWWA C900) PLASTIC PIPE OR EQUIVALENT, CENTERED OVER THE PIPE BEING CROSSED.
 3. A CONTINUOUS SECTION OF REINFORCED CONCRETE PRESSURE PIPE (PER AWWA C302-74) CENTERED OVER THE PIPE BEING CROSSED.
 4. ANY SEWER PIPE WITHIN A CONTINUOUS SLEEVE.
- D A SEWER LINE CROSSING A WATER MAIN SHALL BE CONSTRUCTED OF:
 1. A CONTINUOUS SECTION OF DUCTILE IRON PIPE WITH HOT-DIPPED BITUMINOUS COATING.
 2. A CONTINUOUS SECTION OF CLASS 235 (DR 18 PER AWWA C900) PLASTIC PIPE OR EQUIVALENT, CENTERED ON THE PIPE BEING CROSSED.
 3. A CONTINUOUS SECTION OF REINFORCED CONCRETE PRESSURE PIPE (PER AWWA C302-74) CENTERED ON THE PIPE BEING CROSSED.
 4. ANY SEWER PIPE WITHIN A CONTINUOUS SLEEVE.
 5. ANY SEWER PIPE SEPARATED BY A TEN FOOT, FOUR INCH THICK REINFORCED CONCRETE SLAB.
- P PROHIBITED CONSTRUCTION ZONE PER SECTION 64630 (E) (2) CALIFORNIA ADMINISTRATIVE CODE, TITLE 22.

CASE 2: NEW WATER MAINS BEING INSTALLED

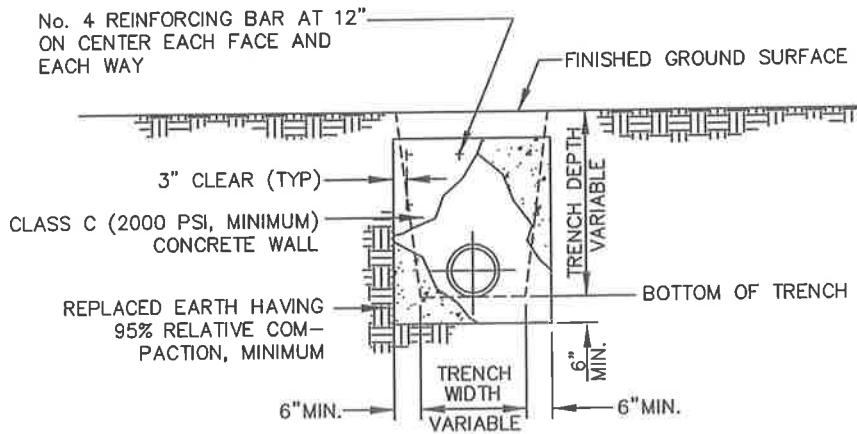
- A NO WATER MAINS PARALLEL TO SEWERS SHALL BE CONSTRUCTED WITHOUT APPROVAL FROM THE STATE OF CALIFORNIA DEPARTMENT OF PUBLIC HEALTH.
- B IF THE SEWER PARALLELING THE WATER MAIN DOES NOT MEET THE CASE 1, ZONE B, REQUIREMENTS, THE WATER MAIN SHALL BE CONSTRUCTED OF:
 1. DUCTILE IRON PIPE WITH HOT-DIPPED BITUMINOUS COATING.
 2. DIPPED AND WRAPPED ONE FOURTH INCH THICK WELDED STEEL PIPE.
 3. CLASS 235 PRESSURE RATED PLASTIC WATER PIPE (DR 18 PER AWWA C900) OR EQUIVALENT.
 4. REINFORCED CONCRETE PRESSURE PIPE, STEEL CYLINDER TYPE, (PER AWWA C300-74, OR C301-79, OR C303-70)
- C IF THE SEWER CROSSING THE WATER MAIN DOES NOT MEET THE CASE 1, ZONE C, REQUIREMENTS, THE WATER MAIN SHALL HAVE NO JOINTS IN ZONE C AND BE CONSTRUCTED OF:
 1. DUCTILE IRON PIPE WITH HOT-DIPPED BITUMINOUS COATING.
 2. DIPPED AND WRAPPED ONE FOURTH INCH THICK WELDED STEEL PIPE.
 3. CLASS 235 PRESSURE RATED PLASTIC WATER PIPE (DR 18 PER AWWA C900) OR EQUIVALENT.
 4. REINFORCED CONCRETE PRESSURE PIPE, STEEL CYLINDER TYPE (PER AWWA C300-74, OR C301-79, OR C303-70).
- D IF THE SEWER CROSSING THE WATER MAIN DOES NOT MEET THE REQUIREMENTS FOR ZONE D, CASE 1, THE WATER MAIN SHALL HAVE NO JOINTS WITHIN FOUR FEET FROM EITHER SIDE OF THE SEWER AND SHALL BE CONSTRUCTED OF:
 1. DUCTILE IRON PIPE WITH HOT-DIPPED BITUMINOUS COATING.
 2. DIPPED AND WRAPPED ONE FOURTH INCH THICK WELDED STEEL PIPE.
 3. CLASS 235 PRESSURE RATED PLASTIC WATER PIPE ((DR 18 PER AWWA C900) OR EQUIVALENT.
 4. REINFORCED CONCRETE PRESSURE PIPE, STEEL CYLINDER TYPE, PER AWWA (C300-74, OR C301-79, OR C303-70).
- P PROHIBITED CONSTRUCTION ZONE PER SECTION 64630 (E) (2) CALIFORNIA ADMINISTRATIVE CODE, TITLE 22.

INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	CRITERION FOR SEPARATION OF WATER MAINS AND SANITARY SEWERS	STD. DRAWING P-3B
<u>CHIEF ENGINEER</u> APPROVED <u>March 12, 2012</u> DATE		



PROFILE



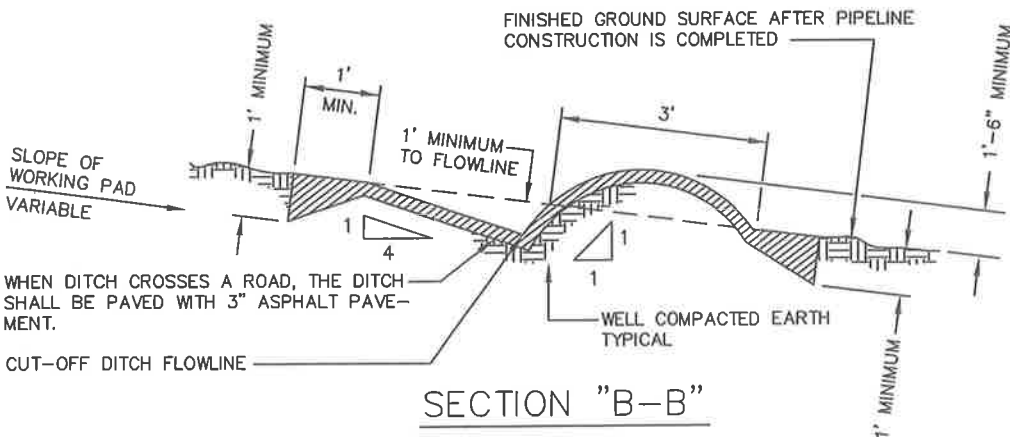
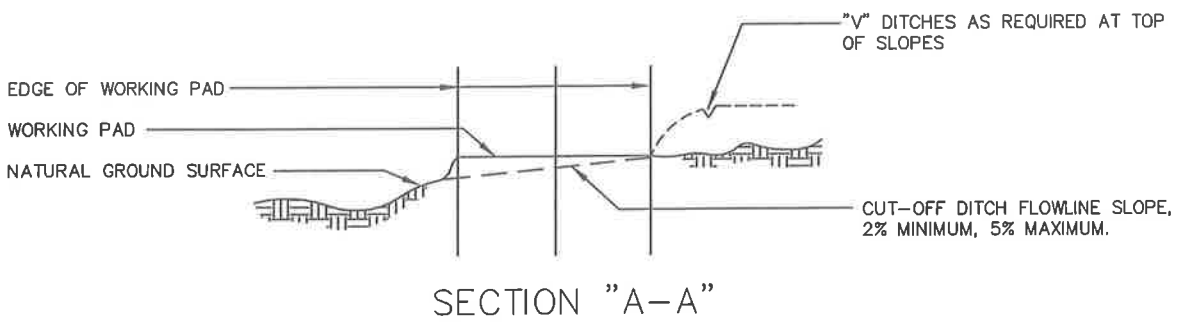
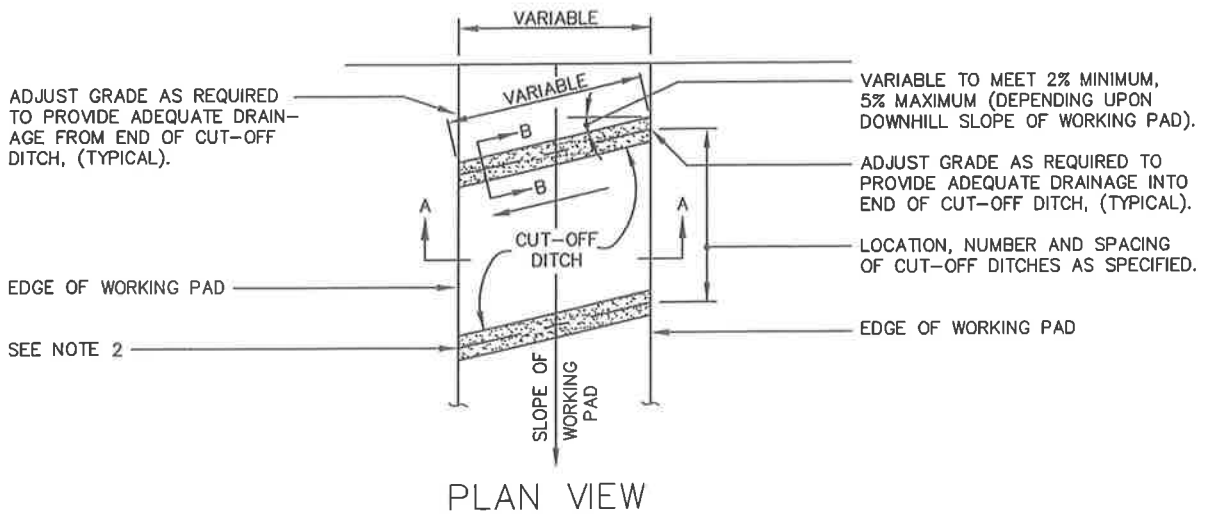
SECTION "A-A"

NOTES

- 1) SLOPE PROTECTION CUT-OFF WALLS TO BE INSTALLED WHERE SPECIFIED.
- 2) CONCRETE SHALL BE FORMED WITH TRIMMED EARTH, SANDBAGS OR LUMBER TO ACHIEVE REQUIRED CONFIGURATION.

INDIAN WELLS VALLEY WATER DISTRICT

<p>Renee E. Morquecho R.C.E. 79344</p>	<p>SLOPE PROTECTION CUT-OFF WALL</p>	<p>STANDARD DRAWING</p>
<p>CHIEF ENGINEER APPROVED March 12, 2012 DATE</p>		<p>P-4</p>

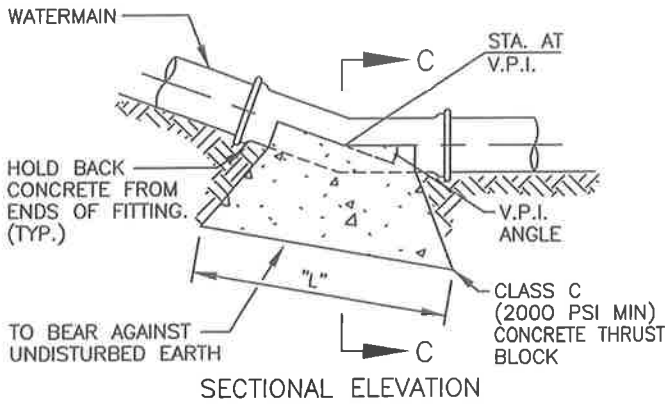


NOTES

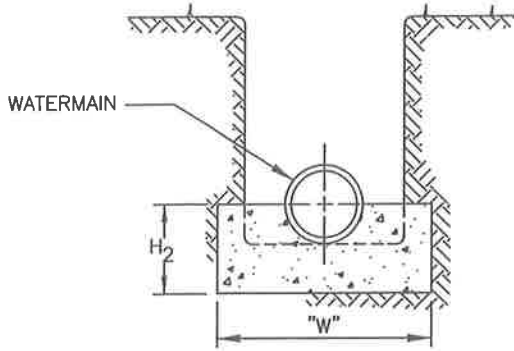
- 1) SLOPE PROTECTION CUT-OFF DITCHES TO BE INSTALLED WHERE SPECIFIED.
- 2) CUT-OFF DITCH DISCHARGE SHALL BE INTO GROUND PROTECTED FROM EROSION (ROCK OR VEGETATION) OR INTO NATURAL WATERWAYS. IF NONE OF THESE CONDITIONS EXIST, CUT-OFF DITCHES SHALL BE ALTERNATED FROM RIGHT TO LEFT.

INDIAN WELLS VALLEY WATER DISTRICT

<p>Renee E. Morquecho R.C.E. 79344</p>	<p>SLOPE PROTECTION CUT-OFF DITCH</p>	<p>STANDARD DRAWING</p>
<p>CHIEF ENGINEER APPROVED March 12, 2012 DATE</p>		<p>P-5</p>

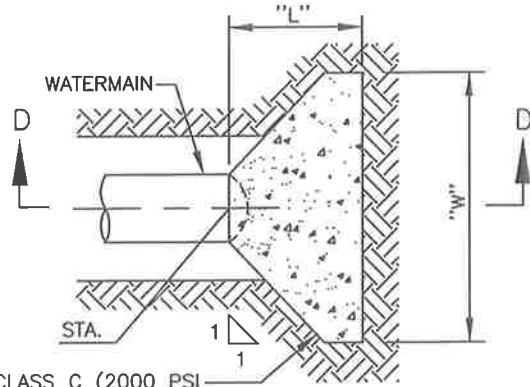


SECTIONAL ELEVATION

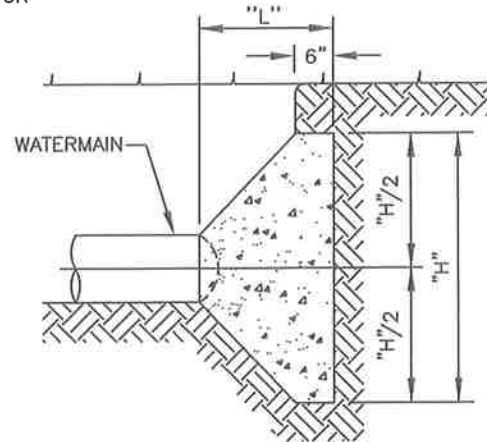


SECTION C-C
VERTICAL BEARER BLOCK

PIPE DIA.	"W"	"H ₂ "	"L"	V.P.I. ANGLE
4", 6" & 8"	2'-0"	1'-0"	1'-0"	5°-20'
	2'-0"	1'-0"	1'-0"	21°-40'
	2'-0"	1'-0"	1'-6"	41°-60'
10" & 12"	2'-0"	1'-0"	1'-6"	5°-20'
	2'-0"	1'-0"	2'-0"	21°-40'
14" & 16"	2'-6"	1'-6"	2'-0"	41°-60'
	2'-6"	1'-6"	2'-0"	5°-20'
	2'-6"	1'-6"	3'-0"	21°-40'
18" & 20"	3'-0"	1'-6"	2'-0"	41°-60'
	3'-0"	1'-6"	2'-6"	21°-40'
	3'-0"	1'-6"	3'-0"	5°-20'
24"	3'-0"	2'-0"	3'-0"	41°-60'
	3'-0"	2'-0"	4'-0"	21°-40'
	3'-0"	2'-0"	5'-0"	5°-20'
27"	3'-6"	2'-0"	3'-0"	41°-60'
	3'-6"	2'-0"	4'-0"	21°-40'
	3'-6"	2'-0"	6'-0"	5°-20'
30"	4'-0"	2'-6"	3'-0"	41°-60'
	4'-0"	2'-6"	5'-0"	21°-40'
	4'-0"	2'-6"	7'-0"	5°-20'
33"	4'-6"	3'-0"	3'-0"	41°-60'
	4'-6"	3'-0"	6'-0"	21°-40'
	4'-6"	3'-0"	8'-0"	5°-20'
36"	5'-0"	3'-6"	4'-0"	41°-60'
	5'-0"	3'-6"	6'-0"	21°-40'
	5'-0"	3'-6"	9'-0"	5°-20'



SECTIONAL PLAN
CLASS C (2000 PSI MIN) CONCRETE THRUST BLOCK



SECTION D-D
END THRUST BLOCK

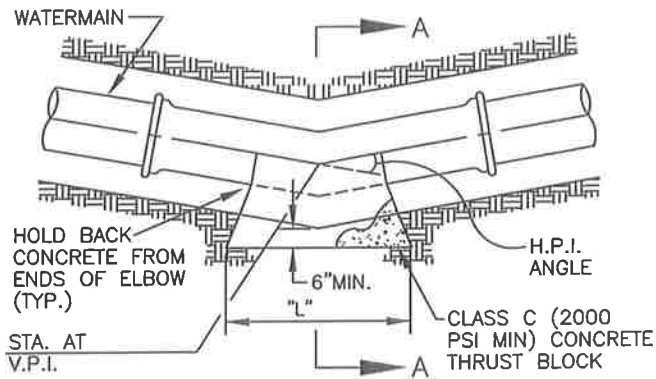
NOTES

- THRUST BLOCKS SHOWN HEREON ARE APPLICABLE TO WSP, ACP, PVC, AND DIP INSTALLATIONS.
- NO MIXING OF CONCRETE IN DITCH.

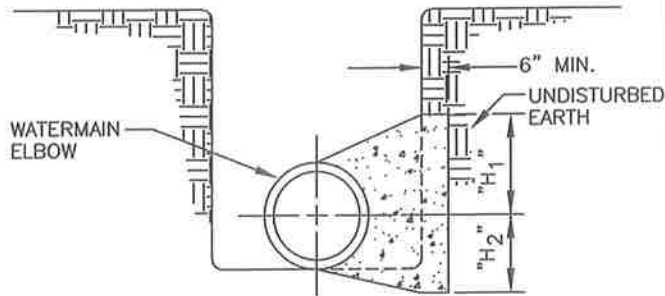
PIPE DIA.	"H"	"L"	"W"
4"	2'-0"	1'-0"	2'-4"
6"	2'-0"	1'-0"	2'-6"
8"	2'-6"	1'-0"	2'-8"
10"	3'-0"	1'-0"	2'-10"
12"	3'-3"	1'-4"	3'-8"
14"	3'-10"	1'-6"	4'-2"
16"	4'-3"	1'-6"	4'-3"
18"	4'-8"	1'-10"	5'-2"
20"	5'-0"	2'-0"	5'-8"
24"	5'-3"	2'-0"	6'-0"
27"	5'-6"	2'-0"	6'-3"
30"	5'-9"	2'-0"	6'-6"
33"	6'-0"	2'-0"	6'-9"
36"	6'-3"	2'-0"	7'-0"

INDIAN WELLS VALLEY WATER DISTRICT

Renee E. Morquecho R.C.E. 79344	THRUST BLOCK DETAIL (CLASS 235 OR LESS)	STANDARD DRAWING
CHIEF ENGINEER APPROVED March 12, 2012 DATE		P-6A



SECTIONAL PLAN

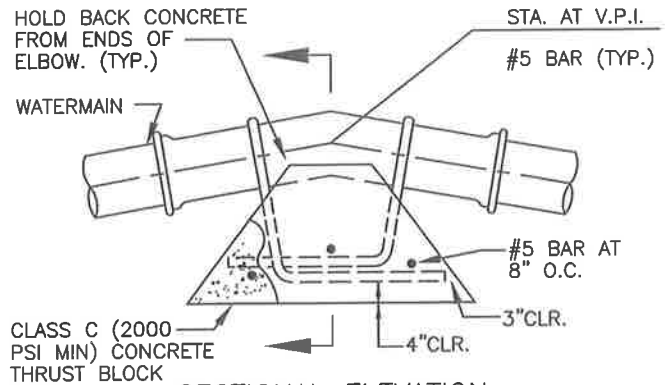


SECTION A-A
HORIZONTAL THRUST BLOCK

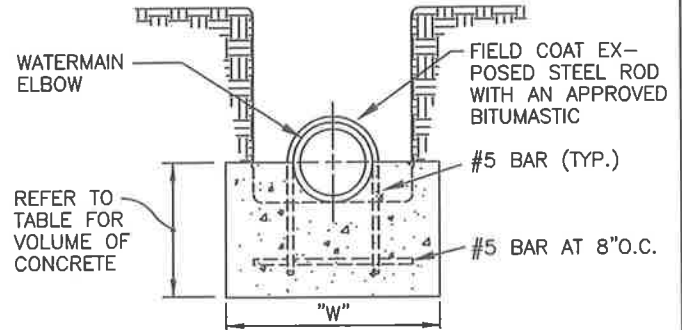
PIPE DIA.	"H ₁ "	"H ₂ "	"L"	H.P.I.
4", 6" & 8"	9"	9"	4'-0"	5°-40'
	1'-0"	1'-0"	4'-0"	41°-90'
10" & 12"	1'-0"	1'-0"	4'-0"	5°-60'
	2'-0"	1'-0"	4'-0"	61°-90'
14" & 16"	2'-0"	1'-0"	5'-0"	5°-60'
	3'-0"	1'-6"	6'-0"	61°-90'
18" & 20"	3'-0"	1'-6"	6'-0"	5°-60'
	4'-0"	2'-0"	8'-0"	61°-90'
24"	3'-0"	1'-6"	6'-0"	5°-30'
	4'-0"	2'-0"	8'-0"	31°-60'
	4'-0"	2'-0"	10'-0"	61°-90'
27"	3'-6"	1'-9"	6'-0"	5°-30'
	4'-0"	2'-0"	8'-0"	31°-60'
	4'-0"	2'-0"	10'-0"	61°-90'
30"	4'-0"	2'-0"	6'-0"	5°-30'
	4'-0"	2'-0"	10'-0"	31°-60'
	4'-0"	2'-0"	12'-0"	61°-90'
33"	4'-0"	2'-0"	8'-0"	5°-30'
	4'-0"	2'-0"	10'-0"	31°-60'
	4'-0"	2'-0"	14'-0"	61°-90'
36"	4'-0"	2'-0"	8'-0"	5°-30'
	5'-0"	2'-6"	12'-0"	31°-60'
	5'-0"	2'-6"	16'-0"	61°-90'

NOTES

- THRUST BLOCKS SHOWN HEREON ARE APPLICABLE TO WSP, ACP, PVC & DIP INSTALLATIONS.
- NO MIXING OF CONCRETE IN DITCH



SECTIONAL ELEVATION

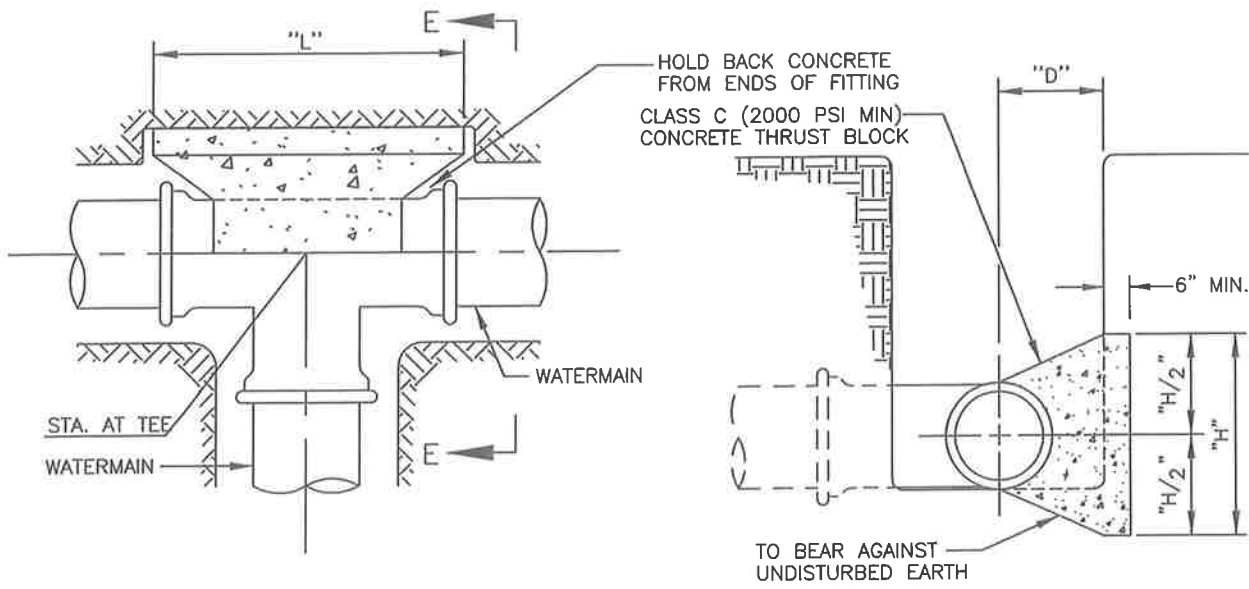


SECTION B-B
VERTICAL ANCHOR BLOCK

PIPE DIA.	"W"	VOL., C.F.	GRADE % DIFF.
4", 6" & 8"	2'-0"	12.0	5°-20'
	2'-0"	26.0	21°-40'
	2'-0"	40.0	41°-60'
10" & 12"	2'-6"	20.0	5°-20'
	2'-6"	35.0	21°-40'
	2'-6"	50.0	41°-60'
14" & 16"	3'-0"	26.0	5°-20'
	3'-0"	53.0	21°-40'
	3'-0"	80.0	41°-60'
18" & 20"	3'-6"	35.0	5°-20'
	3'-6"	60.0	21°-40'
	3'-6"	85.0	41°-60'
24"	4'-0"	54.0	5°-20'
	4'-0"	90.0	21°-40'
	4'-0"	126.0	41°-60'
27"	4'-6"	63.0	5°-20'
	4'-6"	108.0	21°-40'
	4'-6"	153.0	41°-60'
30"	5'-0"	72.0	5°-20'
	5'-0"	126.0	21°-40'
	5'-0"	180.0	41°-60'
33"	5'-6"	81.0	5°-20'
	5'-6"	144.0	21°-40'
	5'-6"	207.0	41°-60'
36"	6'-0"	90.0	5°-20'
	6'-0"	162.0	21°-40'
	6'-0"	234.0	41°-60'

INDIAN WELLS VALLEY WATER DISTRICT

Renee E. Morquecho R.C.E. 79344	THRUST BLOCK DETAIL (CLASS 235 OR LESS)	STANDARD DRAWING
CHIEF ENGINEER APPROVED March 12, 2012 DATE		P-6B



SECTIONAL PLAN

SECTION E-E

TEE THRUST BLOCK

PIPE DIA.*	"H"	"L"	"D"
4"	2'-0"	2'-4"	1'-0"
6"	2'-0"	2'-6"	1'-0"
8"	2'-6"	2'-8"	1'-0"
10"	3'-0"	2'-10"	1'-0"
12"	3'-3"	3'-4"	1'-4"
14"	3'-10"	4'-2"	1'-6"
16"	4'-3"	4'-3"	1'-6"
18"	4'-8"	4'-10"	1'-10"
20"	5'-0"	5'-8"	2'-0"
24"	5'-3"	6'-0"	2'-0"
27"	5'-6"	6'-3"	2'-0"
30"	5'-9"	6'-6"	2'-0"
33"	6'-0"	6'-9"	2'-0"
36"	6'-3"	7'-0"	2'-0"

* OUTLET PIPE DIAMETER

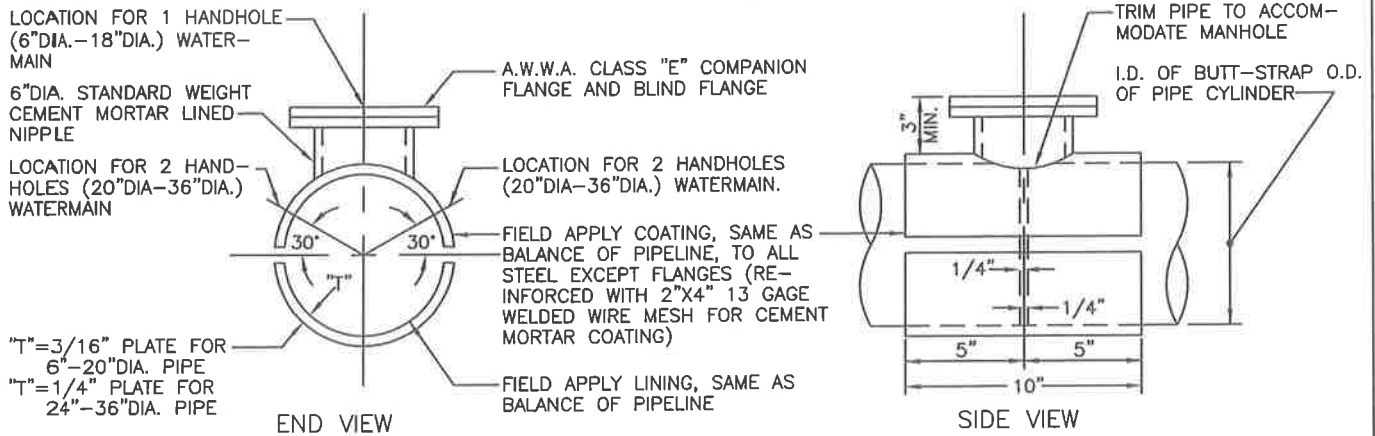
NOTES

- THRUST BLOCK SHOWN HEREON IS APPLICABLE TO WSP, ACP, PVC AND DIP INSTALLATIONS.
- HOLD CONCRETE BACK FROM BOLTS ON CROSSES, TEES, VALVES, AND ELBOWS USING PLASTIC SHEETING BETWEEN BOLTS AND CONCRETE.

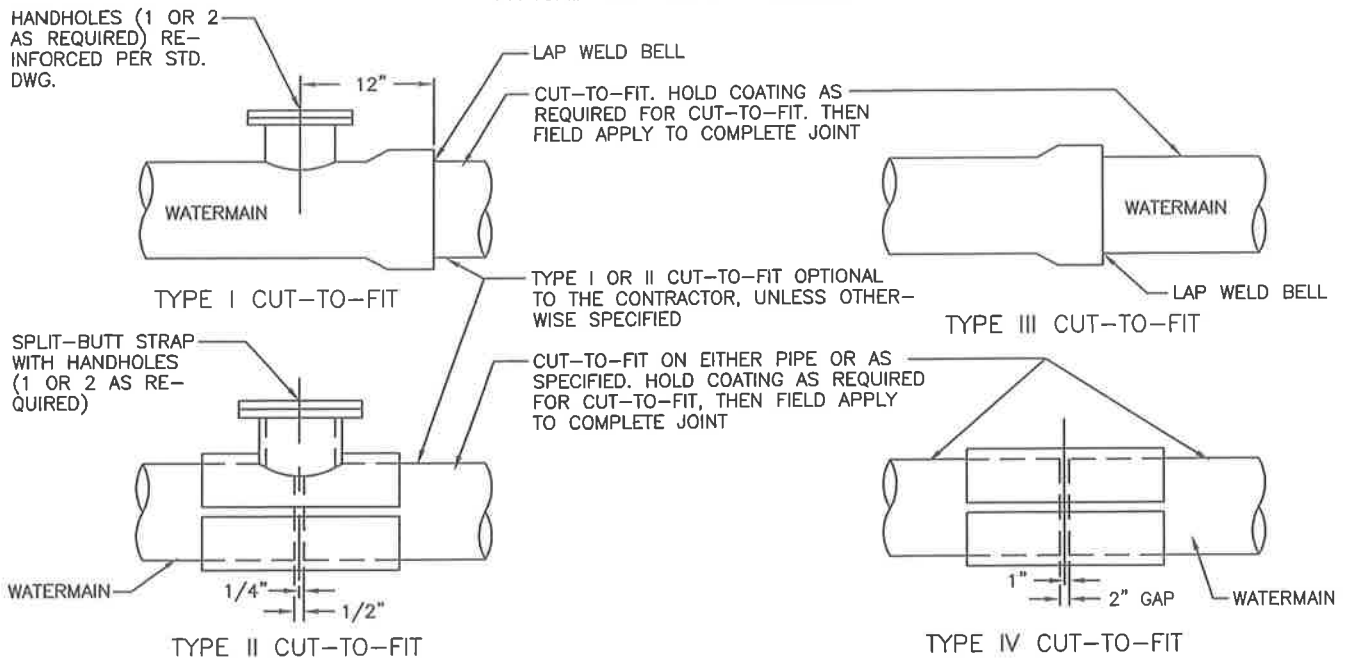
INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	THRUST BLOCK DETAIL (CLASS 235 OR LESS)	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED <u>March 12, 2012</u> DATE		P-6C

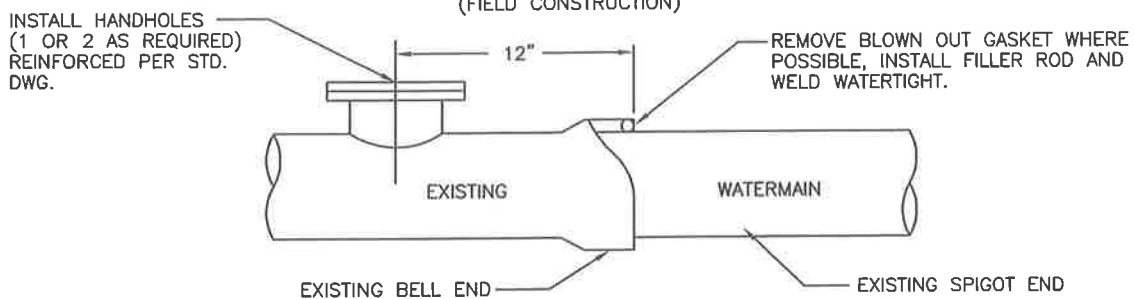
TYPICAL BUTT STRAP WITH HANDHOLES



TYPICAL CUT-TO-FIT DETAILS



TYPICAL FIELD JOINT REPAIR DETAIL (FIELD CONSTRUCTION)



INDIAN WELLS VALLEY WATER DISTRICT

<p>Renee E. Morquecho R.C.E. 79344</p>	<p>STEEL PIPE JOINT DETAILS</p>	<p>STANDARD DRAWING</p>
<p>CHIEF ENGINEER APPROVED March 12, 2012 DATE</p>		<p>P-8</p>

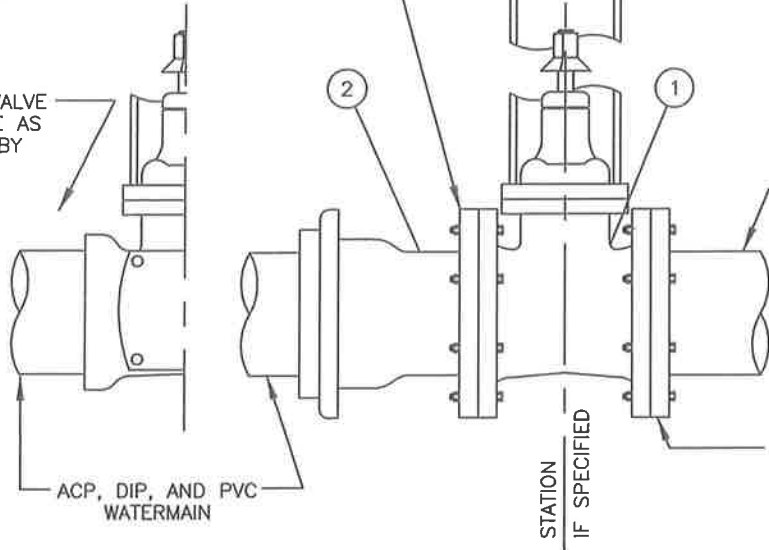
IMPROVED GROUND SURFACE

FINISHED UNIMPROVED GROUND SURFACE

FLANGED COUPLING ADAPTER FOR ACP, DIP, AND PVC AND WHERE REQ'D. BY PLANS TO MATE FLANGED VALVE.

8" PVC VALVE BOX INSTALLATION PER STD. DWG. P-11 OR P-11A

HUB END VALVE ALTERNATIVE AS APPROVED BY DISTRICT



WELDED STEEL WATERMAIN

ACP, DIP, AND PVC WATERMAIN

STATION
IF SPECIFIED

AWWA CLASS "E" FLANGE REQUIRED FOR WELDED STEEL PIPE

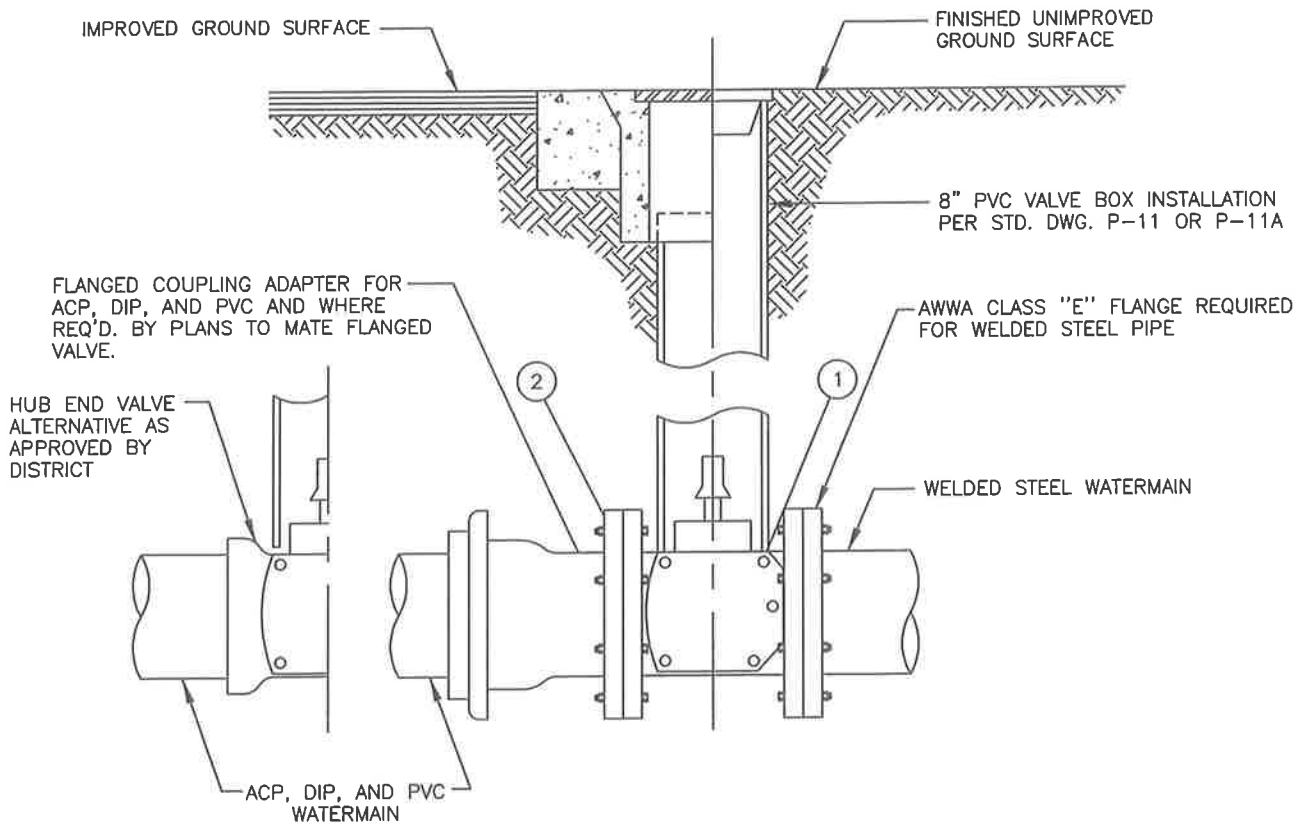
ITEM	NO. REQ'D.	DESCRIPTION	APPROVED MATERIALS LIST No.
1	1	AWWA C509 GATE VALVE WITH DUCTILE IRON BODY AND RESILIENT SEAT. VALVE STEM SHALL BE NON-RISING WITH 2" SQUARE OPERATING NUT AND SHALL TURN COUNTER-CLOCKWISE TO OPEN. VALVES SHALL HAVE "O" RING SEALS AND NON-SHOCK COLD WATER WORKING PRESSURE OF 200 P.S.I.	B-01
2	1	FLANGED COUPLING ADAPTER REQUIRED FOR ACP, DIP AND PVC WATERMAIN.	H-02
-	-	FLANGE BOLTS, NUTS, AND GASKETS AS REQUIRED	H-04 H-06-2

NOTES

- 1) SPRAY OR PAINT STEEL, CAST IRON, BRONZE AND OTHER METALLIC COMPONENTS (INCLUDING NUTS AND BOLTS) WITH A THICK COAT OF AN APPROVED BITUMASTIC. REPLACE ALL REMOVED WRAP OR COATING TO A THICKNESS, DENSITY, AND QUALITY EQUAL TO OR BETTER THAN THE ORIGINAL COATING.

INDIAN WELLS VALLEY WATER DISTRICT

Renee E. Morquecho R.C.E. 79344	GATE VALVE INSTALLATION DETAIL (WATERMAIN DIAMETER SMALLER THAN 12")	STANDARD DRAWING
CHIEF ENGINEER APPROVED March 12, 2012 DATE		P-9



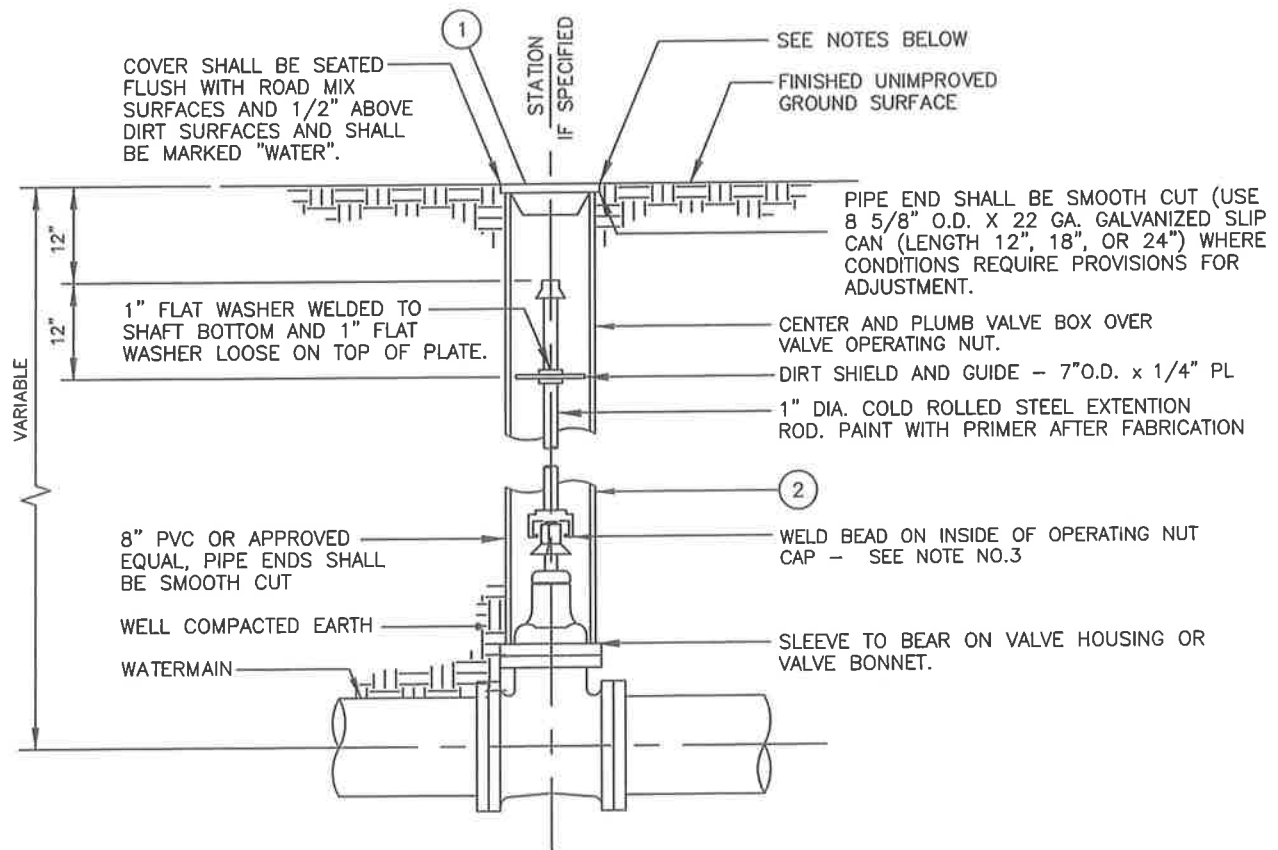
ITEM	NO. REQ'D.	DESCRIPTION	APPROVED MATERIALS LIST No.
1	1	AWWA C504 FLANGED BUTTERFLY VALVE, SHORT BODY. VALVE STEM SHALL TURN COUNTER-CLOCKWISE TO OPEN. VALVE SHALL BE LOCATED SO THAT OPERATOR AND OPERATING NUT ARE SITUATED ON STREET OR EASEMENT CENTERLINE SIDE OF VALVE.	B-02
2	1	FLANGED COUPLING ADAPTER REQUIRED FOR ACP, DIP, AND PVC WATERMAIN.	H-02
-	-	FLANGE BOLTS, NUTS, AND GASKETS AS REQUIRED	H-04 H-06-2

NOTES

- 1) SPRAY OR PAINT STEEL, CAST IRON, BRONZE AND OTHER METALLIC COMPONENTS (INCLUDING NUTS AND BOLTS) WITH A THICK COAT OF AN APPROVED BITUMASTIC. REPLACE ALL REMOVED WRAP OR COATING TO A THICKNESS, DENSITY, AND QUALITY EQUAL TO OR BETTER THAN THE ORIGINAL COATING.

INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	BUTTERFLY VALVE INSTALLATION DETAIL (WATERMAIN DIAMETER 12" AND LARGER)	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED <u>March 12, 2012</u> DATE		P-10



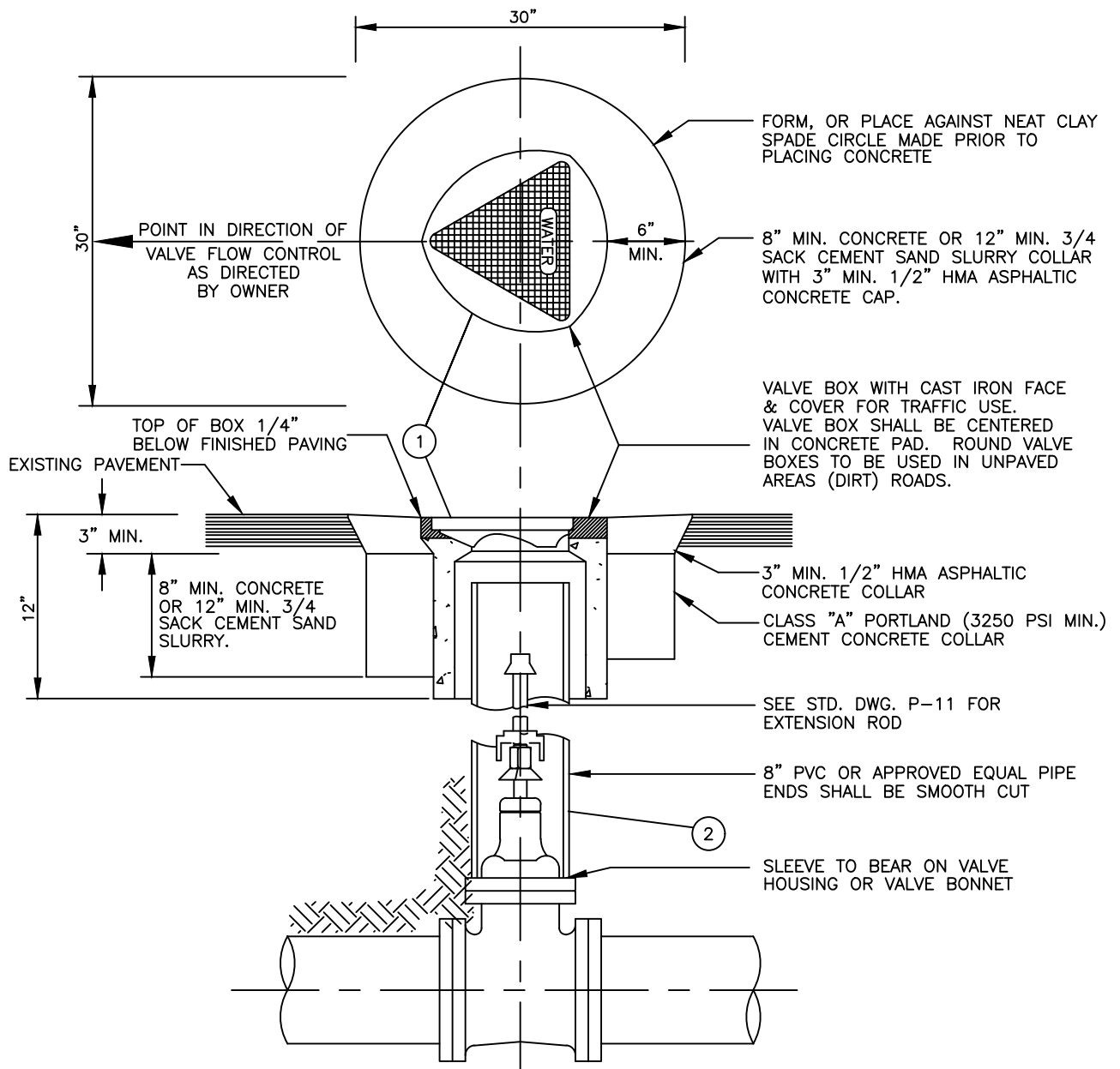
ITEM	NO. REQ'D.	DESCRIPTION	APPROVED MATERIALS LIST No.
1	1	CAST IRON COVER PAINTED PER DISTRICT APPROVED PAINT SYSTEM.	E-09
2	-	8" I.D. AWWA C900, CLASS 165 PVC PIPE.	A-04

NOTES

- 1) CONSTRUCT VALVE BOX PER STD. DWG. P-11A FOR ALL STREETS WHICH ARE PAVED WITH ASPHALTIC CONCRETE (HOT MIX).
- 2) EXTENSION ROD REQUIRED WHENEVER TOP OF VALVE IS 3' OR MORE BELOW FINISHED GROUND SURFACE. WHEN EXTENSION IS REQUIRED, OPERATING NUT SHALL BE 12" BELOW TOP OF COVER OR TRAFFIC BOX. REQUIRED LENGTH FOR EXTENSION SHALL BE DETERMINED BY FIELD MEASUREMENT.
- 3) EXTENSION ROD SHALL BE ATTACHED TO VALVE OPERATING NUT BY WELDING SMALL BEAD AROUND INSIDE OF OPERATING NUT CAP 1/2" TO 3/4" FROM END. EXTENSION ROD SHALL BE DRIVEN ON OPERATING NUT TO PRODUCE A TIGHT FRICTION FIT.

INDIAN WELLS VALLEY WATER DISTRICT

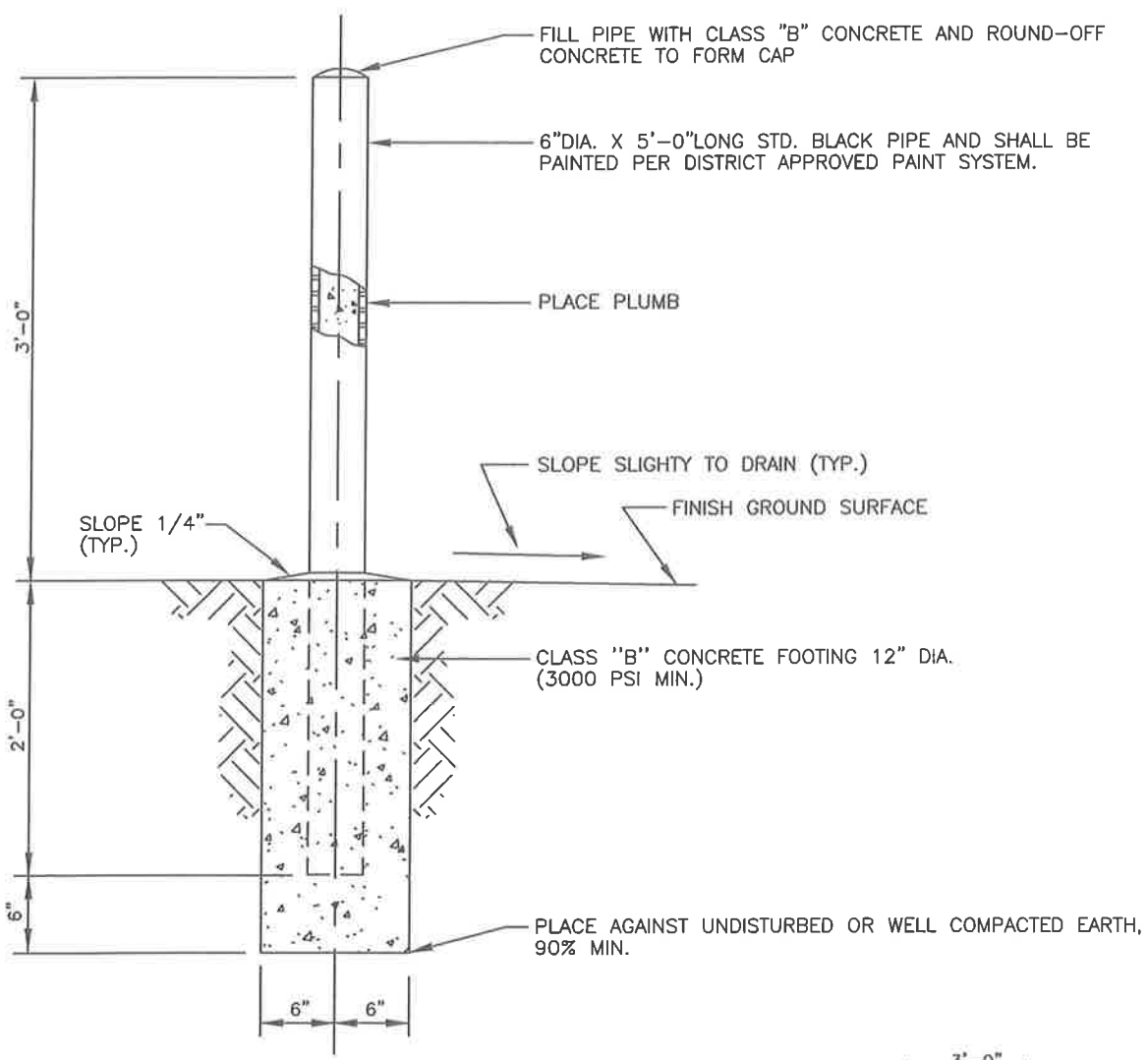
<u>Renee E. Morquecho</u> R.C.E. 79344	VALVE BOX INSTALLATION DETAIL (UNPAVED STREETS)	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED <u>March 12, 2012</u> DATE		P-11



ITEM	NO. REQ'D.	DESCRIPTION	APPROVED MATERIALS LIST No.
1	1	TRAFFIC BOX COVER MARKED "WATER". COVERS FOR FIRE HYDRANT INSTALLATIONS SHALL BE PAINTED PER DISTRICT APPROVED PAINT SYSTEMS.	E-04
2	1	8" I.D. AWWA C900, CLASS 165 PVC PIPE.	A-04

INDIAN WELLS VALLEY WATER DISTRICT

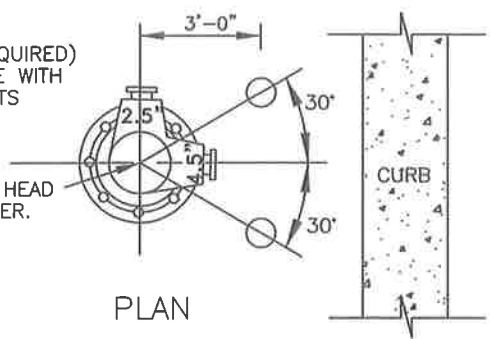
<u>Renee E. Morquecho</u> SUBMITTED R.C.E. 79344	VALVE BOX INSTALLATION DETAIL	STANDARD DRAWING P-11A
<u>BOARD OF DIRECTORS</u> APPROVED <u>March 12, 2012</u> DATE		



SECTION

GUARD POSTS (IF REQUIRED) SHALL NOT INTERFERE WITH HYDRANT OUTLETS

CENTER HYDRANT HEAD OR AIR VALVE RISER.



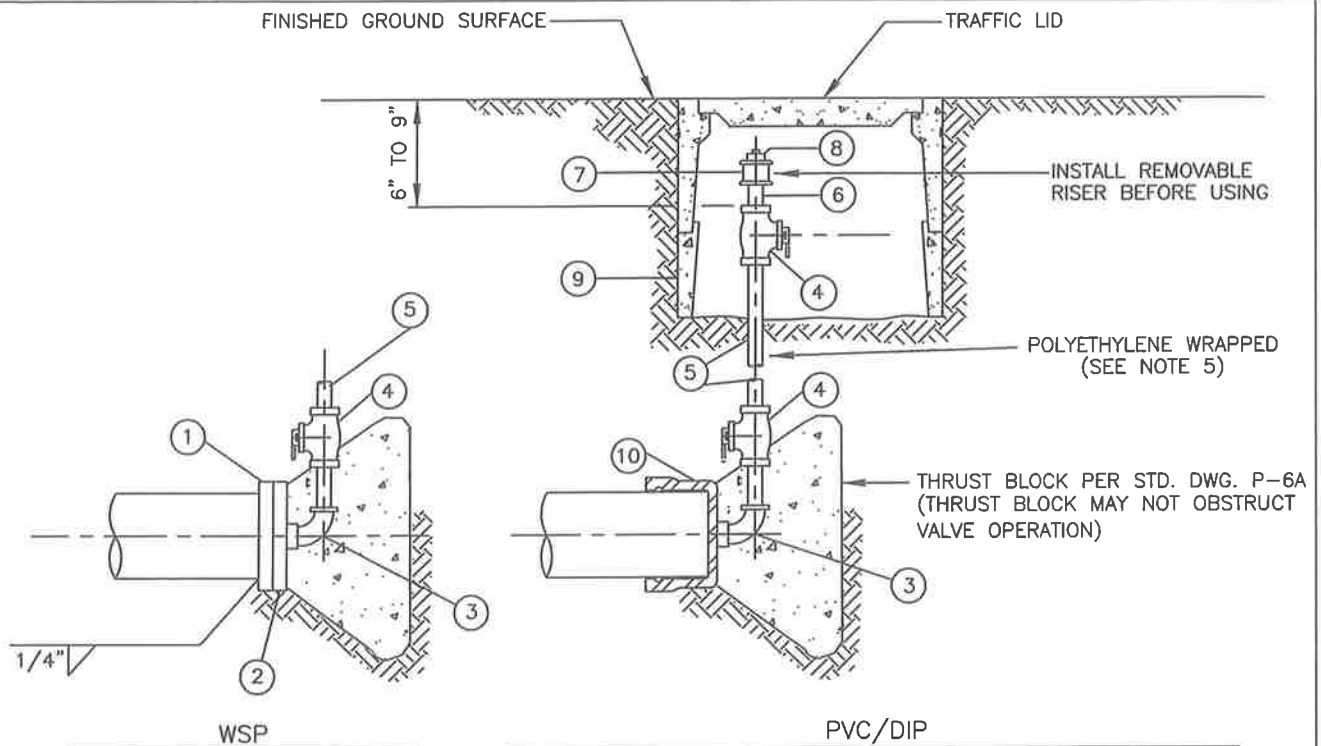
PLAN

NOTE

ALL GUARD POSTS SHALL BE LOCATED PER THE DETAIL OF THE APPURTENANCE PROTECTED OR AS SPECIFIED BY THE DISTRICT

INDIAN WELLS VALLEY WATER DISTRICT

<p>Renee E. Morquecho R.C.E. 79344</p>	<p>GUARD POST INSTALLATION DETAIL</p>	<p>STANDARD DRAWING</p>
<p>CHIEF ENGINEER APPROVED March 12, 2012 DATE</p>		<p>P-12</p>



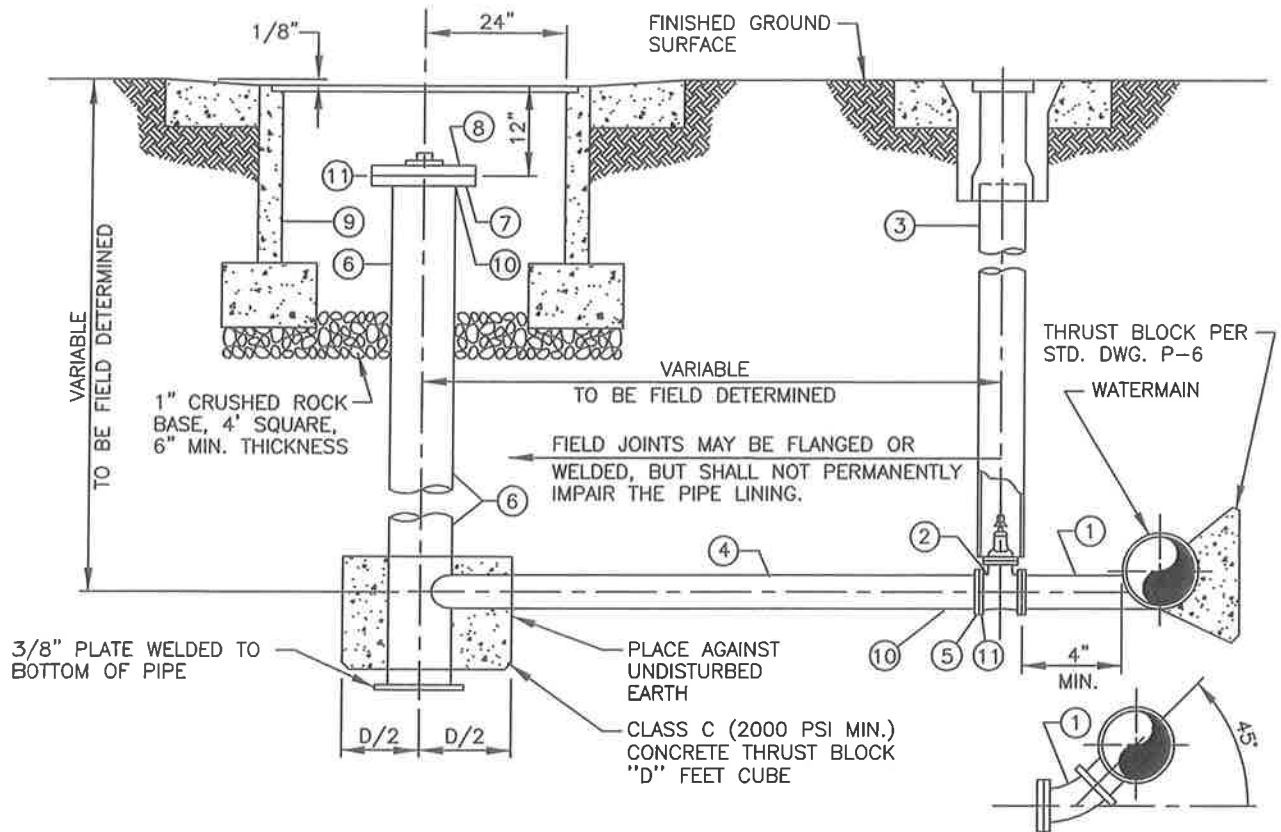
ITEM	NO. REQ'D.	DESCRIPTION	APPROVED MATERIALS LIST No.
1	1	AWWA CLASS E FLANGE	C-01
2	1	AWWA CLASS E BLIND FLANGE WITH 2 1/2" THREADED TAP	C-03
3	1	2 1/2" THREADED NIPPLE, 2 1/2" COUPLING, 2 1/2"x 2" NYLON INSULATING BUSHING AND 2"x 90° STREET ELL.	D-06 H-22
4	1	2" WING LOCK BALL VALVE WITH THREADED ENDS (LEAD FREE).	B-17
5	1	2" COPPER OR BRASS PIPE	A-05 A-06-2
6	1	2" BRASS NIPPLE (THREADED BOTH ENDS)	D-06
7	1	2" BRASS COUPLING	D-06
8	1	2" BRASS PLUG	D-06
9	1	CONCRETE METER BOX	E-06
10	1	END CAP FOR PVC, ACP, OR DIP WITH 2 1/2" TAP	H-18
-	-	FLANGE BOLTS, NUTS, AND GASKETS AS REQUIRED (SEE NOTE 6)	H-04 H-06-2

NOTES

- 1) PIPE THREADS SHALL BE CLEAN AND SHARP AND SEALED WITH AN APPROVED JOINT COMPOUND.
- 2) PAINT COVER PER DISTRICT APPROVED PAINT SYSTEM.
- 3) LOCATE INSIDE OF STREET IF DIRECTED BY DISTRICT. INSTALL ADDITIONAL PIPING AS NECESSARY
- 4) LEAD FREE SOLDER.
- 5) DUCTILE IRON, COPPER, AND BRASS PIPE SHALL BE POLYETHYLENE WRAPPED WITH A 2" WIDE PLASTIC BACKED ADHESIVE TAPE. 60% LAPPED.
- 6) SPRAY OR PAINT STEEL, CAST IRON, BRONZE AND OTHER METALLIC COMPONENTS (INCLUDING NUTS AND BOLTS) WITH A THICK COAT OF AN APPROVED BITUMASTIC. REPLACE ALL REMOVED WRAP OR COATING TO A THICKNESS, DENSITY, AND QUALITY EQUAL TO OR BETTER THAN THE ORIGINAL COATING.

INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	2" DIA. BLOWOFF INSTALLATION DETAIL (FOR DEAD ENDS)	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED <u>March 12, 2012</u> DATE		P-13



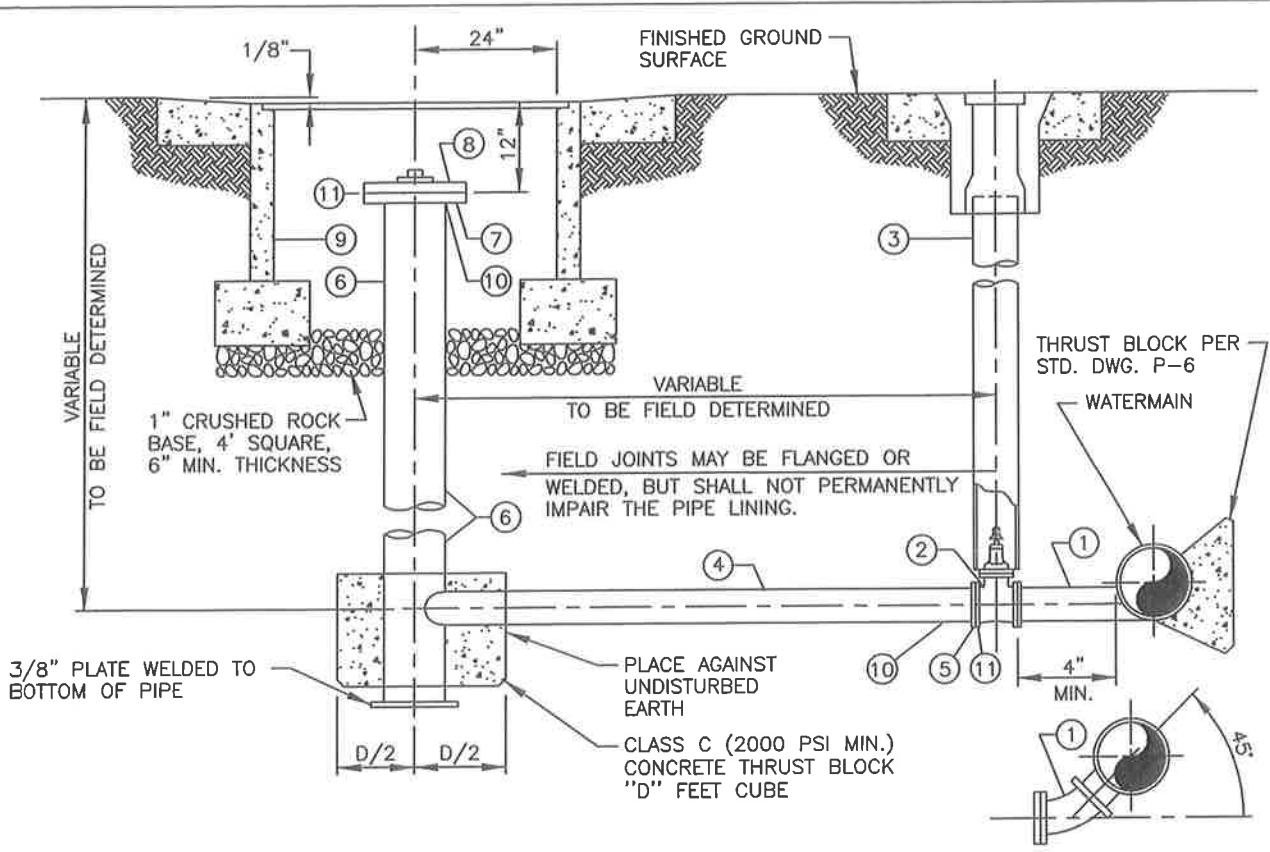
ITEM	No. REQ'D.	DESCRIPTION	APPROVED MATERIALS LIST No.
1	1	FLANGED TANGENTIAL SIDE OUTLET ON STEEL WATERMAIN OR HUB X HUB X FLANGED DUCTILE IRON TEE WITH FLANGED DUCTILE IRON 45° ELL ON ACP, PVC OR DIP WATERMAIN SIZE AS SPECIFIED.	N/A
2	1	FLANGED GATE VALVE PER STD. DWG. P-9 OR FLANGED BUTTERFLY VALVE PER STD. DWG. P-10.	-
3	1	STANDARD VALVE BOX INSTALLATION PER STD. DWG. P-11 OR P-11A.	-
4	1	10 GA. PIPE, CML & CMC SIZE AND LENGTH AS SPECIFIED.	D-01
5	VARIABLE	AWWA CLASS "E" FLANGE. REDUCING FLANGE OR REDUCER, IF REQUIRED.	C-01 OR C-02
6	1	10 GA. STEEL PUMPER WELL, CML & CMC SAME SIZE AS ITEM 4 ABOVE OR 8-5/8" MIN. O.D., WHICHEVER IS GREATER.	A-01 D-01
7	1	AWWA CLASS "E" FLANGE (8" MIN. DIA.).	C-01
8	1	AWWA CLASS "E" BLIND FLANGE WITH 2" THREADED TAP AND BRASS PLUG.	C-03
9	1	BLOWOFF VAULT PER STD. DWG. P-30	E-08
10	2	PROVIDE 2' CUT-TO-FIT, SHIP FLANGE LOOSE	-
11	-	FLANGE BOLTS, NUTS, AND GASKETS AS REQUIRED	H-04 H-06-2

NOTE

1) INSTALL 2-GUARD POSTS PER STD. DWG. P-12 AS SPECIFIED.

INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	4" - 12" BLOWOFF INSTALLATION DETAIL (CLASS 235 AND LESS)	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED <u>March 12, 2012</u> DATE		P-14



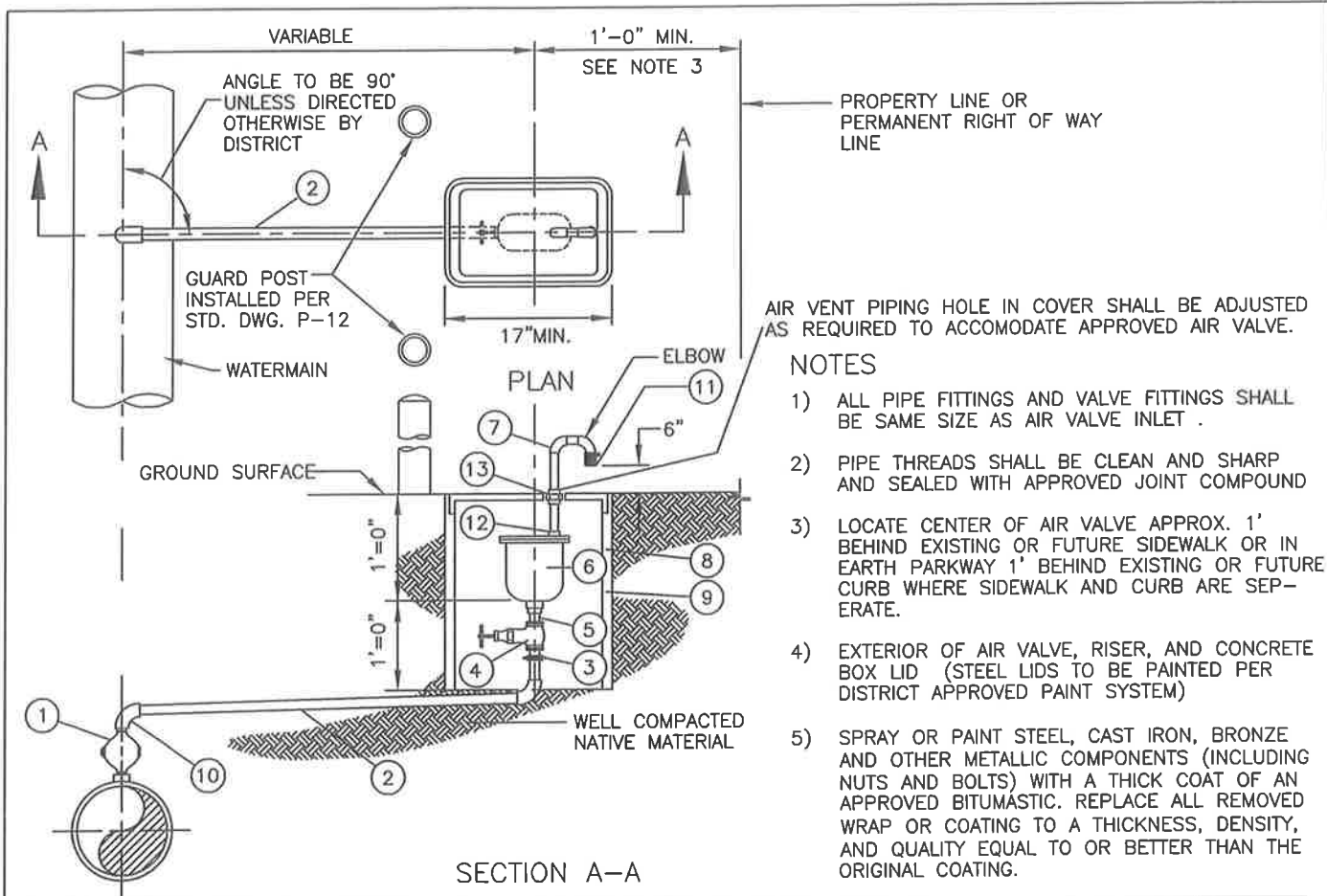
ITEM	No. REQ'D.	DESCRIPTION	APPROVED MATERIALS LIST No.
1	1	FLANGED TANGENTIAL SIDE OUTLET ON STEEL WATERMAIN OR HUB X HUB X FLANGED DUCTILE IRON TEE WITH FLANGED DUCTILE IRON 45° ELL ON ACP, PVC OR DIP WATERMAIN SIZE AS SPECIFIED.	N/A
2	1	FLANGED GATE VALVE PER STD. DWG. P-9 OR FLANGED BUTTERFLY VALVE PER STD. DWG. P-10.	-
3	1	STANDARD VALVE BOX INSTALLATION PER STD. DWG. P-11 OR P-11A.	-
4	1	10 GA. PIPE, CML & CMC SIZE AND LENGTH AS SPECIFIED.	D-01
5	VARIES	AWWA CLASS "E" FLANGE. REDUCING FLANGE OR REDUCER, IF REQUIRED.	C-01 OR C-02
6	1	10 GA. STEEL PUMPER WELL, CML & CMC SAME SIZE AS ITEM 4 ABOVE OR 8-5/8" MIN. O.D., WHICHEVER IS GREATER.	A-01 D-01
7	1	AWWA CLASS "E" FLANGE (8" MIN. DIA.).	C-01
8	1	AWWA CLASS "E" BLIND FLANGE WITH 2" THREADED TAP AND BRASS PLUG.	C-03
9	1	BLOWOFF VAULT PER STD. DWG. P-30	E-08
10	2	PROVIDE 2' CUT-TO-FIT, SHIP FLANGE LOOSE	-
11	-	FLANGE BOLTS, NUTS, AND GASKETS AS REQUIRED	H-04 H-06-2

NOTE

1) INSTALL 2-GUARD POSTS PER STD. DWG. P-12 AS SPECIFIED.

INDIAN WELLS VALLEY WATER DISTRICT

Renee E. Morquecho R.C.E. 79344 CHIEF ENGINEER APPROVED March 12, 2012 DATE	4" - 12" BLOWOFF INSTALLATION DETAIL (CLASS 235 AND LESS)	STANDARD DRAWING P-14
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AIR VENT PIPING HOLE IN COVER SHALL BE ADJUSTED AS REQUIRED TO ACCOMODATE APPROVED AIR VALVE.

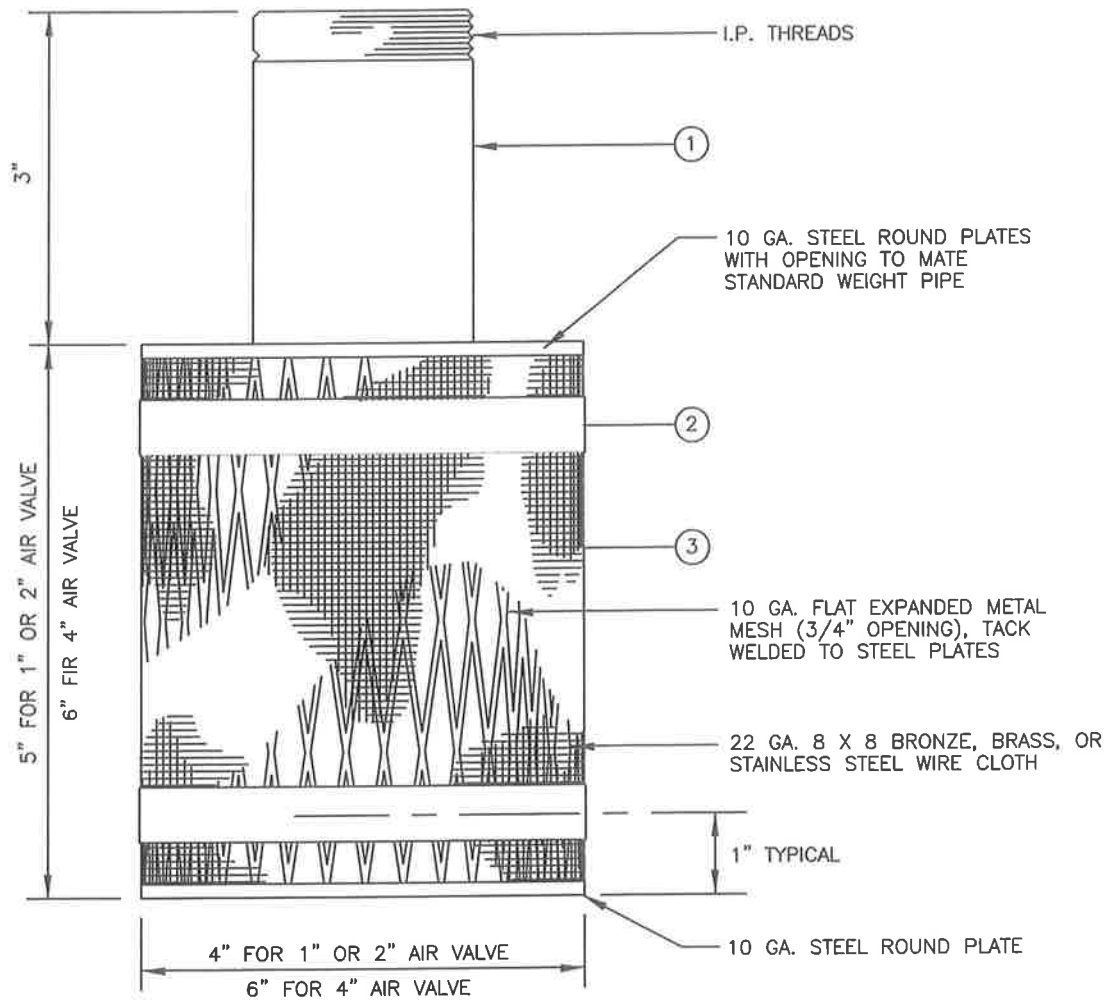
NOTES

- 1) ALL PIPE FITTINGS AND VALVE FITTINGS SHALL BE SAME SIZE AS AIR VALVE INLET .
- 2) PIPE THREADS SHALL BE CLEAN AND SHARP AND SEALED WITH APPROVED JOINT COMPOUND
- 3) LOCATE CENTER OF AIR VALVE APPROX. 1' BEHIND EXISTING OR FUTURE SIDEWALK OR IN EARTH PARKWAY 1' BEHIND EXISTING OR FUTURE CURB WHERE SIDEWALK AND CURB ARE SEPARATE.
- 4) EXTERIOR OF AIR VALVE, RISER, AND CONCRETE BOX LID (STEEL LIDS TO BE PAINTED PER DISTRICT APPROVED PAINT SYSTEM)
- 5) SPRAY OR PAINT STEEL, CAST IRON, BRONZE AND OTHER METALLIC COMPONENTS (INCLUDING NUTS AND BOLTS) WITH A THICK COAT OF AN APPROVED BITUMASTIC. REPLACE ALL REMOVED WRAP OR COATING TO A THICKNESS, DENSITY, AND QUALITY EQUAL TO OR BETTER THAN THE ORIGINAL COATING.

ITEM	NO. REQ'D.	DESCRIPTION	APPROVED MATERIALS LIST No.
1	1	VERTICAL OUTLET PER SERVICE CONNECTION STD. DWG. P-17	-
2	1	1" TYPE "K" SOFT COPPER TUBING WITH A POLYETHYLENE SLEEVE AND NO SPLICES . LEAD-FREE FITTINGS. 2" BRASS (WRAPPED) OR SCHEDULE 80 PVC	A-06-1 A-06-2
3	1	BRASS OR COPPER x I.P.T. CONNECTION	H-12-1 H-12-4
4	1	BRONZE GATE VALVE. THREADED ENDS WITH EXTRA HEAVY HANDWHEEL.	B-10-2
5	1	STANDARD WEIGHT BRASS NIPPLE.	A-05
6	1	HEAVY DUTY COMBINATION AIR VALVE, SIZE AS SPECIFIED.	B-11 B-12
7	1	1" OR 2" STANDARD WEIGHT BLACK RISER, ELL, AND STREET ELL.	A-04
8	1	PRECAST CONCRETE BOX WITH STEEL COVER. PROVIDE SQUARE OR UNIFORMLY ROUND OPENING. PIPE O.D.+1/2".	E-05
9	1	PRECAST BOX EXTENSION.	E-07
10	1	COPPER OR PVC SCH. 80 X I.P.T.	H-12-6
11	1	AIR VALVE SCREEN PER STD. DWG. P-15A	H-19
12	1	1" OR 2" THREADED NIPPLE	D-06
13	1	1" OR 2" THREADED UNION FLUSH WITH COVER.	H-21

INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	AIR VALVE INSTALLATION DETAIL (FLUSH HOUSING FOR 1" OR 2" DIA.) (200 PSI MAX.)	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED March 12, 2012 DATE		P-15



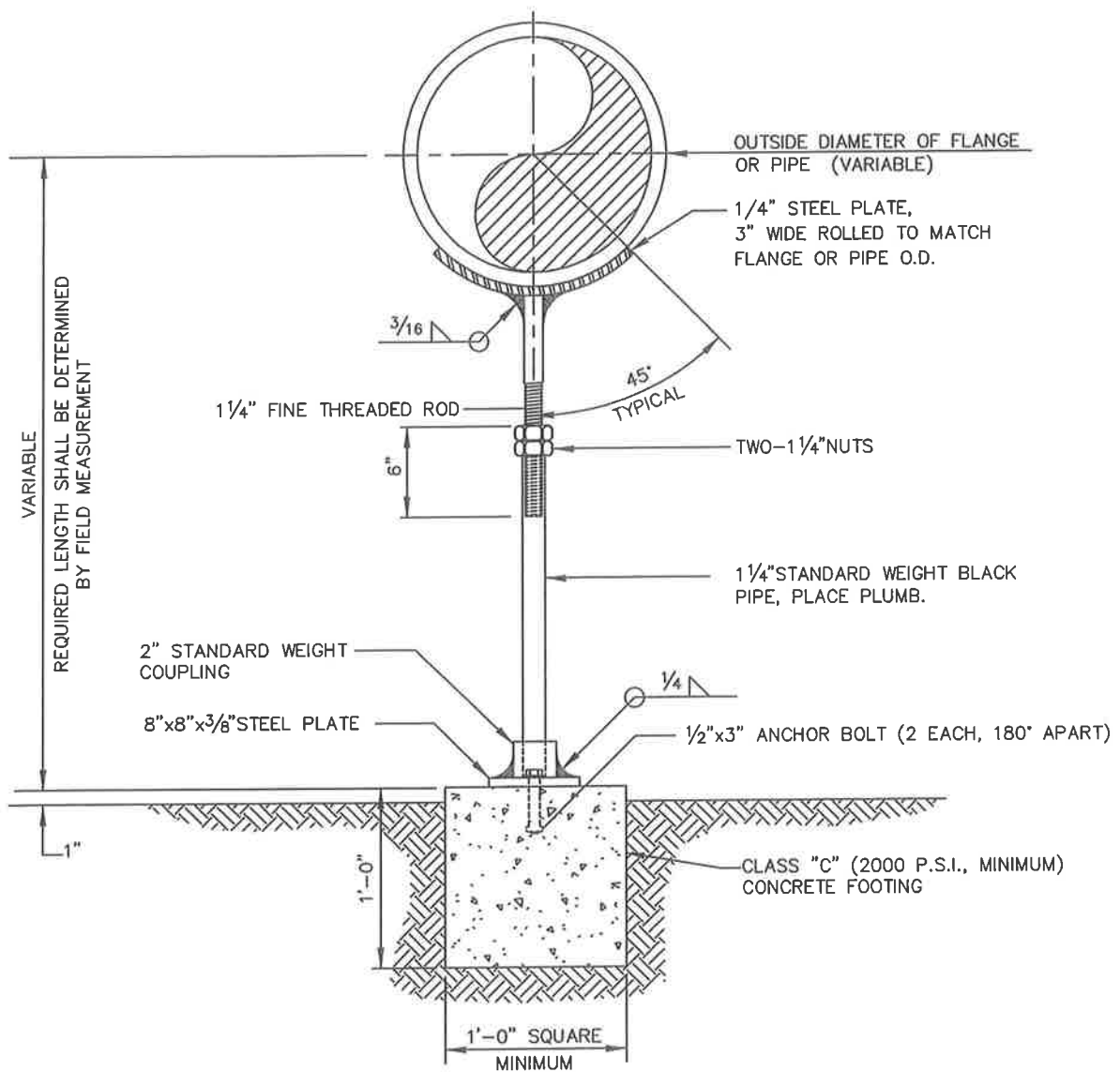
ITEM	NO. REQ'D.	DESCRIPTION	APPROVED MATERIALS LIST No.
1	1	STANDARD WEIGHT STEEL PIPE: 1" OR 2" DIA. FOR 1" OR 2" AIR VALVE, 4" DIA. FOR 4" AIR VALVE.	A-01
2	2	1/2" WIDE STAINLESS STEEL BANDS.	H-10
3	1	AIR VALVE SCREEN	H-19

NOTES

- 1) AIR VALVE SCREEN (EXCEPT WIRE CLOTH AND STAINLESS STEEL BANDS) SHALL BE PAINTED IN ACCORDANCE WITH THE DISTRICT APPROVED PAINT SYSTEMS.

INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	AIR VALVE SCREEN DETAIL	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED <u>March 12, 2012</u> DATE		P-15A

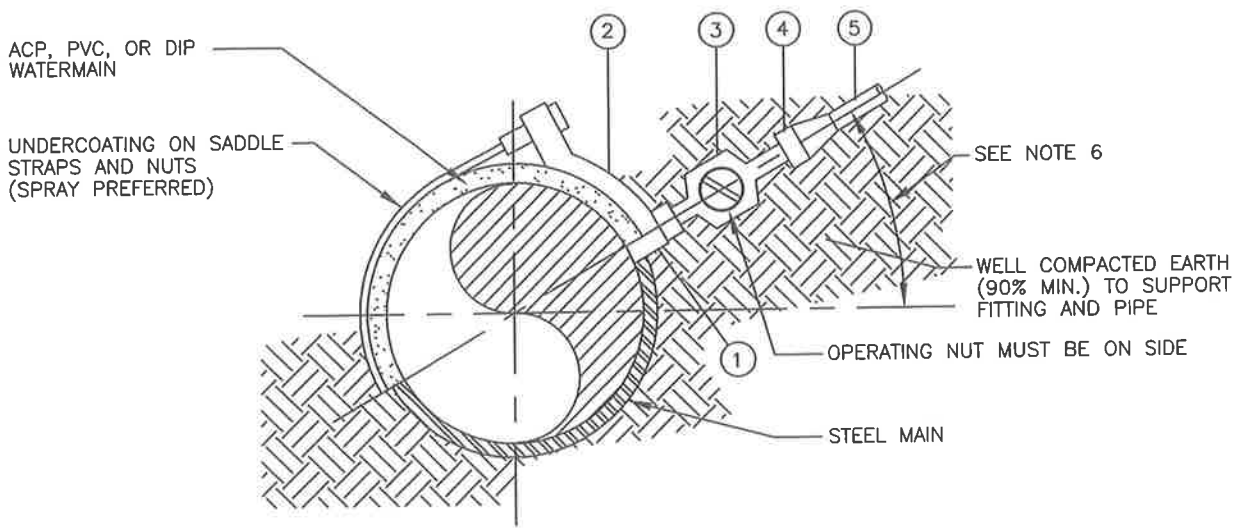


NOTES

- 1.) PAINT WITH PRIME COAT AND FINISH COAT AFTER FABRICATION IN ACCORDANCE WITH DISTRICT APPROVED PAINT SYSTEMS. FINISH COAT SHALL BE SAME AS SUPPORTED PIPE, UNLESS OTHERWISE DIRECTED BY DISTRICT.
- 2.) WHEN CLEARANCE BETWEEN TOP OF CONCRETE FOOTING AND BOTTOM OF FLANGE OR PIPE IS 6" OR LESS, A 2" STANDARD BLACK HALF COUPLING SHALL BE USED IN LIEU OF COUPLING SHOWN.

INDIAN WELLS VALLEY WATER DISTRICT

<p>Renee E. Morquecho R.C.E. 79344</p>	<p>CRADLED PIPE SUPPORT</p>	<p>STANDARD DRAWING</p>
<p>CHIEF ENGINEER APPROVED March 12, 2012 DATE</p>		<p>P-16</p>



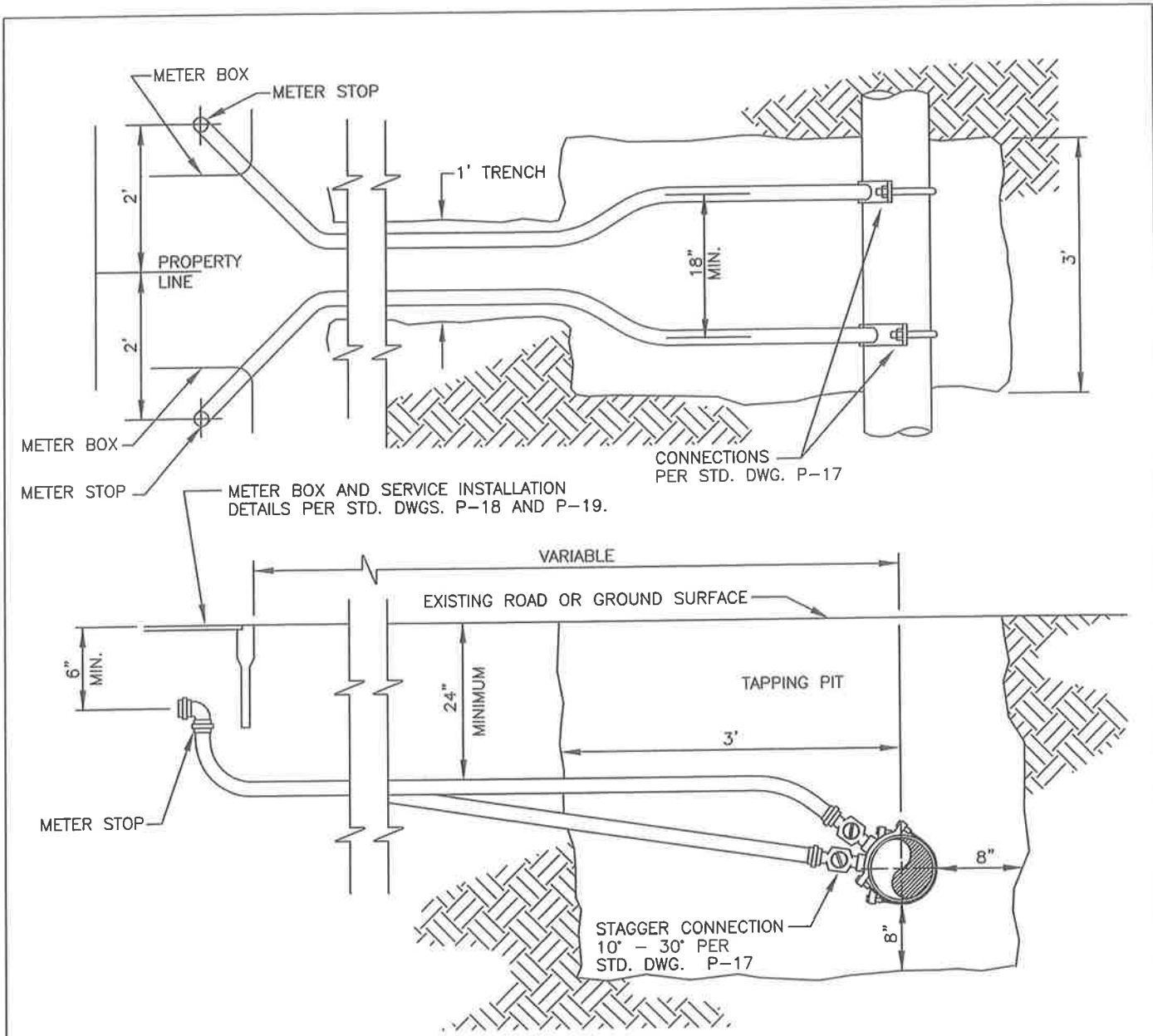
ITEM	NO. REQ'D.	DESCRIPTION	APPROVED MATERIALS LIST No.
1	1	1" STD. STEEL COUPLING FOR 1" SERVICE OR TOP OUTLET ONLY. WELDING TO STEEL PIPE ALLOWED ON NEW AND EXISTING MORTAR COATED OR OUTSIDE WRAPPED MAINS OF 10 GAGE OR BETTER AND IN GOOD CONDITION. USE SADDLE, PER ITEM 2, ON 12 GAGE OR LIGHTER AND OLD DETERIORATED MAINS. INSTALL NYLON BUSHING BETWEEN COUPLING AND CORPORATION STOP.	H-01-3
2	1	BRONZE, DOUBLE STRAP (I.P.T.) SERVICE CLAMP. USE FOR ALL ACP, PVC, AND DIP TAPS AND ALL STEEL PIPE TAPS LARGER THAN 1". USE WIDE STRAP SERVICE SADDLE FOR PVC PIPE.	H-01-1 H-01-2
3	1	CORPORATION STOP,	B-03 B-04
4	1	STRAIGHT COUPLING	H-12-2 H-12-3
5	VARIES AS REQ'D.	1" TYPE "K" SOFT COPPER TUBING WITH A POLYETHYLENE SLEVE AND NO SPLICES . LEAD-FREE FITTINGS. 2" RIGID COPPER (WRAPPED) OR SCHEDULE 80 PVC	A-06-1 A-06-2

NOTES

- 1) 2" DIA. SERVICE OUTLETS ON 4" MAINS ARE NOT PERMITTED.
- 2) 2" DIA. SERVICES ON 6" MAINS SHALL BE INSTALLED ONLY IF APPROVED BY DISTRICT. WHERE 2" SERVICES MUST BE INSTALLED ON LIGHT GAGE (12 GA OR LESS) OR DETERIORATED EXISTING STEEL MAINS, AN ENTIRE 24" SECTION OF THE EXISTING MAIN SHALL BE REPLACED WITH A NEW TAPPED SECTION AS DIRECTED BY OWNER.
- 3) SERVICE AND OTHER TAPS SHALL NOT BE MADE CLOSER THAN 18" TO A BELL, COUPLING, JOINT, FITTING OR OTHER SERVICE.
- 4) PIPE THREADS SHALL BE CLEAN AND SHARP AND SEALED WITH AN APPROVED JOINT COMPOUND.
- 5) SPRAY OR PAINT STEEL, CAST IRON, BRONZE AND OTHER METALLIC COMPONENTS (INCLUDING NUTS AND BOLTS) WITH A THICK COAT OF AN APPROVED BITUMASTIC. REPLACE ALL REMOVED WRAP OR COATING TO A THICKNESS, DENSITY, AND QUALITY EQUAL TO OR BETTER THAN THE ORIGINAL COATING.
- 6) SERVICES SHALL BE PLACED NOT LESS THAN 10 DEG. NOR MORE THAN 30 DEG. ABOVE THE HORIZONTAL CENTERLINE. FOR AIR VALVE AND OTHER TOP OUTLET APPLICATIONS, ROTATE TO VERTICAL CENTERLINE.

INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	1" OR 2" DIA. SERVICE CONNECTION DETAIL AND TOP OUTLET DETAIL	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED March 12, 2012 DATE		P-17

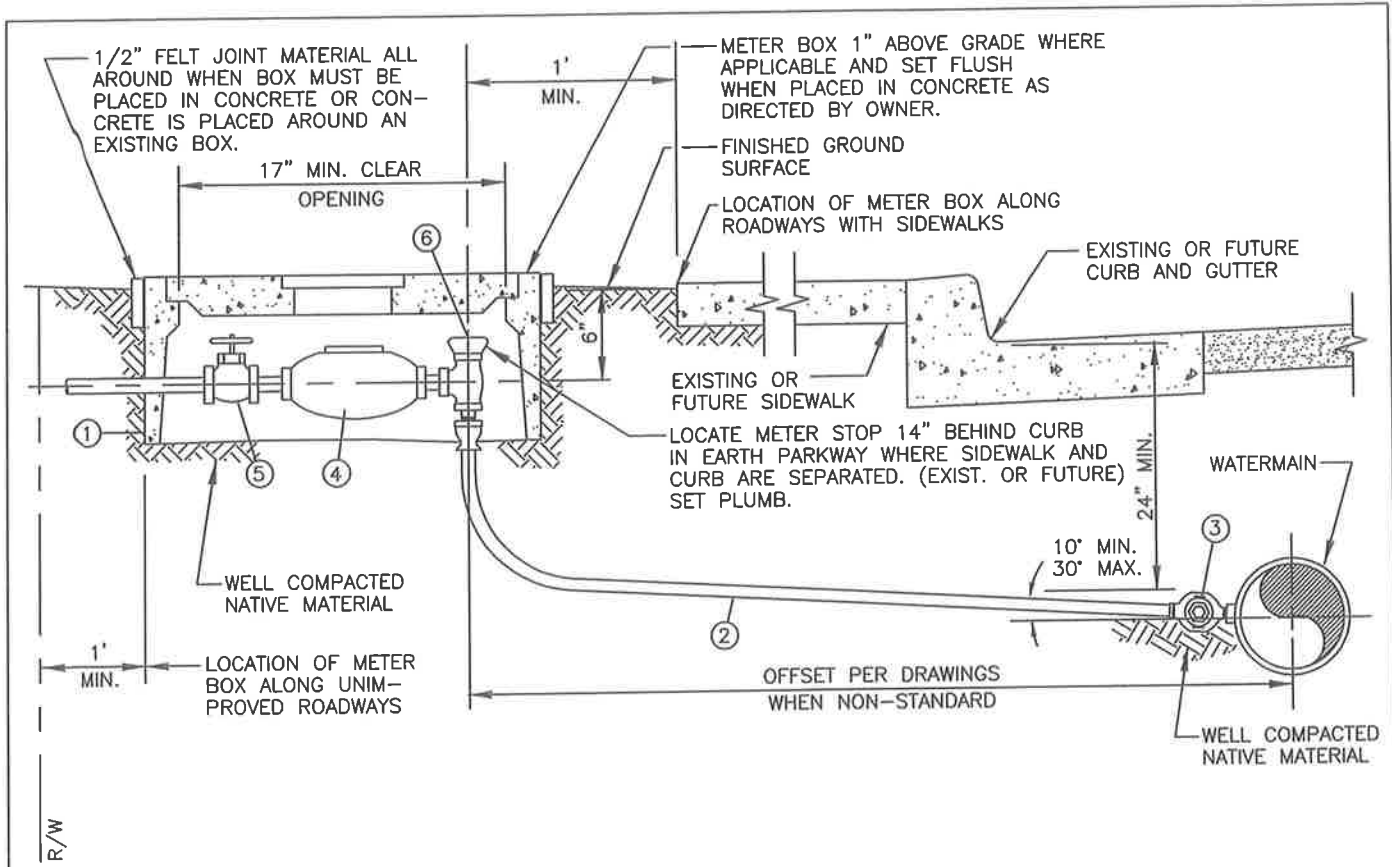


NOTES

- 1) SERVICES FOR ADJACENT LOTS SHALL BE TAPPED A MINIMUM OF 18" APART WITH LATERALS PULLED TOWARDS EACH OTHER AND LAID IN A SINGLE 1' WIDE TRENCH AND SPREAD APART AGAIN FOR METER LOCATION. MINIMUM COVER ON SERVICE LATERAL TO BE 24" UNDER ROADWAY.
- 2) METER BOXES TO BE SET 2' EITHER SIDE OF PROPERTY LINE PROLONGATION.
- 3) DAMAGE TO SERVICE, METER OR BOX, OR IMPROPER PLACEMENT THEREOF, SHALL BE REPAIRED BY CONTRACTOR/CUSTOMER, AT HIS EXPENSE, UNTIL EXPIRATION OF CONTRACTOR/CUSTOMER WARRANTY.

INDIAN WELLS VALLEY WATER DISTRICT

<p>Renee E. Morquecho R.C.E. 79344</p>	<p>SERVICE AND METER INSTALLATION LOCATION IN NEW DEVELOPEMENT</p>	<p>STANDARD DRAWING</p>
<p>CHIEF ENGINEER APPROVED March 12, 2012 DATE</p>		<p>P-17A</p>



R/W

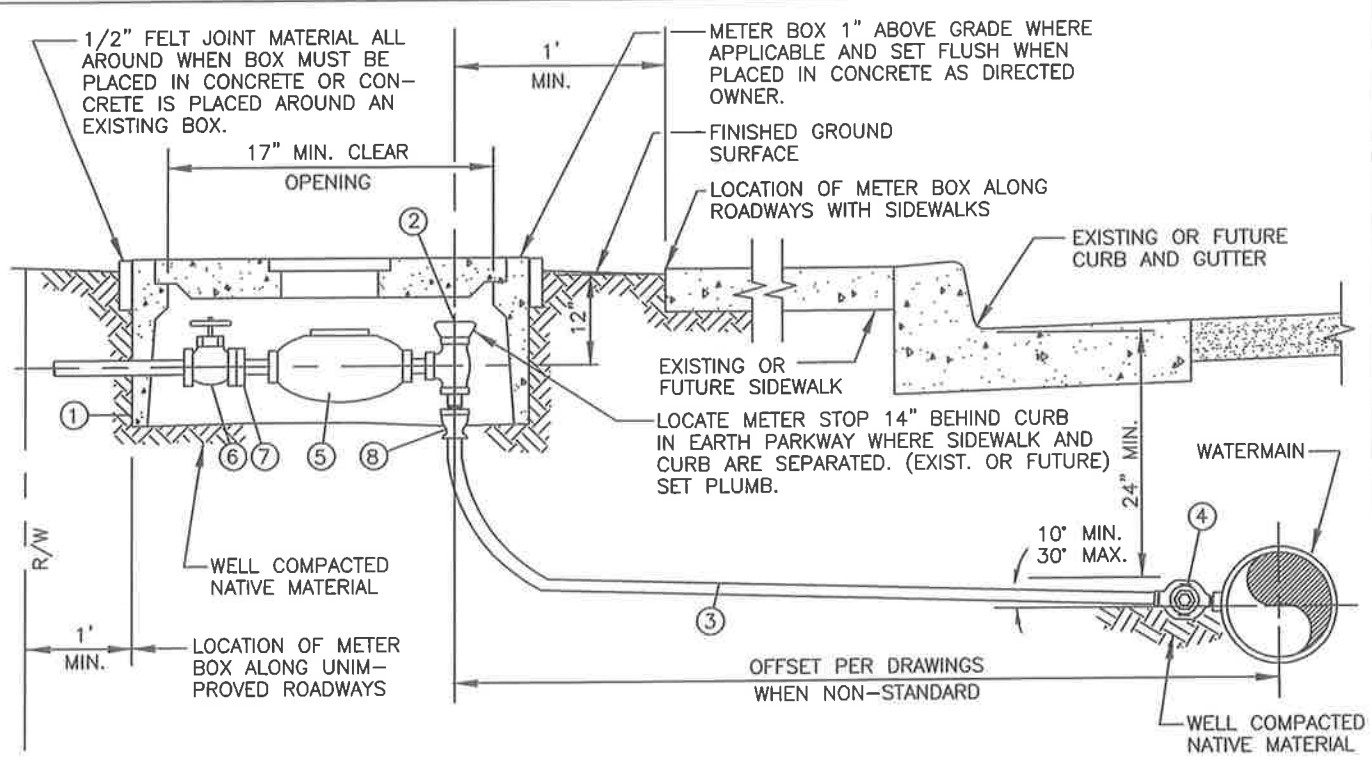
ITEM	NO. REQ'D.	DESCRIPTION	APPROVED MATERIALS LIST No.
1	1	METER BOX WITH COVER AND READING LID.	E-01
2	1	1" TYPE "K" SOFT COPPER TUBING WITH A POLYETHYLENE SLEEVE AND NO SPLICES.	A-06
3	1	1" LEAD-FREE CORP STOP	B-03
4	1	1" OR 3/4" METER	H-15
5	1	1" GATE VALVE WITH THREADED ENDS AND HANDWHEEL	B-08
6	1	1" LEAD-FREE ANGLE METER STOP	B-06

NOTES

- 1) WHERE SERVICES ARE PLACED TO ADJACENT PROPERTIES, LOCATION OF SERVICES SHALL BE PER DETAIL "A" OR AS DIRECTED BY DISTRICT.
- 2) COPPER SERVICE PIPING SHALL NOT BE "SNAKED" IN THE TRENCH BUT LAID STRAIGHT AND AT RIGHT ANGLES TO THE MAIN.
- 3) PIPE THREADS SHALL BE CLEAN AND SHARP AND SEALED WITH AN APPROVED JOINT COMPOUND.
- 4) DAMAGE TO SERVICE, METER OR BOX, OR IMPROPER PLACEMENT THEREOF, SHALL BE REPAIRED BY CONTRACTOR/CUSTOMER, AT HIS/HER EXPENSE, UNTIL EXPIRATION OF CONTRACTOR/CUSTOMER WARRANTY.
- 5) COPPER TUBING SHALL BE WRAPPED WITH SPECIALTY PRODUCTS 4 MIL PLASTIC SLEEVE.
- 6) SERVICE SADDLE TO BE BRASS SINGLE OR DOUBLE STRAP.

INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	SERVICE INSTALLATION DETAIL (SINGLE 1" DIA.)	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED <u>March 12, 2012</u> DATE		P-18



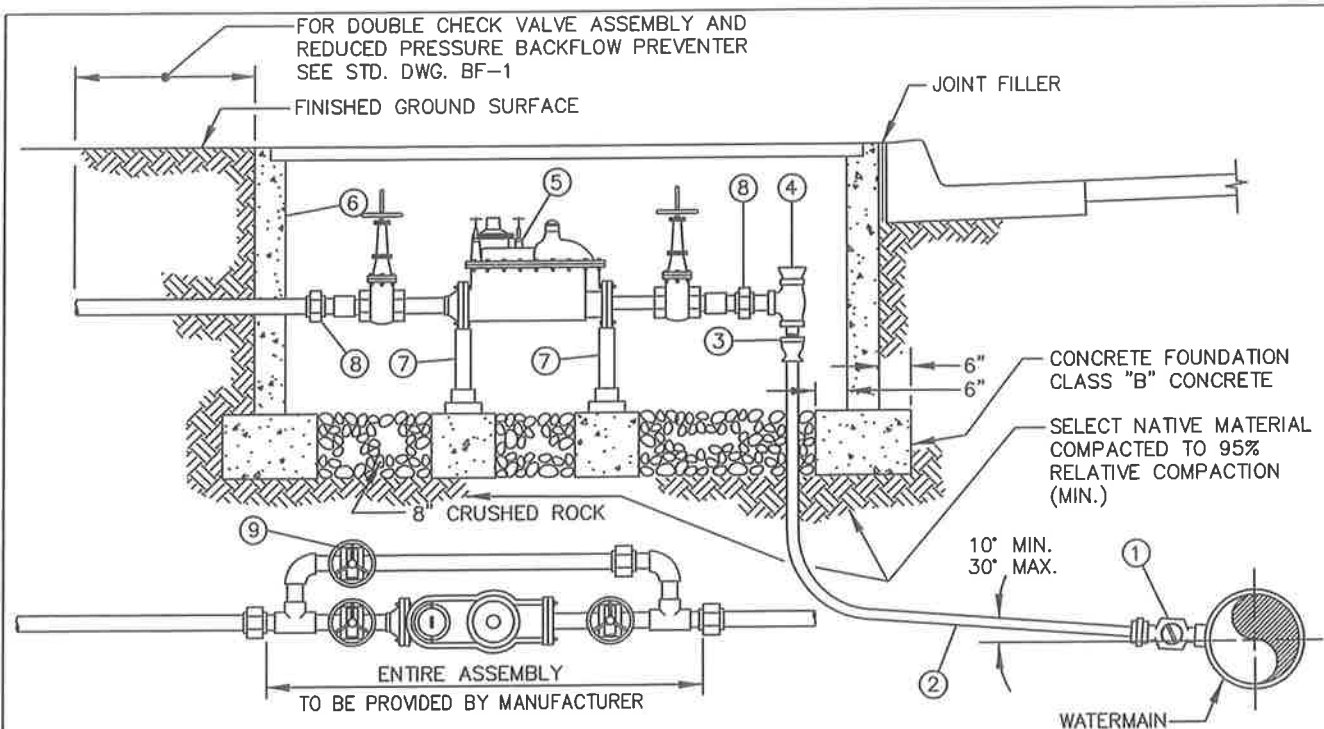
ITEM	NO. REQ'D.	DESCRIPTION	APPROVED MATERIALS LIST No.
1	1	PLASTIC METER BOX WITH PLASTIC COVER & PLASTIC READING LID	E-02
2	1	2" ANGLE METER STOP	B-07
3	1	2" x REQUIRED LENGTH COPPER (WRAPPED IN A POLYETHYLENE SLEEVE) OR SCHEDULE 80 PVC	A-06-2
4	1	2" SERVICE CONNECTION SEE STD. P-17 FOR DETAILS	SEE P-17
5	1	1 1/2" OR 2" WATER METER	H-15
6	1	2" GATE VALVE WITH THREADED ENDS AND HANDWHEEL	B-10
7	1	2" FLANGE x MALE I.P.T. BRONZE METER FLANGE WITH SLOTTED HOLES	H-12-5
8	1	2" PACK JOINT COUPLING.	H-12-4

NOTES

- 1) COPPER SERVICE PIPING SHALL NOT BE "SNAKED" IN THE TRENCH BUT LAID STRAIGHT AND AT RIGHT ANGLES TO THE MAIN.
- 2) NO SERVICE WILL BE PERMITTED TO BE PLACED WITHIN A DRIVEWAY.
- 3) A 14 GA. LOCATOR WIRE SHALL BE RUN WITH ALL PVC SERVICES FROM THE MAIN TO THE METER BOX WITH 2' EXCESS LEFT IN THE METER BOX AFTER TIE TO METER STOP.
- 4) PIPE THREADS SHALL BE CLEAN, SHARP AND SEALED WITH AN APPROVED JOINT SEALER.
- 5) FOR MANIFOLD TYPE INSTALLATION, IF APPROVED BY OWNER, CUSTOMER SHALL PROVIDE MANIFOLD DESIGN CERTIFIED BY A CALIFORNIA REGISTERED ENGINEER FOR OWNER REVIEW AND APPROVAL.
- 6) DAMAGE TO SERVICE, METER OR BOX, OR IMPROPER PLACEMENT THEREOF, SHALL BE REPAIRED BY CONTRACTOR/CUSTOMER, AT HIS EXPENSE, UNTIL EXPIRATION OF CONTRACTOR/CUSTOMER WARRANTY.

INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	SERVICE INSTALLATION DETAIL (1" AND 2" DIA.)	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED <u>March 12, 2012</u> DATE		P-19



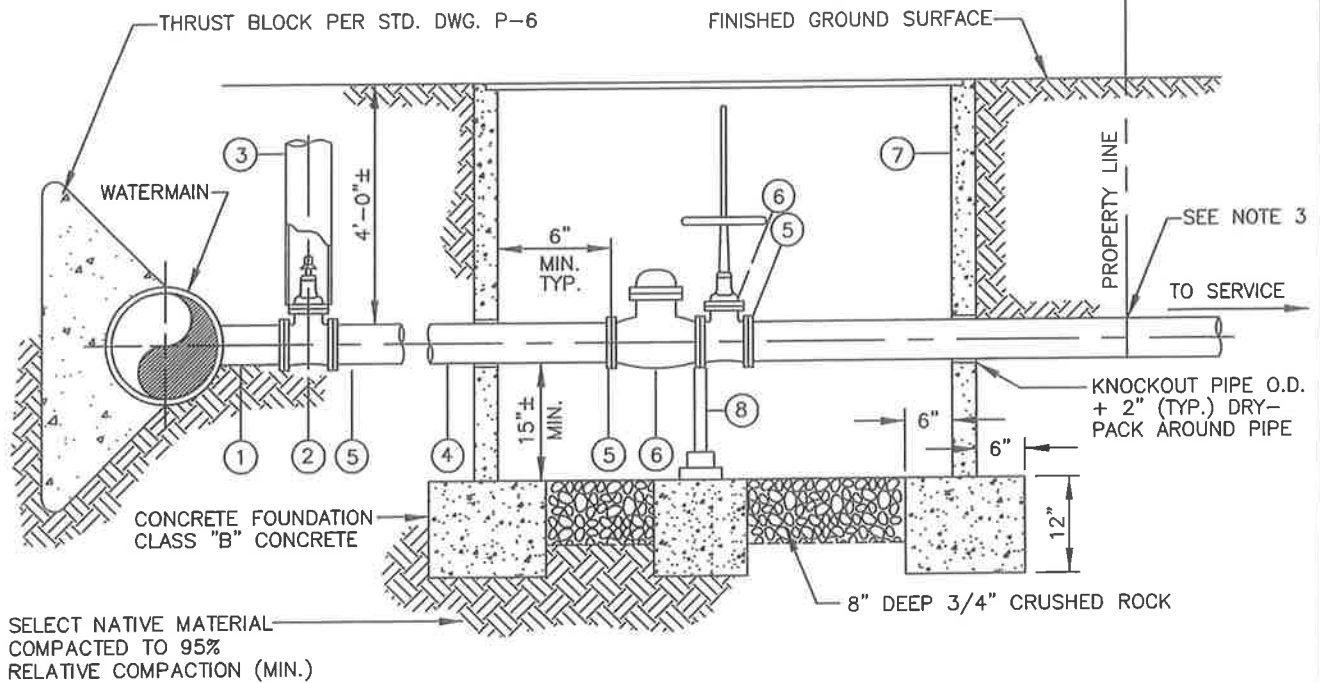
ITEM	NO. REQ'D.	DESCRIPTION	APPROVED MATERIALS LIST No.
1	1	2" SERVICE CONNECTION PER STD. P-17	-
2	1	2" x REQUIRED LENGTH COPPER (WRAPPED) OR SCHEDULE 80 PVC	A-06-2
3	1	2" PACK JOINT COUPLING	H-12-4
4	1	2" ANGLE METER	B-07-1
5	1	2" OR LARGER COMPOUND METER WITH BYPASS	H-15-3
6	1	PRECAST CONCRETE PARKWAY VAULT. (USE NEAREST STD. SIZE, DEPTH TO BE FIELD DETERMINED. IF VAULT IS TO BE LOCATED IN TRAFFIC AREA USE TRAFFIC VAULT AND COVER.)	E-03 E-08
7	VARIABLES	PIPE SUPPORTS PER STD. DWG. P-16	-
8	2	THREADED UNION	H-21
9	1	2" BALL VALVE WITH WING LOCK.	B-17

NOTES

- 1) COPPER SERVICE PIPING SHALL NOT BE "SNAKED" IN TRENCH BUT LAID STRAIGHT AND AT RIGHT ANGLES TO THE MAIN.
- 2) A 14 GA. COPPER LOCATOR WIRE SHALL BE RUN WITH ALL SERVICES FROM MAIN TO METER BOX WITH 2' EXCESS LEFT IN THE METER BOX AFTER TIE TO METER STOP.
- 3) PIPE THREADS SHALL BE CLEAN AND SHARP AND SEALED WITH AN APPROVED JOINT COMPOUND.
- 4) INSTALLATION OF APPURTENANCES FROM ANGLE METER STOP THROUGH CUSTOMER SERVICE VALVE SHALL BE BY DISTRICT.
- 5) INTERIOR AND EXTERIOR OF VAULT COVER TO BE PAINTED PER DISTRICT APPROVED PAINT SYSTEM
- 6) CAST-IN-PLACE CONCRETE OR MASONRY VAULTS MAY BE USED ONLY IF STRUCTURAL CALCULATIONS AND DETAILED CONSTRUCTION DRAWINGS ARE PREPARED BY A LICENSED CIVIL OR STRUCTURAL ENGINEER AND APPROVED BY THE DISTRICT.
- 7) LOW SIDE MUST BE A TRUE-FLO METER, REGISTER MUST BE DIRECT READ IN CUBIC FEET.

INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	COMPOUND METER SERVICE INSTALLATION DETAIL (2" SERVICE OR LARGER)	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED <u>March 12, 2012</u> DATE		P-21



ITEM	NO. REQ'D.	DESCRIPTION	APPROVED MATERIALS LIST No.
1	1	FLANGED SIDE OUTLET ON STEEL WATERMAIN OR DIP TEE (HUB x HUB x FLG'D OUTLET) ON ACP, P.V.C., AND DIP WATERMAINS.	--
2	1	FLANGED GATE VALVE PER STD. DWG. P-9 OR FLANGED BUTTERFLY VALVE PER STD. DWG. P-10.	--
3	1	VALVE BOX INSTALLATION PER STD. DWG. P-11 OR P-11A.	--
4	VARIABLE	STANDARD STEEL PIPE CML & CMC, SIZE AS SPECIFIED.	D-02
5	3	AWWA CLASS "E" FLANGE. (REDUCING FLANGE OR REDUCER IF REQUIRED)	C-01-1 C-02
6	1	DETECTOR CHECK VALVE WITH OS & Y GATE VALVE. SIZE AS SPECIFIED (INCLUDING BYPASS METER AND PIPING)	B-19 B-01
7	1	PRECAST CONCRETE PARKWAY VAULT. (USE NEAREST STD. SIZE, DEPTH TO BE FIELD DETERMINED. IF VAULT IS TO BE LOCATED IN TRAFFIC AREA, USE TRAFFIC VAULT AND COVER.)	E-03 E-08
8	1	PIPE SUPPORT PER STD. DWG. P-16.	--
--	--	FLANGE, BOLTS, NUTS, AND GASKETS AS REQUIRED.	H-04 H-06-2

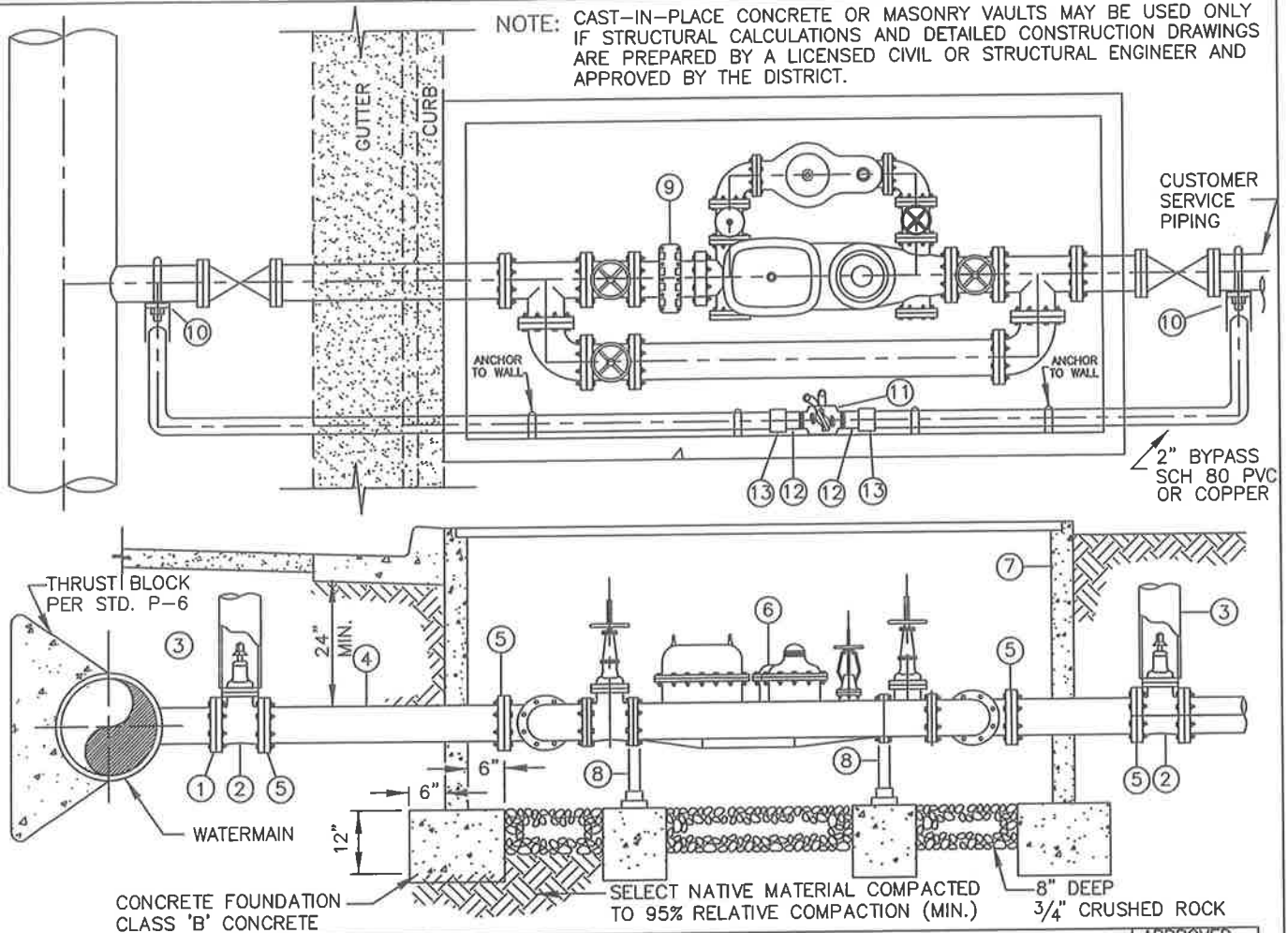
NOTES

- 1) CENTERLINE OF METER INSTALLATION TO BE THROUGH CENTERLINE OF VAULT OR AS DIRECTED BY THE OWNER.
- 2) SECTIONS OF CURB & GUTTER IN VAULT AREA TO BE INSTALLED AFTER VAULT IS IN PLACE.
- 3) CONTRACTOR SHALL CONNECT TO DISTRICT PIPING IN A METHOD APPROVED BY DISTRICT.
- 4) VAULT COVER, FRAME, AND PIPING WITHIN VAULT TO BE PAINTED PER DISTRICT APPROVED PAINT SYSTEM.
- 5) CAST-IN-PLACE CONCRETE OR MASONRY VAULTS MAY BE USED ONLY IF STRUCTURAL CALCULATIONS AND DETAILED CONSTRUCTION DRAWINGS ARE PREPARED BY A LICENSED CIVIL OR STRUCTURAL ENGINEER AND APPROVED BY THE DISTRICT ENGINEER.

INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	BELOW GROUND DETECTOR CHECK SERVICE INSTALLATION DETAIL (2" OR LARGER)	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED March 12, 2012 DATE		P-24

NOTE: CAST-IN-PLACE CONCRETE OR MASONRY VAULTS MAY BE USED ONLY IF STRUCTURAL CALCULATIONS AND DETAILED CONSTRUCTION DRAWINGS ARE PREPARED BY A LICENSED CIVIL OR STRUCTURAL ENGINEER AND APPROVED BY THE DISTRICT.

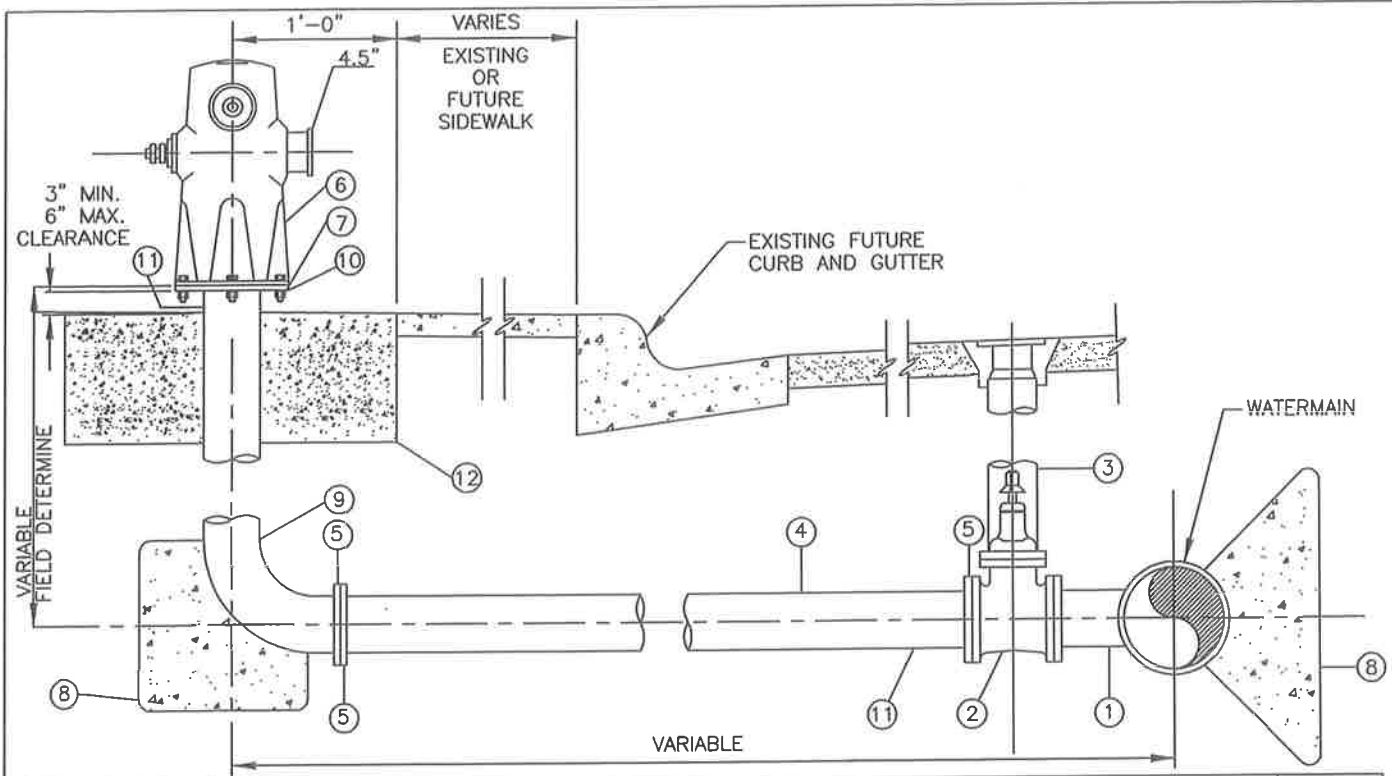


ITEM	NO. REQ'D.	DESCRIPTION	APPROVED MATERIALS LIST No.
1	1	FLANGED SIDE OUTLET ON STEEL WATERMAIN OR HUB x HUB x FLG'D DIP TEE ON DIP, AND PVC WATERMAINS. SIZE AS SPECIFIED.	-
2	1	FLANGED GATE VALVE PER STD. DWG. P-9 OR BUTTERFLY VALVE PER STD. DWG. P-10.	-
3	1	VALVE BOX INSTALLATION PER STD. DWG. P-11 OR P-11A.	-
4	VARIABLES	STANDARD STEEL PIPE CML & CMC, SIZE AS SPECIFIED.	D-02
5	4	AWWA CLASS "E" FLANGE. (REDUCING FLANGE OR REDUCER IF REQUIRED)	C-01-1/C-02
6	1	COMBINED FIRE AND DOMESTIC SERVICE METER WITH BYPASS. SIZE AS SPECIFIED.	H-15-3
7	VARIABLES	PRECAST CONCRETE PARKWAY VAULT WITH REMOVABLE STEEL COVER WITH READING LID OVER METER REGISTER. VAULT COVER AND PIPING WITHIN VAULT TO BE PAINTED PER DISTRICT APPROVED PAINT SYSTEM.	E-03
8	VARIABLES	PIPE SUPPORT PER STD. DWG. P-16.	-
9	VARIABLES	STRAINER, SIZED ACCORDING TO INLET OF METER.	-
10	2	CONNECTIONS PER STD. DWG. P-17	-
11	1	2 INCH WING LOCK BALL VALVE (LEAD FREE).	B-17
12	2	2 INCH I.P.T. BRASS NIPPLE	D-06
13	2	2 INCH FEMALE THREAD BY SLIP FITTING	-
-	-	FLANGE BOLTS, NUTS, AND GASKETS AS REQUIRED.	H-04 H-06-2

NOTE: METER REGISTER MUST BE DIRECT READ IN CUBIC FEET AND APPROVED BY THE DISTRICT.

INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	COMBINED FIRE AND DOMESTIC SERVICE INSTALLATION DETAIL (4", 6", AND 8" SERVICE)	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED March 12, 2012 DATE		P-25



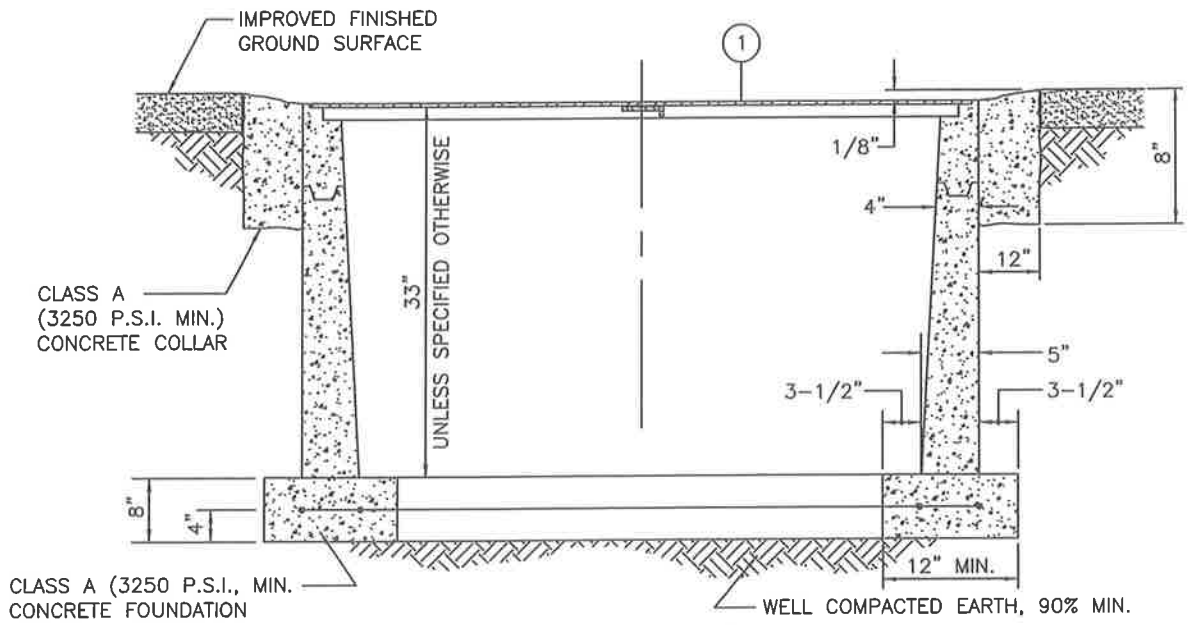
ITEM	NO. REQ'D.	DESCRIPTION	APPROVED MATERIALS LIST No.
1	1	6" FLANGED SIDE OUTLET ON STEEL WATERMAIN OR HUB x HUB x FLANGED DIP TEE ON ACP, PVC, AND DIP WATERMAINS.	-
2	1	6" FLANGED GATE VALVE PER STD. DWG. P-9.	-
3	1	VALVE BOX INSTALLATION PER STD. DWG. P-11 OR P-11A.	-
4	VARIES	6" 10 GA. CEMENT MORTAR LINED AND CEMENT MORTAR COATED WELDED STEEL PIPE. 6" PVC CL 235 C-900.	D-01
5	3	6" AWWA CLASS "E" FLANGE.	C-01
6	1	WET BARREL FIRE HYDRANT WITH 6" FLANGED INLET. RESIDENTIAL FIRE HYDRANTS SHALL HAVE ONE 4-1/2" PUMPER OUTLET AND ONE 2-1/2" HOSE OUTLET. COMMERCIAL/INDUSTRIAL FIRE HYDRANTS SHALL HAVE ONE 4-1/2" PUMPER OUTLET AND TWO 2-1/2" HOSE OUTLETS.	F-01 F-02
7	6	5/8" DIA. BREAK-AWAY BOLTS. PLACE WITH BOLT HEAD ON TOP OF FLANGE.	H-06-1
8	1	THRUST BLOCK PER STD. DWG. P-6.	-
9	1	6" STANDARD WEIGHT CML & CMC WELDED STEEL PIPE WITH SMOOTH 90° ELBOW OR. 6"- 6 HOLE FLANGE X RT BURY	D-02
10	1	6"-6 BOLT FLANGE (DRILLED TO MATCH 6 BOLT FIRE HYDRANT FLANGE).	C-01-2
11	2	PROVIDE 2' CUT-TO-FIT, SHIP FLANGES LOOSE.	-
12	1	36"x36"x12" CONCRETE PAD WITH SIDEWALK FINISH TO BE SLOPED 1/4" PER FOOT TOWARDS CURB	-
-	-	FLANGE BOLTS, NUTS, AND GASKETS AS REQUIRED.	H-04 H-06-2

NOTES

- 1) NORMAL LOCATION FOR FIRE HYDRANT SHALL BE AS SHOWN UNLESS OTHERWISE SPECIFIED
- 2) PAINT EXPOSED METAL SURFACES PER DISTRICT APPROVED PAINT SYSTEM.
- 3) AT THE DISCRETION OF THE DISTRICT, IF FIRE HYDRANT IS LOCATED IN EARTH PARKWAY OR WHERE NO CURB EXISTS, TWO GUARD POSTS SHALL BE INSTALLED PER STD. DWG. P-12 LOCATE AS DIRECTED.
- 4) SPRAY OR PAINT STEEL, CAST IRON, BRONZE AND OTHER METALLIC COMPONENTS (INCLUDING NUTS AND BOLTS) WITH A THICK COAT OF AN APPROVED BITUMASTIC. REPLACE ALL REMOVED WRAP OR COATING TO A THICKNESS, DENSITY, AND QUALITY EQUAL TO OR BETTER THAN THE ORIGINAL COATING.
- 5) IN THE ABSENCE OF A CURB, SET BOTTOM OUTLET 24" ABOVE CROWN OF ROAD.

INDIAN WELLS VALLEY WATER DISTRICT

<u>Renee E. Morquecho</u> R.C.E. 79344	6" FIRE HYDRANT INSTALLATION DETAIL	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED <u>March 12, 2012</u> DATE		P-29

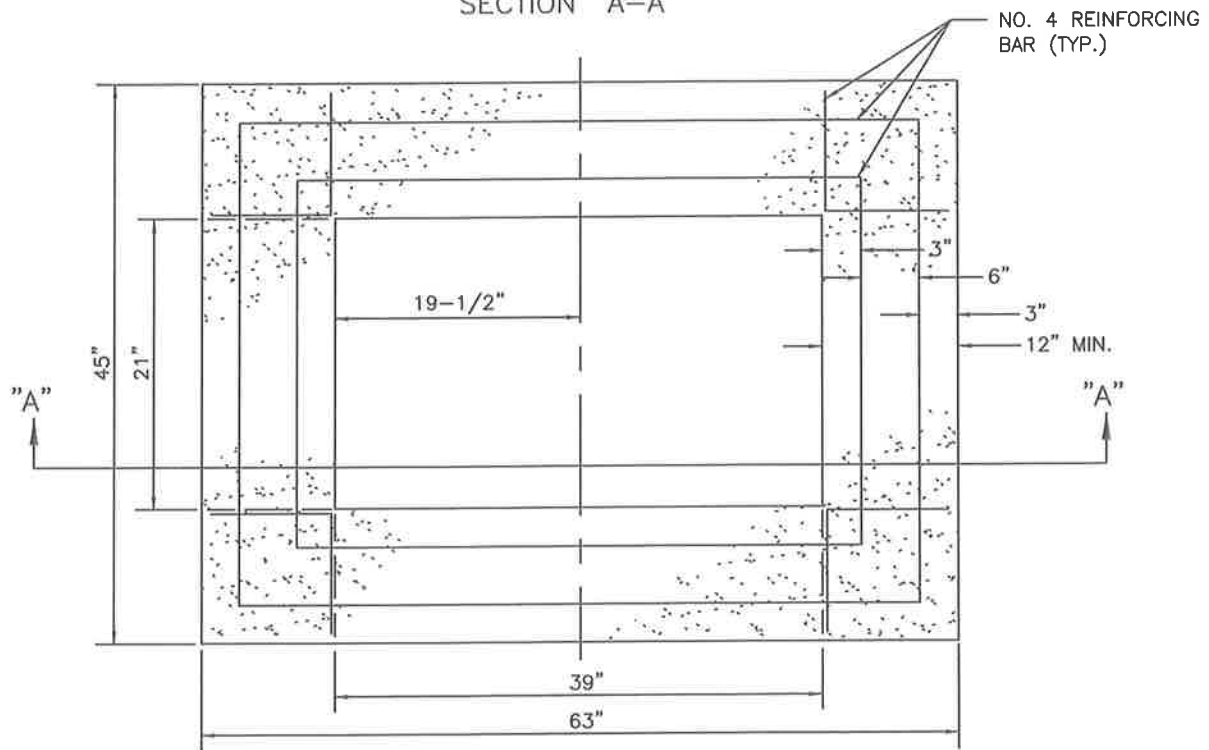


CLASS A
(3250 P.S.I. MIN.)
CONCRETE COLLAR

CLASS A (3250 P.S.I., MIN.)
CONCRETE FOUNDATION

WELL COMPACTED EARTH, 90% MIN.

SECTION "A-A"

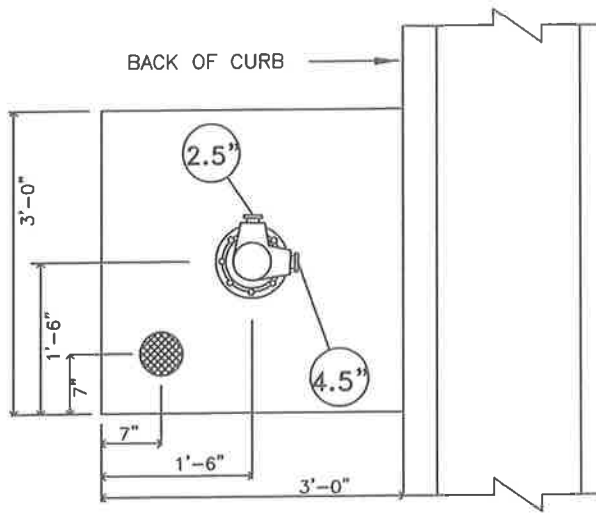


PLAN VIEW

ITEM	DESCRIPTION	APPROVED MATERIALS LIST NO.
1	PRECAST CONCRETE VAULT WITH 5/8" BOLT-DOWN DIAMOND PLATE STEEL TRAFFIC COVER.	E-08

INDIAN WELLS VALLEY WATER DISTRICT

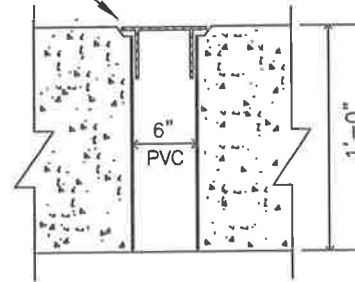
<u>Renee E. Morquecho</u> R.C.E. 79344	BLOWOFF VAULT INSTALLATION DETAIL	STANDARD DRAWING
<u>CHIEF ENGINEER</u> APPROVED <u>March 12, 2012</u> DATE		P-30



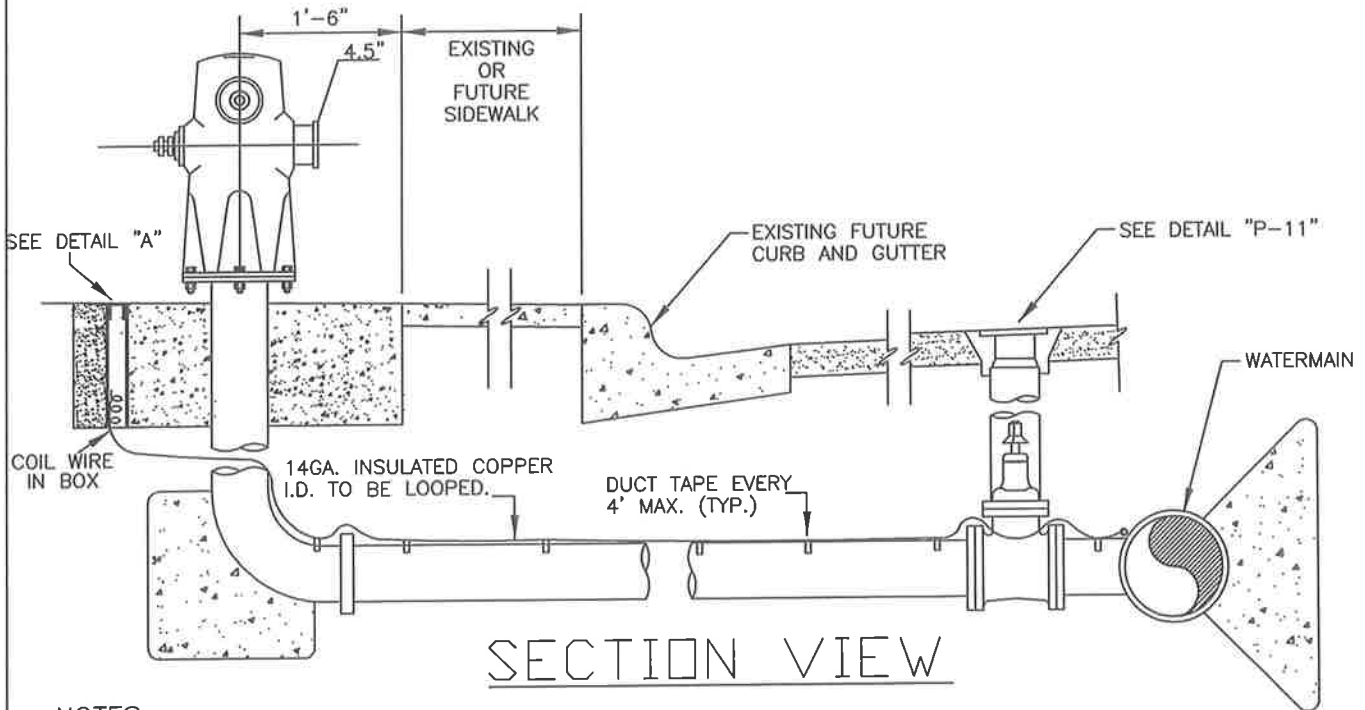
PLAN VIEW

6" CAST IRON VALVE
BOX CAP MARKED
AS SHOWN.

BEVEL CONCRETE TO
BOTTOM OF LID



DETAIL "A"



SECTION VIEW

NOTES

- 1) WIRE MUST BE LAID ON TOP OF PIPE AND FASTENED SECURELY AT EACH COLLAR OR FITTING WITH AN EIGHT INCH LENGTH OF DUCT TAPE OR OTHER APPROVED METHOD.
- 2) SPLICES TO BE MADE WITH BUTT CONNECTORS AND ARE TO BE ENCAPSULATED WITH RUBBER SEALING TAPE (POLYSOBUTYLENE) PER DUET INDUSTRIES OR OTHER APPROVED TYPE.
- 3) INSTALL TEST STATION AT ALL DEAD ENDS OR POINT OF CONNECTION.

INDIAN WELLS VALLEY WATER DISTRICT

<p>Renee E. Morquecho R.C.E. 79344</p>	<p>INSTALLATION OF LOCATOR WIRE</p>	<p>STANDARD DRAWING</p>
<p>CHIEF ENGINEER APPROVED March 12, 2012 DATE</p>		<p>P-31</p>

APPROVED PAINT SYSTEMS

**INDIAN WELLS VALLEY WATER DISTRICT
APPROVED PAINT SYSTEMS**

ITEMS TO BE PAINTED	EXPOSURE	PAINT SYSTEM	
		PRIME COAT	FINISH COAT
A. Steel Bare			
1. Valve Extension Rod	Belowground inside valve can riser	1. Kop-Coat 622 LCF Primer 2. Rust-Oleum #7669	N/A
2. Pipe Supports	Aboveground or inside vaults	1. Kop-Coat 622 LCF Primer 2. Rust-Oleum #7669	<u>Desert Tan</u> 1. Kop-Coat K201
3. Guard Posts	Aboveground	1. Kop-Coat 622 LCF Primer 2. Rust-Oleum #7669	<u>Equipment Yellow</u> 1. Rust-Oleum #7645
4. Shear Rings	Buried	1. Kop-Coat 622 LCF Primer 2. Rust-Oleum #7669	N/A
5. Fire Hydrant Valve Cover	A.C. Streets	1. Rust-Oleum #7669	<u>Equipment Yellow</u> 1. Rust-Oleum #7645
6. Inline Valve Cover	A.C. Streets	1. Rust-Oleum #7669	<u>Safety Blue</u> 1. Rust-Oleum #7625
	Unpaved & Desert Mix Streets	1. Rust-Oleum #7669	<u>Safety Blue</u> 1. Rust-Oleum #7625
7. Blow-off Piping	Exposed Inside Concrete Box	1. Kop-Coat 622 LCF Primer 2. Rust-Oleum #7669	<u>Safety Blue</u> 1. Kop-Coat 5150 (Rust-Armor 500 SPD) 2. Rust-Oleum #7625
8. Air Valve, Fittings, Riser and Screen	Exposed Inside Concrete Box	1. Kop-Coat 622 LCF Primer 2. Rust-Oleum #7669	<u>Desert Tan</u> 1. Kop-Coat K201 (Rust-Armor 500 SPD)
9. Detector Check Service and Piping (Belowground)	Exposed Inside Concrete Box	1. Kop-Coat 622 LCF Primer 2. Rust-Oleum #7669	<u>Safety Blue</u> 1. Kop-Coat 5150 (Rust-Armor 500 SPD)
10. Combined Fire and Domestic Service Piping (Belowground)	Exposed Inside Concrete Box	1. Kop-Coat 622 LCF Primer 2. Rust-Oleum #7669	<u>Safety Blue</u> 1. Kop-Coat 5150 (Rust-Armor 500 SPD)
11. Double Check Valve and Reduced Press. Backflow Preventor Piping	Exposed Aboveground	1. Kop-Coat 622 LCF Primer 2. Rust-Oleum #7669	<u>Desert Tan</u> 1. Kop-Coat K201 (Rust-Armor 500 SPD)

**INDIAN WELLS VALLEY WATER DISTRICT
APPROVED PAINT SYSTEMS
(Continued)**

ITEMS TO BE PAINTED	EXPOSURE	PAINT SYSTEM	
		PRIME COAT	FINISH COAT
12. Pressure Regulator Piping	Exposed	1. Kop-Coat 622 LCF Primer 2. Rust-Oleum #7669	<u>Safety Blue</u> 1. Kop-Coat S150 (Rust-Armor 500 SPD)
B. Previously Painted Steel	N/A	1. Kop-Coat 622 LCF Primer 2. Rust-Oleum #7673	As specified by actual paint system
C. Miscellaneous	Buried	1. Kop-Coat 622 LCF Primer 2. Rust-Oleum #7669	<u>Safety Blue</u> 1. Kop-Coat S150 2. Rust-Oleum #7625
1. Vault Covers – Interior 2. Vault Covers – Exterior		1. As Directed by Owner	1. As Directed by Owner
D. Galvanized Metal	Where Applicable	1. Kop-Coat 622 LCF Primer	1. Kop-Coat K201
E. Bare Bronze	Aboveground	Flat White (Barrier Coat)	<u>Equipment Yellow</u>
1. Rough Finish Fire Hydrant Heads		1. Rust-Oleum #2764	1. Rust-Oleum #7645

APPROVED MATERIAL LIST

INDIAN WELLS VALLEY WATER DISTRICT APPROVED MATERIAL LIST

	<u>DESCRIPTION</u>	<u>MANUFACTURER</u>	<u>ITEM</u>
<u>A. PIPE</u>			
A-01	<u>10 Ga Welded Steel Pipe, CML/CMC</u>		
	1. Bell & Spigot	Ameron Calif. Steel Pressure Pipe Kelly Pipe Northwest Pipe Southland Pipe	
A-02	<u>Standard Weight Pipe, CML/CMC</u>		
	1. Bell & Spigot	Ameron Calif. Steel Pressure Pipe Kelly Pipe Northwest Pipe Southland Pipe	
A-03	<u>Ductile Iron Pipe</u>		
	1. Class 150 to 350 with Double Thickness CML, without Taper, No Interior Asphalt Seal Coat, Push-On, Rubber Gasketed Tyton Interchangeability	American Pacific States U.S. Pipe	
A-04	<u>Polyvinyl Chloride (PVC) Pressure Pipe (AWWA C-900 and C-905)</u>	JM Pipe Diamond Plastics Scepter Certainteed	Blue Brute & Big Blue Centurion Vinyl Iron Pipe
A-05	<u>Brass Pipe (Lead Free)</u>		
	1. Red Hard Brass, ASTM	Bridgeport Merit Brass Mueller	
A-06	<u>Copper Pipe</u>		
	1. 1" Flexible Type	IUSA	
	2. 2" Rigid Copper		

INDIAN WELLS VALLEY WATER DISTRICT APPROVED MATERIAL LIST

(Continued)

	<u>DESCRIPTION</u>	<u>MANUFACTURER</u>	<u>ITEM</u>
<u>B. VALVES</u>			
B-01	<u>Gate Valves</u>		
1.	Flanged, 2" - 10", Resilient Seat, Epoxy Lined and Coated, Ductile Iron Body	AVK Clow U.S. Pipe	
B-02	<u>Butterfly Valves</u>		
1.	Flanged, 12" - 42", Rubber Seat in Body, Epoxy Coated Inside and Outside	Dezurik Pratt (Groundhog) Clow	
B-03	<u>1" Corporation Stop</u>		
1.	IPT Inlet/Outlet	Mueller Jones Ford	H-10012 J41 F-500-4
2.	Inlet, AWWA Taper Thread X IPT Outlet (DIP Only)	Mueller Jones Ford	H-9996 J-1944 FB-400-4
B-04	<u>2" Corporation Stop (2" Corporation Stop on 12" DIP Mains and Smaller shall be with IPT Service Saddle, Larger Main shall be Direct Tap with AWWA Taper Threads)</u>		
1.	IPT Inlet/Outlet	Mueller Jones Ford	H-10013 J-1955 FB-500-7
2.	AWWA Taper Thread Inlet X IPT Outlet (Ductile Iron Pipe Only)	Mueller Jones Ford	H-9996 J-1956 FB-400-7
B-05	<u>1" Angle Meter Stop</u>		
1.	Inside IPT Inlet X Inside IPT Swivel Nut Outlet-Lock Wing	Mueller Jones Ford	H-14265-1" Inlet/Outlet J-1527 KV-13-444W

INDIAN WELLS VALLEY WATER DISTRICT APPROVED MATERIAL LIST

(Continued)

	<u>DESCRIPTION</u>	<u>MANUFACTURER</u>	<u>ITEM</u>
B-06	<u>1" Angle Meter Stop (Service Manifolds)</u>		
	1. Inside IPT Inlet X Inside IPT Swivel Nut Outlet-Lock Wing	Mueller Jones Ford	H-14265-1" Inlet/Outlet J-1527 KV-13-444W
B-07	<u>2" Angle Meter Stop (All 1-1/2" & 2" Services)</u>		
	1. Inside IPT Inlet X Slotted Flange Outlet-Lock Wing	Mueller Jones Ford	H-14286 J-1974W BFA 13-777W
B-08	<u>1" Customer Control Valve</u>		
	1. 1" Ball Valve, Inside IPT Inlet/Outlet	Jones Ford	J-1905 B11-444-HB34-S
B-09	<u>1-1/4" Customer Control Valve</u>		
	1. 1-1/4" Brass Gate Valve, Inside IPT X Inside IPT	Milwaukee Watts	105 GV-1-1/4"
B-10	<u>2" Customer Control Valve</u>		
	1. 1" or 2" Brass Gate Valve, Inside IPT X Inside IPT	Milwaukee MATCO	105 200 WOG
	2. 1" or 2" Bronze Gate Valve, IPT X IPT	Crane Watts MATCO	No. 487 GV-1" or GV-2" 200 WOG
<u>Air Valves</u> Note: All air valves shall have ductile iron bodies and covers, stainless steel floats (rated 1,000 psi min.), stainless steel internal working parts and seats, and white Viton "O" rings.			
B-11	<u>1" Air Valves</u>	APCO Crispin Val Matic	140-C A and AL series 100SSV-M
B-12	<u>2" Air Valves</u>	APCO Crispin Val Matic	140-C A and AL series 100SSV-M
B-13	<u>4" + Air Valves (Flanged Only)</u>	APCO Crispin Val Matic	140-C A and AL series 10(size)SSV-M

INDIAN WELLS VALLEY WATER DISTRICT APPROVED MATERIAL LIST

(Continued)

	<u>DESCRIPTION</u>	<u>MANUFACTURER</u>	<u>ITEM</u>
B-14	<u>3/4" Ball Valves (Backflow Devices)</u>		
	1. Tapped Made for use with Febco, Hersey, Watts, or Wilkens	Fortuna Figure MATCO Ford	601-QT UPC 4798
B-15	<u>1" Ball Valves (Backflow Devices)</u>		
	1. Tapped Made for use with Febco, Hersey, Watts, or Wilkens	Fortuna Figure MATCO Ford	601-QT UPC 4798
B-16	<u>1-1/2" Ball Valves (Backflow Devices)</u>		
	1. Tapped Made for use with Febco, Hersey, Watts, or Wilkens	Fortuna Figure MATCO Ford	601-QT UPC 4798
B-17	<u>2" Ball Valves (Backflow Devices)</u>		
	1. Made for use with Febco, Hersey, Watts, or Wilkens	Fortuna Figure MATCO Ford	601-QT UPC 4798
B-18	<u>Flap Valve</u>	Clow	F-3012
B-19	<u>Detector Check</u>	Hersey Nibco Walworth	Model DC

C. FLANGES

Note: All flanges shall be forged or plate steel material. Flanges 2" through 12" shall be AWWA Class E Hub or ANSI B16.5 Class 150. Flanges 14" and larger shall be AWWA Class E Ring Flanges.

C-01	<u>Weld Flanges</u>		
	1. Flat Face	N/A	N/A
	2. 6 Hole F.H. Flange (Full Face)	N/A	N/A
C-02	<u>Reducing Flanges</u>	N/A	N/A
C-03	<u>Blind Flanges</u>	N/A	N/A

INDIAN WELLS VALLEY WATER DISTRICT APPROVED MATERIAL LIST
(Continued)

	<u>DESCRIPTION</u>	<u>MANUFACTURER</u>	<u>ITEM</u>
<u>D. FITTINGS</u>			
D-01	<u>10 Ga Welded Steel Pipe, CML/CMC</u>	Ameron Calif. Steel Pressure Pipe Kelly Pipe Northwest Pipe Southland Pipe	
D-02	<u>Standard Weight Pipe, CML/CMC</u>	Ameron Calif. Steel Pressure Pipe Kelly Pipe Northwest Pipe Southland Pipe	
D-03	<u>Ductile Iron Pipe, CML</u>		
	1. Flanged C110/A21.10	Tyler Pipe Union Foundry U.S. Pipe	
	2. Push-on Rubber Gasketed C153/A21.10 (Tyton Bell Interchangeability)	Tyler Pipe Union Foundry U.S. Pipe	
D-04	<u>Asbestos Cement Pipe</u>		
	1. Push-on Rubber Gasketed C153/A21.10 (Tylon Bell Interchangeability)	Tyler Pipe Union Foundry U.S. Pipe	
D-05	<u>Polyvinyl Chloride Pipe (PVC)</u>		
	1. Push-on Rubber Gasketed C153/A21.10 (Tylon Bell Interchangeability)	Tyler Pipe Union Foundry U.S. Pipe	
D-06	<u>Brass</u>	Flagg Flagg Stockton	
<u>E. VAULTS/METER BOXES</u>			
E-01	<u>Concrete Meter Box with Concrete Cover and Reading Lid (1" Service)</u>	Brooks J&R Quikset Christy's	37 Series No. W-4-1/2 No. W-20
	<u>Polymer Meter Box with Polymer Cover and Reading Lid (1" Service)</u>	J&R Carson Christy's	No. 4-1/2

INDIAN WELLS VALLEY WATER DISTRICT APPROVED MATERIAL LIST
(Continued)

	<u>DESCRIPTION</u>	<u>MANUFACTURER</u>	<u>ITEM</u>
E-02	<u>Concrete Meter Box with Concrete Cover and Reading Lid (1-1/2" & 2" Service)</u>	Brooks J&R Quikset Christy's	65S Series No. W-5-1/2 No. W-30
	<u>Polymer Meter Box with Polymer Cover and Reading Lid (1-1/2" & 2" Service)</u>	Christy's J&R Carson	No. 5-1/2
E-03	<u>Precast Concrete Parkway Vault</u>	Brooks	700-A Series
E-04	<u>Concrete Valve Box with Cast Iron Face & Cover for Traffic Use</u>	Brooks J&R	4-TT Series No. V4-T
E-05	<u>Concrete Box with Steel or Concrete Cover (1" or 2" A.V.)</u>	Brooks J&R Quikset	38 Series No. 5-1/4 No. W-24
E-06	<u>Concrete Box with Cast Iron Traffic Cover (2" Blowoff)</u>	Brooks J&R Quikset	3 Series No. W3 No. W-16
E-07	<u>Valve Box Extensions</u>	Brooks	No. 1-RT-6 & 1-RT-12
E-08	<u>Traffic Vault</u>	Brooks J&R	W-200 Series No. 2640-1W
E-09	<u>Cast Iron Valve Box Cover</u>	Westernworks	No. 64
<u>F. FIRE HYDRANTS</u>			
F-01	<u>Residential</u>	AVK Jones Long Beach	24/40 J-3740 LB-425
F-02	<u>Commercial</u>	AVK Jones Long Beach	24/50 J-4060 LB-430

INDIAN WELLS VALLEY WATER DISTRICT APPROVED MATERIAL LIST
(Continued)

	<u>DESCRIPTION</u>	<u>MANUFACTURER</u>	<u>ITEM</u>
G. <u>BACKFLOW DEVICES</u>			
G-01	<u>Reduced Pressure</u>		
1.	3/4" - 2"	FEBCO Hersey/Grinnell	LF825Y FRP-2
2.	2-1/2" - 10"	WATTS FEBCO	994RPDA 957R series LF826YD
3.	2" - 10"	Wilkins	950
G-02	<u>Detector Double Check Valve Assembly</u>		
1.	2-1/2" - 12"	WATTS FEBCO Wilkins	LF774DCDA LF856 806YD 950
G-03	<u>Double Check</u>		
1.	3/4" - 3" (No 1-1/4")	WATTS	LF007
2.	2-1/2" - 10"	FEBCO	805YD 850
3.	3/4" - 8" (No 10")	Wilkins	950 series
4.	3/4" - 2" (No 1")	Hersey/Grinnell	FDC
5.	2-1/2" - 12"	Watts	LF774NRSRW
G-04	<u>Continuous Pressure Vacuum Breaker Assembly</u>		
1.	1/2" - 2"	FEBCO Wilkins WATTS	765 720-A LF 800M4QT

INDIAN WELLS VALLEY WATER DISTRICT APPROVED MATERIAL LIST
(Continued)

	<u>DESCRIPTION</u>	<u>MANUFACTURER</u>	<u>ITEM</u>
<u>H. MISCELLANEOUS</u>			
H-01	<u>Service Saddles</u>		
1.	Double Strap, Bronze 1" or 2" IPT Outlet	Ford Jones Smithblair	202-B J-979 323
2.	Wide Strap Service Saddle (PVC Pipe) (All Bronze) 1" or 2" IPT Outlet	Ford Jones Smithblair	 J969 397
3.	Steel Threaded Coupling (Extra Heavy)	Crane	N/A
H-02	<u>Flanged Coupling Adapters</u>		
1.	DI & PVC Pipe	Romac Smithblair Baker Dayton	FCA 501 912 602
2.	Asbestos Cement Pipe	Romac Smithblair Baker	FCA 501 916 602
H-03	<u>Concrete</u> (Portland Cement Mix Design)	Various(Must be 2000 psi + design)	
H-04	<u>Gaskets, Ring Flange</u>		
1.	1/16" Non-Asbestos	Garlock Klinger	
2.	1/8" Flange Tyte (DIP Only)	U.S. Pipe	
H-05	<u>Gaskets, Fire Hydrant</u> (Threaded Flange)	Romac	

INDIAN WELLS VALLEY WATER DISTRICT APPROVED MATERIAL LIST
(Continued)

	<u>DESCRIPTION</u>	<u>MANUFACTURER</u>	<u>ITEM</u>
H-06	<u>Nuts, Bolts (Unplated)</u> Certifications Required		
	1. Fire Hydrant Bolt to be Breakaway 5/8" x 2-3/4", and 3" U.S. Only A-307	Nucore	
	2. All Other Bolts 5/8" to 1-1/2" Diameter U.S. Only, A-325	Nucore	
H-07	<u>Tracing Wire - Copper</u> (500 ft Rolls Max)		
	1. Coated 14 Gage	N/A	N/A
H-08	<u>Pipe Wrap</u>	Protecto Wrap	#200A
H-09	<u>Bronze 90°</u>		
	1. 2"	Mueller	H15533
H-10	<u>Stainless Steel Bands (Air Valve Screens)</u>	Band-it SmithBlair	
H-11	<u>Pipe Dope</u>	Whitlam Select Teflon	Unyte TP8
H-12	<u>Meter Couplings</u>		
	1. 1" Insta-Tite Straight Coupling Male IPT (Outlet X Insta-Tite Inlet)	Mueller	H15426
	2. 1" Insta-Tite Straight Coupling Female IPT (Inlet X Insta-Tite Outlet)	Mueller	H15456
	3. 2" Pack Joint Coupling Female IPT Inlet	Ford	C-16-77
	4. 2" Pack Joint Coupling Male IPT Outlet	Ford	C-87-77
	5. 2" Slotted Flange X Male IPT Coupling	Ford	CF-38-71-1.937
	6. PEC X IPT 1/4 Bend	Haystite	5304

INDIAN WELLS VALLEY WATER DISTRICT APPROVED MATERIAL LIST
(Continued)

	<u>DESCRIPTION</u>	<u>MANUFACTURER</u>	<u>ITEM</u>
H-13	<u>Brass Nipple</u>		
	1. 1" x 12"	Lee Brass Edmond Gray MATCO	
	2. 2" x 18"	Lee Brass Edmond Gray MATCO	
H-14	<u>Meter Bushings</u>		
	1. 3/4"	Neptune	T-10
	2. 1" x 5/8"	Ford	C31-24
	3. 1"	Ford	C31-44
H-15	<u>Meters</u>		
	1. 3/4"	Neptune	T-10
	2. 1" or 2"	Neptune TRU-FLO	OP 400/500
	3. 2" or Larger Compound Meter	Hersey Protectus	MCT II
H-16	<u>Bolt Anti-Seize Material</u>		
		Flo-Pro Hi-Temp Lawson Lubri-Temp VHT 2000 Plus	C5-A 19920
H-17	<u>Tapping Saddles</u>		
		Ford Smithblair Romac	FTSC 622 FTS420
H-18	<u>End Caps with Threaded Tap & Plug</u>		
	1. DI & PVC Pipe	Romac Smithblair Baker	EC 501 482 407
	2. Asbestos Cement Pipe	Romac Smithblair Baker	EC 501 482 407
H-19	<u>Air Valve Screen</u>		
		CEBE Products	N/A

INDIAN WELLS VALLEY WATER DISTRICT APPROVED MATERIAL LIST
(Continued)

	<u>DESCRIPTION</u>	<u>MANUFACTURER</u>	<u>ITEM</u>
H-20	<u>Victaulic Couplings</u>	Victaulic Company of America	Style 77 Style 44
H-21	<u>Threaded Pipe Union</u>	Watts	Series 3006
H-22	<u>Nylon Insulating Bushing</u>	Corrosion Control Products	

C178/4P2-AML
Updated 3/1/12 by TR