

DESIGN STANDARDS AND INSTALLATION REQUIREMENTS FOR CONTRACTORS



WATER DISTRIBUTION DIVISION



These requirements present general and special conditions the Applicant shall meet in order to install a water distribution system for the Los Angeles Department of Water and Power (LADWP). The requirements shall complement LADWP-approved project drawings, and be incorporated with the binding Agreement between LADWP and the Applicant or Agency. General conditions include those which are common to all Water System projects such as: safety, planning and coordination, inspection, excavation, pipe installation, hydrant and service installation, resurfacing and water system testing. Special conditions identify unique requirements for each pipe material, including but not limited to ductile iron and steel. Material specifications shall be acquired from LADWP's Engineer once project drawings have been approved. Typical standard installation details are provided within this document. Additional details needed for specific non-standard designs will be provided during the plan check process.

APPROVED:



Breonia L. Lindsey
Director of Water Distribution

DATE:



Record of Revisions

Revision Date	Description of Major Change	Section
July 2023	Updated Standard Drawing numbers with new prefix "PC."	Standard Drawings Index; Chapter 8
	Updated application requirements.	Section 201.7 - Permits
	Added requirement that no mains will be installed on the sidewalk.	Section 302.2 – Layout of the Distribution System
	Added thrust block design requirements when mains are suspended due to excavations.	Section 302.11 – Thrust Blocks
	Removed Section 401.11.F (1-4) regarding material procurement from LADWP due to LADWP's Material Procurement Policy for Infrastructure Modifications (Appendix F).	Section 401.11 – Material Inspection, Handling, and Storage
	Updated Criteria for the Separation of Water Mains and Non-Potable Pipelines.	Chapter 7, Appendix D
	Updated 30%, 60%, 90%, and 100% Plan Check details.	Chapter 7, Appendix E
	Updated Sample Agreement for Installation and Transfer of Title of Water System Facilities.	Chapter 7, Exhibit 3
	Added new LADWP Material Procurement Policy for Infrastructure Modifications (Appendix F).	Chapter 7, Appendix F

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Chapter 1 - **GENERAL**

Section 101 - General

101.1 Authority

The Design Standards and Installation Requirements (“Standards”) are promulgated by the Engineer in Charge (“Engineer”) of the Los Angeles Department of Water and Power (LADWP) Water Distribution Division.

These Standards apply to the preparation of the plans and specifications for the installation of all water distribution facilities under the control of the Engineer. Such control will be exercised under authority granted by the Board of Water and Power Commissioners of the City of Los Angeles (“Board”) and in accordance with the Rules Governing Water and Electric Service in the City of Los Angeles.

Any variance from these Standards that occurred or was authorized in the past or that may be authorized in the future shall not restrict or limit LADWP in the exercise of its lawful powers. No action in violation of these Standards by any person making any connection, disconnection, repair, or otherwise doing work with respect to any water facility served with water from the Distribution System, shall continue after discovery of such violation, or the enforcement of corrective action pertaining to such violation shall be enforced.

101.2 Effective Date of Standards

These Standards supersede all former Engineering Standards of the Water Distribution Division, which are in conflict herewith.

101.3 Revisions, Amendments or Additions

LADWP reserves the right to add, delete, modify, change, or amend any or all the plans and specifications for the purpose of ensuring the adequacy of the design and conformance with the latest standards and specifications.

101.4 Organization and Interpretation of Standards

These Standards are composed of written Engineering Standards, Installation Requirements, Standard Drawings, Appendices, and Exhibits. The interpretation of any section, or of differences between sections, when appropriate, shall be made by the Engineer or his or her authorized representative, and his or her interpretation shall be binding and controlling in its application.

101.5 Definitions

As used in these Standards, except where noted, the words defined in this paragraph shall have the meanings herein ascribed:

- A. **Applicant:** Any person, association, corporation, entity, or government agency desiring water service for premises under their control which the LADWP is obligated to serve; often a Developer.
- B. **Approved Plans:** Design plans signed by LADWP. Shall be kept at the construction site for progress redlines by the Contractor.
- C. **Board:** The Board of Water and Power Commissioners of the City of Los Angeles.

- D. Contractor: In the context of these Standards, a Contractor employed by the Applicant to install a main extension, including general and subcontractors.
- E. Developer: Owner of certain land, obtaining a water supply adequate for domestic uses and public fire protection purposes.
- F. LADWP: The plant, facilities, system assets, and personnel controlled by the Board pursuant to its charter authority.
- G. Engineer of Record: The Professional Engineer, registered by the State of California, employed by the Applicant to design, prepare plans, and conduct related engineering activities necessary to complete a main extension. Also referred to as Applicant's Engineer.
- H. Distribution Main: A 12-inch (12") or smaller diameter pipe along public streets or appropriate right-of-way generally used for distributing water to individual consumers.
- I. Distribution System: Water mains, together with all appurtenant and necessary valves, fire hydrants, meters, service laterals, and associated material and equipment which carry potable water and distribute it to individual consumers.
- J. Engineer: The Engineer in Charge of the Water Distribution Division (or his or her authorized representative).
- K. Inspector: The authorized representative of the Engineer assigned to a jobsite.
- L. Los Angeles: The territorial limits of the City of Los Angeles, inside which the LADWP has complete control of the Distribution System, including ownership, construction, operation, and maintenance of all facilities, reading of meters, and billing of customers.
- M. Main Extension: An extension to the Distribution System that is needed to serve a new development, including replacement of an existing portion of the Distribution System.
- N. Private Pipe Extension: An extension that provides on-site domestic service or fire protection service on the consumer's side of the LADWP's water meter.
- O. Section: The words Section and Division are used as organizational subdivisions of the LADWP (e.g., Planning Section, Water Division, etc.).
- P. Service Lateral: The pipe or tubing, fittings, valves, and appurtenances necessary to convey water from the Water Main to the LADWP's meter.
- Q. State: State of California.

- R. Supply Main: A greater than 12-inch (12”), but smaller than 24-inch (24”) diameter pipe, generally receiving potable water from a Trunk Line, pumping station, or storage facility which delivers water to Distribution Mains or distributes it to individual consumers.
- S. Tap: Physical connection to a Water Main, which together with appropriate metering, effects water service to individual consumers.
- T. Total Service Area: Los Angeles and the area surrounding Los Angeles where the LADWP is responsible for the construction, operation, and maintenance of the Distribution System, reading of meters, and billing of customers in a manner like that within the City of Los Angeles.
- U. Trunk Line: A 24-inch (24”) or larger diameter pipe carrying raw or potable water from or to treatment facilities and storage reservoirs, and to delivery points which feed Supply and Distribution Mains. May also, with approval of the Engineer, distribute water to individual consumers.
- V. Water Main: A Distribution or Supply Main.

101.6 Abbreviations

All references to documents or specifications shall be the latest edition or revision thereof.

- A. AC: Asbestos Cement (Transite)
- B. ASTM: American Society for Testing and Materials
- C. AWWA: American Water Works Association
- D. AWS: American Welding Society
- E. BCR: Beginning of Curve Return
- F. BOE: City of Los Angeles Bureau of Engineering
- G. Cal/OSHA: California Division of Occupational Safety and Health
- H. CLSM: Controlled Low Strength Material
- I. CSLB: California Contractors State License Board
- J. CI: Cast Iron
- K. DCI: Dual Cast Iron
- L. DE: District Engineer
- M. DI: Ductile Iron
- N. ERDIP: Earthquake Resistant Ductile Iron Pipe
- O. FM: Factory Mutual (i.e. Fireline Service)
- P. FRP: Fiberglass Reinforced Plastic
- Q. LADBS: Los Angeles Department of Building and Safety
- R. LADWP: Los Angeles Department of Water and Power
- S. LASAN: City of Los Angeles Bureau of Sanitation
- T. DWPWS: Los Angeles Department of Water and Power, Water System
- U. NACE: National Association of Corrosion Engineers
- V. PCE: Plan Check Engineer
- W. psi: pounds-per-square-inch
- X. RPC: Reinforced Polymer Concrete
- Y. RPM: Reinforced Polymer Mortar
- Z. SL: Springline
- AA. SSPWC: Standard Specifications for Public Works Construction

- BB. SWRCB: California State Water Resources Control Board
- CC. WATCH: Work Area Traffic Control Handbook
- DD. WSR: Water System Representative

Chapter 2 - MAIN LINE EXTENSION & EASEMENT REQUIREMENTS

Section 201 - Main Line Extension & Easement Requirements

201.1 Inside Los Angeles

The Board has complete charge and control of its Distribution System inside the City of Los Angeles ("City") under the provisions of the Charter. LADWP, under authority extended by the Board, owns, operates, and maintains all facilities within the City.

201.2 Outside Los Angeles

LADWP generally serves only areas within the City. However, it also serves various areas outside the territorial boundaries of the City which were once served by water companies acquired by LADWP. LADWP owns, operates, and maintains all facilities in those areas.

201.3 Engineering Standards to Apply

All agreements for the receipt of water from LADWP and the design and installation of all such systems are subject to all rules and regulations of the City Charter and Rules Governing Water and Electric Service in the City of Los Angeles. These Standards apply only to main extensions which will be incorporated into the Distribution System.

201.4 Application Procedure

LADWP has established, and may amend, procedures to be followed by Applicants for extension of mains. These procedures will include all requirements for paperwork, submittals, fees, engineering design, construction, and acceptance. Applicants for main extensions will generally be required to design and construct main extensions required for their development. Construction should not be anticipated to start sooner than six (6) months after plans for marking are received by LADWP and plan check and inspection fees are paid. The subsequent text illustrates the engineering design and construction portions of the application procedure:

- A. For new subdivisions, the City Engineer or City Planning transmits to LADWP a copy of the final subdivision map. For projects not involving a new subdivision, the Applicant submits to LADWP's Water Service Representative (WSR) an overall or master plan showing the area to be developed, and any other adjoining developments proposed by the Applicant; a preliminary subdivision plan; lists of all properties to be served; and all taps, if known, to be made on the proposed Main Extension.
- B. The WSR transmits to the Applicant an interim letter and estimate of charges.
- C. At Applicant's request, the WSR transmits to the Applicant the "Agreement for Installation and Transfer of Title of Water System Facilities," insurance forms, and an updated estimate of charges. A sample agreement can be found within Exhibit 3Exhibit 3.
- D. The Applicant makes financial arrangements with the WSR and submits two (2) copies of the final subdivision map, or master plan to the WSR for marking of required Water System facilities.

- E. LADWP's District Engineer (DE) will coordinate a pre-design meeting with the Applicant's Engineer to discuss the existing Distribution System and the necessary requirements for the design, and the following criteria:
 - 1. Points of connection to existing facilities.
 - 2. Size and material of mains to be installed.
 - 3. General location of mains, gate valves and fire hydrants to be installed.
 - 4. Special features.
- F. The Applicant submits a 30% conceptual design to the DE, one (1) electronic set in PDF format and one (1) copy in AutoCAD format for review and approval in accordance with Sections 201.5 and 201.6. The acknowledgement letter described in Section 201.5, grading plan, plot plan, recorded subdivision map or easement deed, power plan (if available), City Engineer's substructure and sanitary sewer "wye" maps, and Public Works improvement plans signed by the City Engineer or District/Division Engineer (or latest copy) shall also be submitted at this time.
- G. The Applicant submits to the WSR the agreement executed by the Applicant, financial guarantee, steel pipe inspection fee if steel pipe is not purchased from LADWP, and completed insurance forms.
- H. The DE returns the conceptual design drawing to the Applicant's Engineer. The engineer will develop the design and begin the formal plan check process at 60% design at which point the plan check engineer (PCE) will provide the review and approval.
- I. After approval of the plans. The Applicant or Applicant's Contractor calls the PCE to arrange for a pre-construction meeting to be held at the job location at least four (4) weeks prior to start of construction and no sooner than two (2) weeks after approval of construction plans.
- J. The Applicant starts construction of the Main Extension in accordance with Section 201.8 after curbs and gutters are in place. See Chapter 4 for more details.
- K. The Applicant finishes construction; prepares field notes and as-constructed drawings in accordance with the Field Notes and As-Constructed Drawings Manual and submits the drawings to LADWP's (PCE) for review and approval.
- L. The WSR requests the Applicant to submit one-year financial guarantee, a "Bill of Sale" and payment for all fees including a deposit guaranteeing completion of remaining work.
- M. The WSR notifies the Applicant that the Main Extension is accepted.

201.5 Engineering

All plans and specifications submitted to the Engineer for review and approval of a main extension shall be prepared by, or by someone under the direct supervision of, a Professional Engineer registered by the State of California ("State").

The Professional Engineer shall be responsible for the preparation of the design, plans, specifications and for conducting required field surveys for design purposes. All submitted plans and specifications shall bear the Professional Engineer's seal or stamp prior to approval for construction.

The Applicant, Contractor, and Professional Engineer associated with the plans shall be responsible for the adequacy and satisfactory performance of the design and the installation of all items therein, and any failure or unsatisfactory performance of the system, so constructed, shall not be a cause for action against LADWP. LADWP does not perform engineering services for any person or entity in connection with its review of plans. Approval of plans by LADWP signifies only that the plans meet the minimum requirements of these Standards based upon the information provided to LADWP by the Professional Engineer and/or Applicant/Contractor and makes no finding, representation, or warranty that the system and associated components will perform any certain function.

If the Professional Engineer responsible for the plans disagrees with any changes required by the Engineer as a result of LADWP's review of the plans, such disagreement shall be brought to the attention of the Engineer for resolution prior to the start of construction of the project set forth in the plans. The seal or stamp of the Professional Engineer on plans corrected and approved for construction will signify that the Professional Engineer has reviewed, approved, and authorized the corrected plans for construction.

The plans and specifications approved by the Engineer shall govern when in conflict with these Standards and other plans or specifications.

201.6 Plans and Specifications

All plans and specifications submitted shall be in strict compliance with the Standards contained herein and shall meet any special conditions that may be reasonably required. Sample plans will be provided when requested by the Applicant's Engineer. The design and installation of all facilities shall ensure development of an integrated Water System. No work shall commence on any facilities until the plans and specifications are approved in writing by LADWP and all necessary permits are obtained. Plans and specifications become the property of LADWP when submitted.

Detailed plans and specifications shall be submitted to LADWP for review and approval. The plans shall conform to, and contain the following:

- A. All plans shall be drawn on LADWP-provided AutoCAD standard border 14 inches high by 34 inches wide (14" x 34").
- B. The original drawing shall be legible, drawn in AutoCAD per the most current LADWP standards. Drafting standards will be provided by LADWP prior to the Pre-Design meeting.

- C. A title block on each sheet in the lower right-hand corner, containing pertinent information concerning that sheet, including the street name(s), sheet number, and date completed.
- D. A title sheet containing the following:
1. A key map of a suitable scale showing the limits of each subsequent sheet, and having the North Arrow directed in an upward position.
 2. A LADWP-provided "Notice to Contractors" per current standards. See Appendix A Request for Contractor Prequalification.
 3. "General Notes" listing water service requirements, special construction notes, and LADWP standard drawings applicable to the Main Extension.
 4. Job titles, plan numbers, and construction permit numbers of Public Works plans and other agency plans for work within the limits of the Main Extension. The information shall be placed directly above the title block.
 5. "Inspection Work Order No." and DWP "Connection Work Order No." when applicable, directly above the title block and to the right of the information required under Item 4.
 6. A business block identifying the name and address of the business that prepared the plan. The business block shall be located to the left of the title block.
 7. The stamp and signature of the Professional Engineer, registered in the State, responsible for the design of the Main Extension. The stamp shall be placed adjacent to the business block.
 8. Details showing unusual utility crossings and Water System installations not contained within Chapter 8 Standard Drawings. Details may overflow onto subsequent sheets.
- E. Layout sheets drawn in accordance with the following guidelines:
1. Lettering in Reinhart Style - uppercase, vertical or slanted, with size and weight appropriate to the size and the importance of the text. Street names shall be the largest size. The next smaller size shall be used for Work Order numbers, centerline designations, street widths, pipe activity instructions, and material items. The smallest sized letters shall be used for substructure identification, informational notes, curb locations, and similar information. The importance of the information to be conveyed by the words or symbols shall determine the letter size and the boldness of the text.
 2. North Arrow shall be directed in an upward position and towards the left if necessary. The arrow shall not point down or to the right except for segmented portions of winding streets where continuity to the adjoining portions of the drawing is important.

3. Horizontal scale shall be one-inch equals 40 feet (1" = 40'), except on occasions when the drawing is extremely congested with details or substructures; then a scale of one-inch equals 20 feet (1" = 20') or one-inch equals ten feet (1" = 10') shall be used.
 4. Substructures and water mains shall be referenced laterally in accordance with the following rules:
 - a) For the area north of Mulholland Drive, calculate the horizontal distance along the line perpendicular to the street centerline from the latter to the center of the facility being referenced.
 - b) For the area in and south of Mulholland Drive, calculate the horizontal distance along the line perpendicular to the nearest property line (right-of-way line) from the latter to the center of the facility being referenced.
 5. Connections, fire hydrants, blow offs, services larger than two-inch (2"), air valves, and bends or elbows causing a shift in lateral location of main shall be referenced longitudinally in accordance with the following rules:
 - a) For the area north of Mulholland Drive, calculate the distance along the longitudinal street centerline, from the nearest point of intersection of street centerlines to the point whose tangent is perpendicular to the line projected to the facility being referenced.
 - b) For the area in and south of Mulholland Drive, calculate the distance along the surface over the pipe and parallel to the nearest property line from the point where the pipe intersects the nearest crossing property line (produced), to the center of the facility being referenced.
 6. Plan based on actual field surveys by a Professional Land Surveyor, registered by the State. The survey must be referenced to official survey control points, be of sufficient accuracy so that the facilities can be accurately staked for installation, and be readily located after installation for operation, maintenance, tapping, and control.
- F. Layout sheets showing:
1. Location and dimensions of dedicated streets and easements.
 2. Lots to be served.
 3. All existing and proposed curbs and pavement including pavement join lines.
 4. A table containing water line curve data for steel water main extensions showing deflection, radius, and length of each curve.

5. The proposed alignment of the water main properly symbolized if cathodically protected and the location of all proposed Distribution System facilities such as fire hydrants, blow offs, air valves, etc.
 6. All existing and proposed substructure utilities properly identified and located. Refer to the Standard Drawings.
 7. All existing and proposed obstructions such as vaults, catch basins, traffic islands, etc.
 8. All existing and proposed fittings such as tees, bends, reducers, insulating joints, gate valves, etc.
 9. All proposed thrust blocks or other joint restraining devices.
 10. Lists of material identifying all pipe and fittings used on each street for every sheet in accordance with the current Standard Drawings.
 11. The approved permanent water source which can supply sufficient water for chlorination, flushing and hydrostatic testing.
 12. Sufficient adjacent area to give the relation of new facilities to existing facilities.
- G. Layout sheets with a center of pipe profile for all main extensions in non-paved areas. Profile shall show:
1. Existing ground line.
 2. Finished grade.
 3. The spring line (SL) elevation at grade breaks and the slopes of the water main.
 4. The SL elevations of all outlets.
 5. All proposed and existing utility crossings.

When a conflict occurs between or within standards, specifications, and drawings in this manual, an interpretation shall be made by the Engineer pursuant to Section 101.4 of these standards.

Addenda and modifications to the drawings and specifications take precedence over the original documents. On the drawings, calculated dimensions shall take precedence over scaled dimensions and noted material over graphic indication.

Dedicated streets and easements shall conform to the requirements of other sections of these Standards. The copy of the recorded subdivision map furnished in the final submittal, a recorded copy of the deed for the property involved, or a recorded copy of

an easement shall be furnished to LADWP as evidence of conformance with Section 302.2 of these Standards.

201.7 Permits

LADWP will not apply for other permits or exemptions required by the city of Los Angeles or by the Department of Drinking Water on behalf of the applicant. All applicants will be responsible for obtaining permits such as but not limited to excavation permits, B permits, shoring permits, exemptions for clearance variances, etc. Permits for construction of main extensions in public right-of-way and easements to LADWP will be secured by the applicant. Permits required for use of LADWP property shall be secured by the Applicant in accordance with Section 202.4.

201.8 Construction Procedure

In addition to all construction requirements contained in other portions of these Standards, the Applicant and Contractor shall observe the following:

- A. Construction shall commence within six (6) months of the approval date shown on the plans, or the plans shall be resubmitted for review and approval. If construction on the main installation is halted for more than six (6) months, plans shall be resubmitted for review and approval.
- B. The Contractor shall contact the appropriate Water Services Representative (PCE) at the telephone number shown on the approved plans under "Notice to Contractors" to arrange a pre-construction meeting with the Professional Engineer who designed the Main Extension, LADWP personnel, and the Applicant at least two (2) weeks after approval of construction plans and at least four (4) weeks prior to initiating any Distribution System construction. The purpose of the meeting shall be to discuss the construction project, scheduling, materials, and to define responsibilities for the personnel involved in the project. The Contractor shall give at least a two (2) working day notice to LADWP prior to commencing construction by calling the PCE.
- C. In case of an emergency during non-working hours, LADWP's customer telephone service, (800) DIAL-DWP, shall be notified.
- D. The Contractor shall make provisions for notification of customers who will be temporarily out of water. Outages shall be kept to a minimum in compliance with Section 401.29C of these Standards.
- E. Construction shall not commence until proposed curbs and gutters are in place.
- F. The Main Extension shall be surveyed in accordance with Section 401.8 of these Standards if installed in an area without curbs.
- G. Prior to the installation of mains in dedicated streets and easements, construction shall have progressed to within 15 inches (15") of the finished street grade.
- H. All material needed to complete the work shall be available at the start of construction so that the project may proceed without delay.

- I. Welding shall be performed by LADWP-approved operators currently qualified under the current Standard Qualification Procedure of the American Welding Society (AWS).
- J. Steel main extensions shall be placed under a galvanic cathodic protection system installed and tested by a Corrosion Engineer registered by the State, Corrosion Specialist certified by the National Association of Corrosion Engineers (NACE), or someone under their direct supervision.
- K. The Contractor shall cooperate with the Engineer of Record in compiling as-constructed data of the Main Extension by completing the Field Notes Drawing in accordance with LADWP's latest Field Notes and As-Constructed Drawings Manual. Accuracy shall be to within 0.5 feet horizontally and to within 0.1 feet vertically. As-constructed survey data shall be provided for 16-inch (16") and larger Supply and Distribution Mains and Trunk Lines installed in the absence of curbs.
- L. The Inspector shall be notified whenever it becomes necessary to open or close a valve on the existing Water System. Only authorized LADWP personnel are to operate valves in the Distribution System. See Section 401.29C of these Standards.
- M. Mains shall not be installed unless they can be extended from an approved permanent water source which can supply sufficient water for flushing, hydrostatic testing, and disinfection.
- N. All standpipes, maintenance holes, fire hydrants, and other main appurtenances shall be adjusted to the final finished grade by the Contractor.
- O. All service taps on the existing Distribution System will be made by LADWP or when specifically approved by LADWP, by a LADWP-approved tapping Contractor. All service taps on the proposed Main Extension shall be made by the Contractor. Application for service shall be received and approved by LADWP before any taps are made on the main.
- P. Meters less than four inches (4") in size shall be set by LADWP, except when specifically approved by LADWP.
- Q. Service installation documents will be prepared by the Inspector unless LADWP directs the Contractor to do so, or services are not installed in conjunction with installation of main. The Contractor shall cooperate with the Inspector in compiling as-constructed service lateral data.
- R. Mains shall be hydrostatically tested and disinfected in accordance with Sections 401.26 and 401.27 of these Standards.
- S. As-constructed drawings conforming to LADWP's latest Field Notes and As-Constructed Drawings Manual shall be prepared by the Engineer of Record and together with the Field Notes Drawings be submitted to the Engineer for approval no later than two (2) weeks after completion of the project. Accuracy shall be to within 0.5 feet horizontally and to within 0.1 feet vertically.

- T. The Applicant shall submit a Bill of Sale and LADWP will verify payment of all fees and prepare final documents.

201.9 Points of Delivery

LADWP will deliver water for the connection from the nearest available, adequate and feasible point on the Distribution System. LADWP's determination of this point shall be final.

201.10 Special Conditions

All conditions involving another agency, such as crossing a railroad or a highway, shall be satisfied. All designs, drawings, and calculations submitted to said agency shall also be submitted to LADWP for approval. Should a conflict in the plans and specifications occur between LADWP and the other agency, the plans and specifications yielding an acceptable product, as determined jointly by LADWP and the other agency, shall prevail.

201.11 Exceptions

LADWP reserves the right to design and/or install mains when it is in the best interest of LADWP. This determination is solely at the discretion of the Engineer.

The Applicant shall pay all design and installation costs for extending mains whether installed by its own Contractor or by LADWP.

Section 202 - Easements and Use of LADWP Property

202.1 General

The following procedures have been developed to process easements as quickly as possible through LADWP. These procedures have been developed for ease of administration and to provide LADWP with legal documents and specifications. Requests that do not follow these procedures and required attachments will not be considered.

202.2 Procedure for Granting Easements to LADWP During Recordation of Subdivision

Easements shall be granted to the City for use of LADWP using LADWP's Standard Dedication Certificate. The easement shall be accurately shown on the subdivision map. LADWP's Standard Dedication Certificate shall be incorporated as part of the Ownership Certificate and executed by the owner of the subdivision prior to the recording of the subdivision map. Contents of the Standard Dedication Certificate for easements over roadway and non-roadway areas are shown on Exhibits 1 and 2 of Chapter 7.

202.3 Procedure for Granting Easements to LADWP Not in Connection with Recordation of Subdivision

A. Procedure

A letter signed by the granter requesting LADWP to accept the easement shall be submitted to the Engineer and addressed as follows:

Engineer in Charge of Water Distribution Division
Los Angeles Department of Water and Power
P.O. Box 111
Los Angeles, CA 90051

The letter of request shall contain the exact name of the company, corporation, partnership, etc., granting the easement, the names and titles of the persons authorized to sign the easement document, and include the following attachments:

1. A legal description approved by a person who is registered or licensed to practice Land Surveying in the jurisdictional area within which the property is located. The legal description shall be correctly defined, unambiguous, and shall truly represent the intention of the parties involved. It must also be based on an accurate field survey of the land involved and clearly state the monuments on which the survey is based.

To accomplish this, there shall be correct plat designations and references, proper location information, mathematical fitness, and sufficient references to matters of record concerning boundary lines, corners, and monuments.

2. Two copies of an overall site plan. The site plan shall accurately show the relationship of the following:
 - a. The proposed water facility and easement.

- b. All exceptions listed in the Title Commitment.
- c. All existing and proposed utilities on the site.
- d. Proposed buildings and private roadways on the site.
- e. Cross section of private roadways over the proposed water facility easement.

LADWP will then prepare the Easement Deed which will incorporate the applicable Standard Dedication Certificate (Exhibits 1 and 2 of Chapter 7).

- B. Approval of Construction Plans
Main Extension Plans will not be approved until the letter of request and attachments referenced in Section 202.3A are reviewed and approved.
- C. Acceptance of Main Extension
Acceptance by LADWP of the Main Extension is subject to the easement deed being recorded with the Los Angeles County Recorder's Office.

202.4 Procedure for Obtaining Permission to Use or Cross LADWP Property

- A. Procedure
A letter requesting LADWP's permission to use or cross its property shall be submitted to the Chief Real Estate Officer. The request shall contain the exact name of the company, corporation, partnership, etc., which will own, operate and maintain the proposed facilities, the names and titles of the persons authorized to sign the agreement, and include, but not be limited to the following attachments:
 - 1. A reproducible drawing conforming to the following specifications. Drawings which do not comply with the following specification, and/or that are folded, stapled, or damaged are not acceptable:
 - a. Scale: The drawings shall be at an appropriate recognized Engineering scale. The scale used shall be large enough so that all dimensions are clearly shown. Whenever possible, the entire crossing shall be on one drawing. Break lines, except the direct land corner ties, are not acceptable.
 - b. Tie: All crossings shall have a direct tie to the nearest available recognized tract boundary or City Engineer's survey marker.
 - c. All distances shown on the drawing shall be to the nearest hundredth of a foot.
 - d. All drawings shall have a typical profile of the crossing unless specifically waived by LADWP.

2. Requests shall include prints of the overall job in the area of the crossing, when available, and prints of new or proposed subdivisions whenever this information would clarify or identify the location of the request.

B. Fees

The fee for the use of LADWP property will be determined by LADWP using accepted real estate appraisal practices.

Chapter 3 - DESIGN STANDARDS

Section 301 - System Design

301.1 General

LADWP's Distribution System is designed to deliver water to its customers in sufficient volumes and without excessive head loss. Specific design and layout criteria for distribution mains, service installations, supply mains, and trunk lines are covered in the following sections of this chapter.

301.2 Sizing of Distribution Mains

LADWP designs its distribution facilities to obtain the lowest cost over their expected life. This may not necessarily result in the lowest initial cost when long-term operation and maintenance costs are considered. This policy, however, results in a water supply system that yields optimum quality service at the lowest total cost to the consumer.

All mains will be sized by LADWP large enough to provide the consumer a minimum of 43 pounds-per-square-inch (psi) residual pressure at the building pad at peak-hour demand for domestic needs and 25 psi residual pressure at the building pad at peak-hour demand plus private fire demand (established by the local fire department LAFD) for fire services. Mains will also be sized to meet the public fire supply requirements of the local fire department. The Main Extension shall be capable of providing a minimum residual pressure of 20 psi at the most critical fire hydrant with peak-hour demand plus fire demand established by the local fire department. Generally, Distribution Mains are sized for a head loss of five feet per thousand feet (5'/1000') of main at peak-hour flows. The LADWP reserves the right to size mains to provide service for future needs.

All new Distribution Mains shall be of the standard sizes used by LADWP. Standard sizes are: six-inch (6"), eight-inch (8"), and 12-inch (12") mains. Four-inch (4") main may be used in short cul-de-sacs not requiring fire hydrants or fire services larger than two inches (2") in size.

The sizing of Distribution Mains normally follows a standardized grid based upon careful consideration and analysis of results of Distribution System studies utilizing network simulation.

In residential districts zoned R-1, mains are usually six inches (6") in diameter in a grid system and four inches (4") in diameter in short cul-de-sacs.

In residential districts zoned R-3, the Distribution System is usually comprised of a mixed pattern of six-inch (6") and eight-inch (8") grid.

In areas zoned R-4, Commercial, and Industrial, a grid of eight-inch (8") mains and sometimes 12-inch (12") mains are generally adequate to meet domestic and fire protection needs. Looping is done whenever possible in conjunction with the Main Extension to maintain water quality and improve reliability of the system.

The present sizing of the grid system has the benefit of utilizing the system as an integral part of the overall supply system to distribute water without excessive head loss. LADWP will analyze grid systems for developing areas to determine their adequacy.

301.3 Operating Pressures Within the Distribution System

Pressures within the Distribution System shall be a minimum of 43 psi at the building pad during peak-hour demand, whenever possible. At building site elevations where the minimum pressure is 45 psi, the Contractor is required to install oversized plumbing in accordance with the latest version of the Los Angeles Plumbing Code. An Elevation Agreement shall be executed by the Applicant and the LADWP for the portion of any lot having a minimum pressure of less than 35 psi.

Every effort shall be expended to grade the lots within subdivisions to enable the Distribution System to provide a minimum pressure of 35 psi. Future growth and main deterioration result in future consumer problems if water pressure is not provided at adequate levels. Domestic pressure regulators are required in accordance with the latest version of the Los Angeles Plumbing Code where the maximum static pressure exceeds 80 psi at the building site elevation.

301.4 Pressure Regulating Stations

Pressure regulating stations are used within the Distribution System to control pressures between service zones. When main extension plans are submitted for review, the need for a pressure regulating station will be determined by LADWP based on existing pressure zones and the existing Distribution System. LADWP will make all pressure settings and field adjustments on pressure regulating stations within the Distribution System.

In certain situations, LADWP will require monitoring of the station's rate of flow and upstream and downstream water pressures via electronic telemetry. The equipment used shall be of the manufacture and type specified or approved by LADWP. See Section 301.5.

301.5 Telemetry and Control Systems

Telemetry and/or data acquisition and control systems installed for use by LADWP to collect data, monitor, control remotely and coordinate the operations of its Water System, or the operations between a distributor's system and LADWP's system, shall be designed, installed and maintained by LADWP unless other specific arrangements are made during the design phase of Trunk Lines, pressure regulating stations, storage facilities, or pumping facilities.

301.6 Connections to the Existing Distribution System

Connections to Distribution Mains or Supply Mains will generally be made by the Contractor unless LADWP determines it is in its best interest to have LADWP make the connection. See Section 401.29.

All connections to Trunk Lines owned or controlled by LADWP will be made by LADWP. LADWP will provide and install all fabricated pipe, tapping sleeves, valves, etc., that are necessary to construct the connection.

Section 302 - Layout and Design of 12-inch (12") and Smaller Distribution Mains

302.1 General

Design and layout criteria for services, supply mains and trunk lines are covered in the subsequent sections of this chapter. Chapter 4 contains detailed pipe installation information, which shall be incorporated in the design as appropriate.

302.2 Layout of the Distribution System

A. Width Requirements for Main Installation

All mains shall be installed in the paved roadway section of dedicated streets having alignment and grade approved by the City Engineer. When LADWP determines it is not feasible for an installation to be made in a dedicated street, the installation shall be made in an easement. The conditions under which such an exception will be allowed will be determined for each individual case, and only easements which conform to the terms of LADWP's Standard Dedication Certificate will be accepted (see Exhibits 1 and 2). The minimum width of Exclusive easements accepted by the LADWP is 20 feet (20'). Nonexclusive easements will be accepted only over full-width private streets that conform to the City Engineer's standards for public streets. Installations may be made in streets or easements of other widths only when authorized by LADWP. All distribution mains are to be installed in public right-of-way within the paved road section. No mains shall be designed to be installed on the sidewalk. When a project requires a change of the street geometry, a main relocation will be required.

B. Dedicated Streets

Mains shall be installed in dedicated public streets of such grade, alignment, curvature, and other characteristics as to permit them to be laid and maintained in the normal and usual manner. Main alignment shall be parallel to property lines. Normal practice is to lay the main no closer than and preferably a distance of six feet (6') from the curb on the south or the west side of the street except in hillside areas where they are located on the uphill side of the street. The main shall be installed no closer than four feet (4'), centerline to centerline from adjacent substructures. In no case shall there be less than two feet (2') clear between the trench line of the main and the trench lines of adjacent substructures. Special conditions detailed in Appendix D apply to mains installed adjacent to or crossing sanitary sewers.

C. Easements

Mains installed in easements shall conform to the terms of the corresponding LADWP Standard Dedication Certificate including proper surface drainage (see Exhibits 1 and 2).

D. Alleys

New installations of mains in alleys are strictly prohibited. Replacement of mains may be allowed under special circumstances.

E. Fire Hydrants

All fire hydrants shall be installed within dedicated streets. When LADWP determines it is not feasible for a hydrant to be installed in this manner, it shall be installed in an easement contiguous to said dedication. The fire hydrant easement shall be acquired on the corresponding LADWP Standard Dedication Certificate (see Exhibits 1 and 2) and have a minimum width and length of five feet (5') for standard installations.

Fire hydrants shall be installed at general locations determined by the local fire department, and modified by the following field conditions:

1. Normally on the short lateral side of the street.
2. On the uphill side of the street in hillside areas.
3. No closer than four feet (4') clear of adjacent substructures or aboveground facilities.
4. At lot lines.
5. No closer than and preferably at five feet (5') clear of adjacent driveways and sidewalk wheelchair ramps.
6. For curbs having a radius of 20 feet (20') or larger, no closer than and preferably at five feet (5') from the beginning of curve return (BCR) of the curb, not in the curb radius, and 22 inches (22") from the curb face to the center of the fire hydrant.
7. For curbs having a radius smaller than 20 feet (20'), no closer than preferably at ten feet (10') from the BCR of the curb, not in the curb radius, and 22 inches (22") from the curb face to the center of the fire hydrant.

F. Line Valves

Line valves are required approximately every 600 feet (600') to 1,200 feet (1,200') in all 12-inch (12") and smaller Distribution Mains receiving water from LADWP. Where blocks exceed 600 feet (600') in length, or if two (2) or more hydrants are connected to the same main, additional line valves may be required in the middle of the block. For a succession of short blocks perpendicular to the direction of major feed and without residential services, several intersections may have the valve omitted in that direction but should retain the 600-foot (600') to 1,200-foot (1,200') interval requirement. Line valves are generally installed adjacent to the fitting connecting intersecting mains. Street intersections carrying heavy traffic, or containing major Distribution Mains in both streets may require four (4) valves, one at or near each extended property line and adjacent to fire hydrants, if possible.

302.3 Materials and Testing Overview

The materials and construction methods specified herein are based upon lowest life cycle cost, not upon lowest initial costs. LADWP considers long-term operation and

maintenance costs to procure a water supply system that yields optimum quality service at the lowest total cost to the consumer.

All materials furnished shall be new, undamaged, and clearly marked to allow identification during installation. Everything necessary to complete all installations in accordance with these Standards shall be furnished and installed whether shown on approved drawings or not, and all installations shall be completed as fully operable functioning parts of LADWP's Water System. Additional information on materials can be found within Chapter 4 - Installation Requirements for Contractors.

New water industry products or materials will be tested by LADWP if the Engineer feels the product or material has some merit. LADWP will establish the criteria for testing and evaluating the product. Adequate lead time shall be allowed for testing of previously unapproved materials so as to not delay the project. LADWP reserves the right to accept or reject any product or material regardless of the test results.

302.4 Sizing and Selection of Pipe

All mains will be sized by LADWP in accordance with Section 301.2.

Pipe materials will be selected by the LADWP in accordance with the guidelines on PC9434 of the Standard Drawings. However, the LADWP reserves the right to deviate from those guidelines in specific circumstances.

302.5 Pipe Fittings

A. Joints

Joints and fittings shall conform to applicable LADWP and AWWA Specifications. Acceptable joint types for straight lengths of ductile iron (DI) and steel pipe are push-on and slip-joint welding, respectively. Mechanical joints for straight lengths of pipe will be allowed only for temporary blow offs.

Flange joints are required when installing four-inch (4") and larger line valves in steel pipe, four-inch (4") and larger tapping sleeves, and other fittings. No other type of joint shall be used without the specific approval of LADWP.

Flanges and flanged fittings shall have a rating that meets the maximum static pressure at the location of installation. Care should be exercised to select flanges and flanged fittings that have matching drilling templates. As a rule of thumb, flanges and flanged fittings having a 200 psi or smaller rating or class, match. Also, flanges and flanged fittings having a greater than 200 psi rating or class, match.

B. Closure Fittings

Mechanical couplings shall be of a gasketed sleeve-type with diameter to properly fit the pipe. Tolerance on pipe and coupling, together with proper bolt and gasket arrangements, shall be sufficient to ensure permanent watertight joints under all conditions. Where pipes of different outside diameter are connected together, or where pipe is connected to fittings of different materials, care shall be exercised to select the proper ring or adapter.

C. Miscellaneous Pipe Fittings

Adapters, plugs, end cap, bulkheads, slip sleeves, anchor boxes, lock-joint gaskets, yokes and rods, and other appurtenances shall be used where appropriate throughout the system, subject to the approval of LADWP. LADWP does not intend to unreasonably limit the installation of any type of fitting, joint, or proprietary device; however, the installation of any such fitting, not specifically approved by these Standards, is subject to the approval of LADWP. Written request for approval of deviating items shall be made in advance through LADWP.

D. Tapping Sleeves

Tapping sleeves or clamps shall be used to tap existing water mains that are in service and under pressure without interrupting service. Tapping of AC mains is **NOT** allowed in any case. Care shall be exercised to select sleeves and gaskets which are properly sized to fit the type and class of pipe to be tapped. Where four-inch (4") or larger tapping sleeves or clamps are used, a thrust block shall be formed and poured behind the sleeve to prevent possible damage to the main from pressure shocks which develop as valves are first opened. Most tapping sleeves four-inch (4") and larger currently used by LADWP require rubber gaskets. No size on size tapping sleeves are allowed see section 303.6.

E. Line Valves

Line valves shall be gate valves conforming to LADWP Specifications. Line valves shall be the same size as the main and shall open to the left (counterclockwise). Line valves in DI pipelines shall have push-on ends. Line valves in welded steel pipelines and valves used in conjunction with tapping sleeves shall have flange ends. Depending on system pressure, a bypass valve must be provided for inline valve of 6-inch (6") and greater.

F. Check Valves

A check valve permits flow in one direction only, closing when the flow stops so that no flow reversal can occur. They are generally used in meter installations and at service zone boundaries to allow the lower service zone to provide supply to the higher service zones during emergencies. They are otherwise prohibited unless specifically approved by LADWP. See PC9449 and PC9450 of the Standard Drawings.

302.6 Fire Hydrants

Fire hydrant type and size is determined by the local fire department. Standard types of fire hydrants currently used by LADWP are two and ½-inch (2-1/2") single built-up, and two and ½ -inch by four-inch (2-1/2" x 4") double. The single type is used where the maximum static pressure is above 210 psi and the double is used where the maximum static pressure is 210 psi or less. All fire hydrants shall be located 5 feet horizontally from curb returns and any other above ground structure or utility.

Ductile Iron fire hydrant installations shall have all joints within the lateral restrained. Push-on joints, cast mechanical couplings, and steel mechanical couplings shall be fitted with lock-joint gaskets, yokes and rods, and anchor box assemblies, respectively. Ductile iron fire hydrant installations shall have the lateral, bury ell and mid-section encased in polyethylene material in accordance with Sections 302.7A and PC9440.

All steel mains shall have fire hydrant laterals of steel only. Ductile iron mains can have fire hydrant laterals of either DI or steel. For hydrant laterals under bus pads, steel laterals are required regardless of existing main material. Cathodic protection will be required per Section 302.7B when connecting steel pipe to DI and CI mains. See sheets PC9456-1 through PC9456-4, PC9457-1, PC9457-2, PC9458, and PC9461 of the Standard Drawings.

302.7 Corrosion Mitigation

For all main extensions, the Applicant shall provide to LADWP, after the curbs and gutters have been installed, a soil resistivity survey of the main installation area performed by a Corrosion Specialist certified by NACE or a Corrosion Engineer registered by the State. The soil resistivity readings shall be taken at each intersection, cul-de-sac, 500-foot intervals, and both sides of obvious cut and fill areas.

A. Polyethylene Encasement Material

Polyethylene tubes shall be used on all cast iron (CI) or DI pipe, fittings, rods, and appurtenances. Polyethylene material shall conform to the Materials Specifications and shall be installed as shown on PC9440 of the Standard Drawings.

B. Cathodic Protection (CP)

All steel mains shall be placed under a galvanic cathodic protection system that is:

1. Designed in accordance with guidelines established in this Section.
2. Reviewed and approved by LADWP.
3. Installed and tested by a Corrosion Engineer registered by the State, Corrosion Specialist certified by NACE, or someone under their direct supervision per the latest revisions to LADWP's Cathodic Protection Standards.

Steel mains, including fire hydrant laterals and service laterals four-inch (4") and larger shall be electrically isolated from CI, DI, concrete cylinder, and existing steel mains with LADWP-furnished pre-assembled insulating flanges.

Test stations shall be located, in order of preference, adjacent to fire hydrants, adjacent to line valves, and adjacent to insulating flanges.

Following is a table that lists insulating flange, anode, and test station requirements for various situations that may be encountered during design of a main extension involving steel pipe:

No.	Description	Insulating Joint	Number of Anodes			Test Station
			4"-8"	12"-16"	20"-24"	
1.	Steel main connection to non-steel main	*Yes	1	2	2	Yes
2.	Steel main connection existing steel main	Yes	4	6	8	Yes
3.	Steel main at 2,500-foot maximum intervals	Yes	4	6	8	Yes
4.	Steel main at fire hydrant laterals spaced 1,000 feet or less, or steel main at 600-foot maximum intervals in the absence of strategically spaced fire hydrants	No	**2	3	4	Yes
5.	Steel main or steel fire hydrant lateral of length between 50 feet and 100 feet connected to non-steel main	*Yes	2	3	4	No
6.	Steel main or steel fire hydrant lateral of length less than 50 feet connected to non-steel main	*Yes	1	2	3	No
7.	Encased steel main or steel fire hydrant lateral of length less than 100 feet connected to non-steel main	*Yes	2	3	4	No

*Steel mains need no insulation from AC mains.

**Any two fire hydrant laterals separated by a distance greater than 600 feet shall be provided with an extra node at both hydrants for every additional 200 linear feet of spacing or portion thereof.

302.8 Blow Offs

Two-inch (2") permanent blow offs shall be required whenever a Distribution Main dead ends unless a fire hydrant, which can serve as a blow off, is provided within 5 feet from the location. Two-inch (2") blow offs shall be assembled as shown on PC9443 and PC9444 of the Standard Drawings.

302.9 Steel Pipe Standpipes and Maintenance Holes

Steel pipe standpipes and maintenance holes shall be provided for access to four-inch (4") and larger check valves and other installations. See PC9449 and PC9450 of the Standards Drawings.

302.10 Reinforcement of Openings in Welded Steel Pipe

Fittings used to divide or combine flows (i.e. tees, crosses, etc.) do not have as high a resistance to internal pressure as pipes of the same thickness. This is because a portion

of the side wall of these fittings is removed to allow for the branching pipe. The strength of these fittings shall be investigated and reinforcement provided in accordance with Sections 13.3 thru 13.7 of AWWA M11 "Steel Pipe - A Guide for Design and Installation", as last revised.

302.11 Thrust Blocks

Concrete thrust blocks shall be sized for the test pressure of the main and the allowable soil bearing capacity. The test pressure is generally one and one-half times the maximum static pressure. For design purposes, a minimum of 200 psi shall be used for all main installations. Standard sizes and shapes of thrust blocks based on 200 psi water pressure and various types of soil are shown on PC9441 of the Standard Drawings.

The thrust blocks shall be 2,000 psi or greater compressive strength concrete conforming to the Materials Specifications.

In certain situations where the active water main will be suspended from a temporary support system due to large excavations, the existing main must be replaced by a Welded Steel Pipe. Due to the lack of support from lateral forces in the absence of soil resistance, the concrete thrust block must be replaced by a steel member thrust block. The suspended WSP thrust block system must be engineered and designed by a Professional Engineer registered in the state of California. The system must be reviewed and approved by LADWP prior to the start of excavation.

302.12 Length of Restrained Pipe

Ductile iron fittings subjected to unbalanced hydrostatic forces and the adjacent 60 lineal feet of pipe (ten lineal feet (10') for horizontal 11¼-degree bends) shall be restrained with lock-joint gaskets or yokes and rods (at mechanical couplings).

Steel pipe shall be restrained throughout the entire length. Non-insulating mechanical couplings shall be fitted with anchor boxes and shall be electrically bonded in accordance with PC9194 of the Standard Drawings, respectively.

302.13 Pipe Cover Equal to or Less than Twenty-Four Inches (24")

Under certain circumstances, it may be necessary to lay pipe at shallow depths. If the pipe cover is equal to or less than twenty-four inches (24"), the pipe material shall be steel. The slabs shall be designed and constructed to support traffic and construction loads without transmitting the impact, or load, to the pipe. Concrete slabs shall be installed only with the approval of LADWP.

302.14 Casing Pipe

Installation of mains through non DWP right-of-way or easements, such as highways, railroads, utilities etc., require encasement or thimbles. The casing structural requirements for crossing highways and railroad will be specified by the agency granting permission to cross. LADWP will determine the design criteria the utility crossings alignment and separation from other utilities. For all cases, the casing shall not come in contact with the pipe being encased. Such crossing shall also be subject to approval by LADWP to avoid conflicts in requirements or standards between LADWP and the persons or agency granting permission to cross. LADWP will require cathodic protection for the casing per the latest cathodic protection requirements.

Section 303 - Service Laterals and Meters

303.1 General

Water is conveyed from mains to the plumbing of customer's premises by service laterals. In the context of these Standards, service laterals include all pipe, fittings, valves, and appurtenances up to the meter. All water pipe beyond the meter is controlled by the latest version of the Los Angeles Plumbing Code.

All new or replacement domestic and fire service laterals installed in areas being supplied with potable water from LADWP shall conform to the following minimum standards which shall be binding regardless of the regulations of any other agency covering like installations.

303.2 Ownership and Maintenance

Rule 16 of the Rules Governing Water and Electric Service in the City of Los Angeles deals extensively with ownership, installation, and maintenance of service laterals and meters. These Standards are intended to be supplemental and subordinate to those rules and will be so construed in any conflicting situations.

A. Ownership

The service lateral and meter through which a customer receives water service from the facilities of LADWP are the sole property of the City under the control of LADWP and installed at the expense of the Applicant.

B. Maintenance

LADWP will maintain the service lateral and meter except as set forth under the referenced rules.

A customer shall provide and maintain reasonable access for LADWP representatives to all service laterals, meters, backflow prevention devices, or other facilities pertinent to water service installed on the customer's premises.

C. Repair Services Available

LADWP will maintain and repair the service lateral and the meter. The customer has total responsibility for all repairs beyond the meter.

303.3 Layout

Service laterals shall not be installed within a three-foot (3') horizontal distance of other utilities.

The main to be tapped shall extend along the front lot line of the property to be served. In the case of corner lots, the property may be served from the side lot line.

If service is requested for lots at the end of a cul-de-sac street, the main to be tapped shall not be more than 50 feet (50') from any property line in the cul-de-sac.

303.4 Combination Service Laterals

A property requiring a domestic service lateral and a fire service lateral is generally served from a single tap. The domestic service lateral is connected to the fire service lateral ahead of the fire service curb valve. No more than one domestic service connection shall be installed on a fire service lateral unless specifically approved by

LADWP. No irrigation services are allowed to be tapped to a fire services lateral. Irrigation services will require a tap directly perpendicular to the main.

303.5 Pumps

Except where specifically authorized by LADWP, the installation of pumps designed to increase water pressure in service laterals is prohibited.

303.6 Service Taps

A. Tapping

Adjacent taps 2 inches and smaller shall be spaced a minimum of two feet (2'). In tapping water mains, it may be necessary to dig out bedding material and to cut or remove part of the polyethylene wrapping in DI pipe main and to remove part of the enamel undercoating and cement coating in steel pipe. When tapping steel pipe, the reinforcing wire in the cement mortar coating must not come in contact with the pipe or the corporation valve. After the taps are made, the polyethylene wrap in DI pipe shall be repaired or replaced in accordance with PC9440 of the Standard Drawings. The steel pipe coating shall be repaired using the latest protective coating standards and procedures. All trenches shall be backfilled with the approved CLSM per LADWP's standards. All 2 inch and smaller copper service laterals shall be wrapped with wax tape up to 3 feet from the main. Tapping of small services is only allowed on a pressurized main connected to the active system after successful completion of a pressure test and disinfection.

B. Tapping Sleeves and Tees

Tapping sleeves or clamps are used to tap existing mains that are in service and under pressure without interrupting service. They are also used to tap new mains. Care shall be exercised to select sleeves and gaskets which are properly sized to fit the type and class of pipe to be tapped. Where four-inch (4") and larger tees and tapping sleeves are used, a thrust block shall be formed and poured behind the sleeve or tee to prevent possible damage to the main from pressure shocks which develop as valves are first opened. Tapping sleeves and tees shall conform to the Materials Specifications of these Standards. No size on size tap is allowed regardless of pressure.

The tapping fitting required for a given type and of water main shall be as follows:

TYPE OF MAIN AND SIZE OF TAP

Size of Main	Ductile Iron (Inches)						Steel (Inches)					
	1	1 ½	4	6	8	12	1	1 ½	4	6	8	12
4"	B	B	N	N	N	N	W	W	N	N	N	N
6"	B	B	C	N	N	N	W	W	F	N	N	N
8"	B	B	C	C	N	N	W	W	F	F	N	N
12"	B	B	C	C	C	N	W	W	F	F	F	N

- B Double-strap bronze clamp required
 C Tapping sleeve/clamp required
 N Connection is not permitted
 W Steel welding coupling is required
 F Steel flanged nipple required

C. Insulation

Two-inch (2") and smaller service connections to all steel water mains shall be electrically insulated by means of insulating couplings that conform to the Materials Specifications. Four-inch (4") and larger DI service laterals shall be encased in polyethylene material in accordance with PC9440 of the Standard Drawings. Four-inch (4") and larger steel service laterals shall be provided with a galvanic cathodic protection system in accordance with Section 302.7B. The Contractor may be required to install a total of two (2) pre-assembled insulating flanges in four-inch (4") and larger steel service laterals when the main being tapped is of non-steel, or of steel that lacks adequate cathodic protection.

303.7 Service Laterals

A. Size

Service laterals shall be sized to supply the requirements of the property being served. The minimum size allowable for a domestic service shall be one-inch (1"). The minimum size allowable for an irrigation service is one and a half (1-1/2").

B. Pipe Material

Plastic pipe shall not be used. All service laterals supplying water from LADWP's system shall conform to one of the following specifications:

1. Seamless Copper Tube conforming to the Materials Specifications shall be used for one-inch (1") through two-inch (2") service pipe.
2. Ductile Iron Pipe conforming to the Materials Specifications shall be used for four-inch (4") and larger service pipe connected to CI, DI, or asbestos cement (AC) water mains.
3. Steel Pipe conforming to the Materials Specifications shall be used for four-inch (4") and larger service pipe connected to steel water mains, or

where required by LADWP. Steel pipe is required when the pipe alignment is installed five-feet (5') and below.

4. Earthquake Resistant Ductile Iron Pipe shall be designed and installed per LADWP's Requirement for the Water System's Seismic Resilient Pipe Network included in Exhibit 5. Horizontal and vertical alignments shall be approved by LADWP.

C. Installation

Service laterals shall be designed and installed as shown in PC9465 through PC9477 of the Standard Drawings for size two-inch (2") and smaller, and in conformance with Chapter 3 for size four-inch (4") and larger, except where noted differently in this Chapter. Additional details are provided within Chapter 4 - INSTALLATION REQUIREMENTS FOR CONTRACTORS.

All joints in four-inch (4") and larger service laterals shall be firmly anchored to each other. Cover from top of service lateral to nearest gutter grade shall be a minimum of two feet (2') for two-inch (2") and smaller service laterals, a minimum of 2½ feet (2½') for four-inch (4") to eight-inch (8") service laterals, and three feet (3') for 12-inch (12") service laterals. The service lateral shall be installed at lower depths if LADWP determines that the installation at normal depth is not desirable.

303.8 Corporation Valves, Curb Valves, and Bronze Fittings

Corporation valves provide the connection for the service lateral to the main for small services. By utilizing a corporation valve, a service can be connected to the main without taking the main out of service. Corporation valves are also used in a variety of other miscellaneous installations.

Curb valves are set on the service lateral of small services on the inlet side of the meter box to provide a means to shut off the service lateral during repair or replacement of the meter.

Miscellaneous bronze fittings (i.e. elbows, insulating couplings, etc.) shall be used where appropriate throughout the system, subject to the approval of LADWP.

Corporation and curb valves and miscellaneous bronze fittings shall conform to the Materials Specifications.

303.9 Gate Valves and Standpipes

Four-inch (4") and larger gate valves of the same size as the service lateral shall be installed on the service lateral adjacent to the tee or tapping sleeve on the inlet side of the detector check meter and on both sides of the domestic meter.

Four-inch (4") and larger gate valves used with steel or DI service pipe within the service vault shall be flanged gate valves with CI or DI bodies conforming to the Materials Specifications. All eight-inch (8") and larger gate valves installed in a vault or aboveground shall be supported by concrete stands or grout-filled concrete blocks.

Unless installed in a vault or aboveground, all four-inch (4") and six-inch (6") gate valves shall be equipped with a CI vertical gate cap, steel split sleeve, and steel standpipe. All eight-inch (8") and 12-inch (12") gate valves, not installed in a vault or above-ground,

shall be equipped with a CI vertical gate cap, steel split sleeve, steel standpipe, and eight by six-inch (8" x 6") steel standpipe bottom. The standpipe shall not bear and transmit shock, external loads, or electrical continuity to the valve and shall be centered and plumb over the wrench nut of the valve, with the gate cap set to finished grade or an elevation determined by LADWP. See PC9442 of the Standard Drawings.

303.10 Meters

All meters installed for billing purposes shall be under the control of LADWP, be obtained from LADWP, and conform to these Standards. No meter shall be installed until the proposed installation is approved and the meter is tested by LADWP.

There are three (3) categories of meters currently being installed by LADWP. Meters used to record volume of water for domestic needs are called domestic meters. Meters used to detect fire line usage are called detector check valves and are used on fire services. Dual-purpose meters used to measure combined large flows (for fire protection systems) and small flows (for domestic systems) are called fire line meters.

The characteristics which are of special importance in meters are accuracy, sensitivity, durability, pressure loss, cost, and ease of maintenance.

All meter installations will be inspected and approved by LADWP. Installations which do not comply with the approved plans and specifications shall be made to conform prior to acceptance by LADWP.

A. Type of Meters

The various types of meters currently being installed in the Distribution System are positive displacement, compound, turbine, detector check valve, and fire line. The type of meter installed shall be determined by LADWP at the time of application based upon size, service and flow requirements, location of meter, and other conditions, which may exist.

B. Positive Displacement Type Water Meters

Displacement meters are positive in action. The measuring chambers supply a fixed quantity of water for each nutation or oscillation of the disc or piston when operated under positive pressure. Meters are available in 5/8-inch (5/8") thru two-inch (2") sizes. One and ½-inch (1½") and two-inch (2") meters are equipped with inlet and outlet oval type flanges.

C. Compound and Turbine Meters

Compound meters consist of two meters in a single case separated by a check valve. One meter measures small flows and the other measures large flows. Compound meters are designed so that the small meter operates during low flows and as flows begin to increase, the check valve opens and the large meter takes over. When the large meter is in operation, the small meter is also in operation. Turbine meters are designed to measure primarily large flows, and should not be used where the possibility of small flows (below the manufacturer's stated minimum flow) exists.

D. Detector Check Valves

Detector check (DC) valves are assemblies that consist of a check valve in the main line and a positive displacement meter in the bypass line to detect flow.

Detector check valves are designed to provide large, unmeasured flows for fire protection purposes with minimum pressure losses.

E. Fireline Meters

Fireline or Factory Mutual (FM) meters allow the consumer to use one service line to supply various combinations of domestic, private fire hydrant, and fire sprinkler systems. Fireline meters measure large flows and are always used in combination with a smaller meter to measure the smaller flows through a bypass line.

F. Meter Setting

All meters shall be installed in a horizontal position and housed in a LADWP-approved box or vault. LADWP will set all meters smaller than four-inch (4") except when the Contractor is specifically authorized in writing by LADWP.

G. Meter Bypass Lines

Bypass provisions are required for all four-inch (4") and larger domestic service installations, unless otherwise specified by LADWP. Bypass designs may or may not contain a meter, but shall contain an independent control valve on each end of the installation. Bypass lines permit the consumer to have water while the domestic meter is being repaired or replaced.

303.11 Residential Meter Boxes and Covers

Service Size	Meter Box and Cover Type	Application
1"	No. 2 plastic (high-density polyethylene molded structural foam) box with No. 2 concrete cover and CI hinged lid	Sidewalk loading
	No. 2 concrete (cast-in-place) box with No. 2 steel algrip cover	Traffic loading ¹
1½" & 2"	No. 3 plastic (reinforced polymer mortar (RPM) top ring and fiberglass reinforced plastic (FRP) walls) with No. 3 reinforced polymer concrete (RPC) cover	Sidewalk loading
	No. 2 concrete (cast-in-place) box with No. 2 steel algrip cover	Traffic loading ¹
3" EQ	Two (2) No. 3 plastic (RPM top ring and FRP walls) boxes (side by side) with one (1) No. 3 RCP cover per box	Sidewalk loading
	No. 2 concrete (cast-in-place) box with No. 2 steel algrip cover	Traffic loading ¹

¹ BOE Approval Required when installing in the Public Right-of-Way.

PC9465 through PC9470 and PC9472 of the Standard Drawings show one-inch (1") thru three-inch equivalent (3" EQ) services designed for sidewalk loading applications.

303.12 Large Service Vaults

Large services are generally installed in underground vaults or when authorized by LADWP, on aboveground concrete pads. Services installed underground shall be provided with vaults designed by a registered Civil Engineer in accordance with accepted reinforced concrete theory.

All vaults, except those that are installed flush with the surface grade, shall be designed for a depth of cover that may vary from one-foot (1') to four feet (4') and be equipped with removable top deck(s) and an access pre-cast concrete manhole, ring, frame, and cover. Vaults installed flush with the surface grade shall incorporate LADWP's No. 3 or No. 4 meter box cover into the top slab.

LADWP will accept the following types of vaults, subject to approval by the City of Los Angeles Bureau of Engineering (BOE), Structural Engineering Division:

A. Plastic Vaults

Plastic Vaults are generally installed in parkway areas flush with the surface grade and are designed for sidewalk loading only. PC9478 through PC9487 of the Standard Drawings show services housed by City-approved plastic vaults designed for sidewalk loading.

B. Precast Concrete Vaults

Concrete vaults are generally installed in parkway and roadway areas. Vaults installed in roadway areas shall be designed to meet or exceed LADWP's Standard Specification for Precast Concrete Substructures and Accessories, as last revised. PC9488 through PC9499 of the standard Drawings show services housed by standard-size pre-cast concrete vaults.

Large domestic meters and detector checks are housed in the following manner:

Service Size and Type	Vault and Cover Sizes and Types	Application
4" Dom. Service	48-inch by 72-inch (48" x 72") plastic Reinforced Polymer Mortar (RPM) top <u>and</u> RPM or Fiberglass Reinforced Plastic (FRP) walls vault with RPM cover	Sidewalk loading
	48-inch by 78-inch (48" x 78") precast concrete vault with one-inch (1") thick No. 3 steel hinged cover	Traffic loading ¹
6" Dom. Service	48-inch by 72-inch (48" x 72") plastic (RPM top <u>and</u> RPM or FRP walls) vault with RPM cover	Sidewalk loading
	72-inch by 96-inch (72" x 96") precast concrete vault with one-inch (1") thick No. 4 steel hinged cover	Traffic loading ¹
8" Dom. Service, 10" Dom. Service, 8" FM, 10" FM, Combination Dom. Service and Fire Service	Special	Sidewalk loading and Traffic loading ¹
4" Fire Service, 6" Fire Service & 8" Fire Service	48-inch by 48-inch (48" x 48") plastic (RPM top <u>and</u> RPM or FRP walls) vault with RPM cover	Sidewalk loading
	48-inch by 60-inch (48" x 60") precast vault with one-inch (1") thick No. 3 steel hinged cover	Traffic loading ¹
10" Fire Service	48-inch by 72-inch (48" x 72") plastic (RPM top <u>and</u> RPM or FRP walls) vault with RPM cover	Sidewalk loading
	72-inch by 96-inch (72" x 96") precast concrete vault with one-inch (1") thick No. 4 steel hinged cover	Traffic loading ¹

¹ BOE Approval Required when installing in the Public Right-of-Way.

303.13 Backflow and Backflow Prevention Devices

Backflow, which is the flow of water or other liquid or foreign materials into LADWP's Distribution System from another source, is strictly prohibited and shall be prevented by the installation of an approved backflow prevention device purchased, installed, and maintained by the customer at the customer's expense.

The type and complexity of the backflow prevention device shall be determined by LADWP and shall be based upon the degree of hazard caused to the public from contamination by toxic or nontoxic substances.

303.14 On-Site Mains for Fire Services and Fireline Services

Private fire hydrants found in large parking lots, long driveways, and fire protection systems found in LADWP stores, warehouses, etc. are supplied by on-site water lines

through either fire services or fire line services. The water line shall be sized by LADBS or the local fire department and the persons responsible for the structure it protects. LADWP will not size on-site water lines.

Section 304 - 16-Inch (16") and 20-Inch (20") Supply Mains

304.1 General

New developments are commonly designed with curved streets, only one or two access roadways, and many cul-de-sacs. Mains supplying these subdivisions often cannot be sized using the hydraulic grid system common in most of Los Angeles. In some instances, the maximum water demand within these developments exceeds the allowable design capacity of a 12-inch (12") Distribution Main, but is often considerably under that of a 24-inch (24") Trunk Line. As a result, it has become necessary to install 16-inch (16") and 20-inch (20") pipe to supply this type of development.

304.2 Other Standards to Apply

Chapter 3 Section 304 - addresses only 16-inch (16") and 20-inch (20") Supply Mains. All standards that apply to four-inch (4") through 12-inch (12") Distribution Mains shall apply to 16-inch (16") and 20-inch (20") Supply Mains along with the requirements or exceptions discussed in this Section. In case of conflict with any other Chapter or Section in these Standards, this Chapter shall govern for 16-inch (16") and 20-inch (20") pipe.

304.3 Design

Sixteen-inch (16") and 20-inch (20") Supply Mains shall be designed in accordance with Chapter 3 Section 301 - through Section 302 - of these Standards and the following additional requirements:

- A. Only welded steel pipe and DI pipe that conform to the Materials Specifications or better shall be used. The Applicant should be aware that large diameter pipe and fittings may require long lead times and it is the responsibility of the Applicant to assure materials are on hand.
- B. Restrained joints for DI pipe installations shall be of the boltless type, capable of deflection after assembly, and designed for a minimum working water pressure of 250 psi.
- C. Line valves shall be optimally placed such that outages to services during future repairs or construction are minimized. Generally, this will require the ability to isolate and alternately supply all Distribution Mains (or Supply Mains) extending from the Supply Main but in no instance should the spacing between valves exceed 1,200 feet (1,200').

Line valves shall be of the same size as the main or one diameter size smaller when specifically approved by LADWP. The size and type of valve to be used shall be clearly indicated on all submitted drawings.

A rectangular vault or pipe manhole used as a standpipe shall be used to house 16-inch (16") and larger line valves. See PC9464 of the Standard Drawings for a steel pipe manhole assembly.

If LADWP requires the installation of remote control and monitoring equipment for its operation, the line valve shall be a butterfly valve with a rectangular vault housing both the electric motor operator and telemetering equipment. Each installation will require individual approval.

- D. Blow off assemblies, as shown on PC9462 of the Standard Drawings, shall be installed at all low points in Supply Mains and wherever a Supply Main dead ends unless a fire hydrant, which can serve as a blow off, is provided at these locations.
- E. Automatic air valves (air release valves (ARV), air and vacuum valves (AVV) and combination air valves (CAV)) shall be required for Supply Mains at the discretion of LADWP. Air valve assemblies, as shown on PC9463 of the Standard Drawings, are generally installed at high points in the Supply Main, where there is an abrupt change of slope, and at the downslope side of line valves, or as determined by LADWP.
- F. Each Supply Main shall be examined individually to determine special conditions and/or requirements (e.g., air valve, check valves, etc.).
- G. A galvanic cathodic protection system shall be provided on all steel Supply Mains in accordance with the latest LADWP Corrosion Standards and the following table:

No.	Description	Pre-Ass'd Ins. Flange Required	No. of Anodes Required (Pipe Diam.)		Test Station Required
			16"	20"	
1.	Steel main connection to non-steel main (cast-iron, reinforced concrete cylinder, prestressed concrete cylinder, and modified pretension pipe)	*Yes	3	4	Yes
2.	Steel main connection existing steel main	Yes	6	8	Yes
3.	Steel main at 2,500-foot maximum intervals	Yes	6	8	Yes
4.	Steel main at fire hydrant laterals spaced 1,000 feet or less, or steel main at 600-foot maximum intervals in the absence of strategically spaced fire hydrants	No	**3	4	Yes
5.	Steel main or steel fire hydrant lateral of length between 50 feet and 100 feet connected to non-steel main	*Yes	3	4	No
6.	Steel main or steel fire hydrant lateral of length less than 50 feet connected to non-steel main	*Yes	2	3	No
7.	Encased steel main or steel fire hydrant lateral of length less than 100 feet connected to non-steel main	*Yes	3	4	No

*Steel mains need no insulation from A.C mains.

**Any two (2) fire hydrant laterals separated by a distance greater than 600 feet shall be provided with an extra anode at both hydrants for every additional 200 lineal feet of spacing or portion thereof.

304.4 Installation

Installation of 16-inch (16") and 20-inch (20") Supply Mains will generally be done by the Applicant or the Applicant's Contractor. The Contractor shall be prequalified by LADWP for the installation of 16-inch (16") and 20-inch (20") pipe. As with four-inch (4") through 12-inch (12") mains, LADWP reserves the right to install 16-inch (16"), and 20-inch (20") Supply Mains when it is in the best interest of LADWP. This determination is solely at the discretion of LADWP. The Applicant shall pay all costs for extending mains whether installed by its Contractor or by LADWP.

Line and grade and as-constructed surveying will be established and done by LADWP at the Applicant's expense. When specifically approved by LADWP, this work can be performed by a Professional Engineer or Professional Land Surveyor licensed to practice in the State or by their Authorized Representative in accordance with Section 401.8.

Section 305 - 24-Inch (24") and Larger Trunk Lines

305.1 General

It is the policy of LADWP to design 24-inch (24") diameter and larger Trunk Lines to ensure a high-quality, uninterrupted, low-maintenance water service system. The function of Trunk Lines is more important than that of Supply or Distribution Mains, and the risk is correspondingly greater if the Trunk Lines are improperly designed or installed.

LADWP reserves the right to design and install Trunk Lines when to do so is in the best interest of LADWP. All Trunk Lines, which will become part of LADWP system, will be designed by LADWP unless other arrangements are made. Trunk Lines will be installed by the Applicant when practical.

Design of the Trunk Line should proceed only after approval to design and/or construct the Trunk Line is received from LADWP. The concept, size, location, and any other pertinent details shall be reviewed by LADWP prior to the submittal of plans and specifications required by Section 201.6.

The Applicant shall pay all costs for the design and construction of Trunk Lines including those incurred by LADWP for inspection, testing of materials, and other LADWP services.

305.2 Other Standards to Apply

LADWP's Trunk Line Design Standards available upon request.

305.3 Preliminary Investigation

If the Applicant is allowed by LADWP to conduct its own preliminary investigation, the following requirements shall be met:

- A. A subsoil investigation shall be performed by a geotechnical Engineer from exploratory holes dug to determine design values, slide areas, fault crossings, backfill suitability of the soil, presence of groundwater or bedrock, and any other condition which may affect the construction of the Trunk Line. Test holes shall be dug with a maximum spacing of 750 feet (750') and at railroad, highway, and river crossings. Soil resistivity readings shall be taken at depths of five feet and ten feet.
- B. A stationed alignment of the proposed Trunk Line is required to define the route with lines, angles, and curvatures referenced to land corners and other official survey control points when available. Negative stationing is not allowed. The angle points, curve points and the centerline at a minimum spacing of 100 feet (100') shall be marked on the ground with an accuracy of at least one part in 5,000 (1/5,000) which shall be checked by LADWP prior to acceptance of the survey work.

All points of intersection (PI), points of curvature (PC), points of tangency (PT), angle points (AP), and any points on the tangent (POT), needed for inter-visibility shall be marked with semi-permanent steel pins in the ground such as concrete reinforcing bars, P-K nails or survey spikes.

- C. A ground surface profile of the alignment in National Geodetic Vertical Survey Datum of 1929 tied to official survey bench marks is required. Additional semi-permanent bench marks shall be established every 1,500 feet (1,500') by closed loops of Third-Order accuracy. The profile shall consist of ground surface elevations along the proposed Trunk Line centerline at every 100 feet (100') station and at grade breaks. All level loop and profile data shall be recorded in field books.
- D. Topographical features within the street or easement and any topographic feature outside the easement which may interfere with the operation or installation of the Trunk Line shall be accurately shown in field books by both note and drawing. Topographic features may also be compiled by aerial photogrammetry methods. In areas where the ground slope perpendicular to the centerline of the Trunk Line exceeds five percent (5%), cross sections shall be taken at all profile points and shall extend at least 25 feet (25') to each side of the centerline. All cross-section data shall be entered into field books.
- E. All utility crossings or close utility interference shall be exposed by digging test pits. Field books shall be used to record the size, nature, and location of the interference by station offset and elevation.
- F. All survey data compiled in the determination of the route location, the extent of the interference, the centerline profile, the cross sections, and level loops shall be entered into field books provided by LADWP and submitted with the plans and specifications.

305.4 Design

Trunk Lines shall be designed in accordance with all other applicable Sections of these Standards, LADWP's Trunk Line Design Standards, and the following additional requirements:

- A. Pipe shall conform to the Materials Specifications. Trunk Lines shall be of welded steel, but may be of reinforced concrete cylinder, prestressed concrete cylinder, or DI if specifically approved by LADWP. The design criteria for reinforced concrete and DI pipe shall be those currently specified by LADWP for Trunk Lines. Prior to construction, the Contractor shall submit for approval by LADWP, the manufacturer's detailed shop drawings, design calculations, material list, laying schedule, and marking diagram. The Applicant should be aware that large diameter pipe and fittings may require long lead times and it is the responsibility of the Applicant to assure materials are on hand.
- B. Line valves shall be placed such that outages to consumers during future repairs or construction are minimized. Generally, this will require the ability to isolate and alternately supply all mains extending from the Trunk Line, but in no instance should the spacing between valves exceed one (1) mile.
- C. Line valves shall be butterfly valves with flanged-end connections conforming to the Material Specifications. A pipe manhole used as a standpipe or a rectangular vault shall be used to house each valve. The valve installation shall include a tap on each side of the valve for chlorination and/or air release. See PC9464 of the Standard Drawings for a typical steel pipe manhole assembly.

If LADWP requires the installation of remote control and monitoring equipment for its operation, the line valve shall be a butterfly valve with a rectangular vault housing the electric motor operator and telemetering equipment. Each installation will require individual approval.

- D. Blow off assemblies shall be installed at all low points, dead ends, and at line valves where the Trunk Line slopes toward the valve. See PC9462 of the Standard Drawings for blow off installations for 16-inch (16") and larger steel pipe.
- E. Automatic air valves (air release valves (ARV), air and vacuum valves (AVV) and combination air valves (CAV) assemblies) are generally installed at high points, where there is an abrupt change of slope, and at the downslope side of line valves or as determined by LADWP. See PC9463 of the Standard Drawings.
- F. Access manhole assemblies as shown on PC9013 of the Standard Drawings shall be installed at intervals not exceeding 1,000 feet (1,000') unless otherwise approved by LADWP. Pipe manhole assemblies similar to those required on large line valves (PC9464 of the Standard Drawings) shall be installed over every other access manhole installed under paved finished surfaces or where required by LADWP.
- G. The location and design of outlets, tie-ins to any existing or proposed facilities, and bulkheads shall be approved by LADWP.
- H. Each Trunk Line plan shall be examined individually to determine any special condition and/or requirements by LADWP (e.g., pressure regulating valves, telemetering, pitots, etc.).
- I. Vertical clearance between the Trunk Line and crossing interferences shall be at least one-foot (1'). Horizontal clearance shall be at least five feet (5').
- J. All welded steel Trunk Lines shall be provided with a galvanic cathodic protection system designed, installed and tested by a Corrosion Engineer registered by the State, Corrosion Specialist certified by NACE, or someone under their direct supervision. The system shall be subject to approval by LADWP.

305.5 Plans and Specifications

Detailed plans and specifications for Trunk Lines shall be prepared for approval in accordance with Section 201.6. Plan and profile scales shall be one-inch equals 40 feet (1" = 40') horizontal, and one-inch equals ten feet (1" = 10') vertical. In addition to the requirements of Chapter 2, the plans shall contain the following information and exceptions:

- A. A plan view showing:
 - 1. The proposed alignment of the Trunk Line and the location of outlets, valves, blow offs, air valves, pitots, thrust blocks, bends, reducers, bulkheads, and connections to all facilities.
 - 2. All existing and proposed substructure utilities and obstructions complete with dimensions to the Trunk Line.
 - 3. All survey bench marks and alignment data.
- B. Top-of-pipe profile showing:
 - 1. Existing ground line.
 - 2. Official street grades where the Trunk Line is located beneath roadways.
 - 3. Proposed final ground surface where the Trunk Line is installed within an easement and not located in a roadway.
 - 4. The SL elevation of grade breaks and the slopes of the Trunk Line.
 - 5. The SL elevations of all outlets, valves, reducers, etc.
 - 6. Any proposed or existing utility crossings of the proposed Trunk Line complete with clearance dimensions.
- C. A location map with a list of all bench marks and field book references.
- D. Detail sheets showing outlets, connections, valves, etc.
- E. The location and log results of the test holes.

305.6 Installation

LADWP may permit the Applicant to have its own Contractor install a Trunk Line. LADWP reserves the right to install or have its Contractor install Trunk Lines when it is in the best interest of LADWP. This determination is solely at the discretion of LADWP and the Applicant shall pay all installation costs, whether installed by its Contractor or by LADWP.

The Trunk Line installation shall be inspected by LADWP at the expense of the Applicant. LADWP will also provide plant inspection during pipe fabrication at Applicant's expense. The Applicant shall also furnish, at Applicant's expense, such labor as will be required by LADWP to enable thorough inspection and culling of all the materials by the

Applicant and shall furnish reasonable samples of materials at the job to afford adequate testing.

Line and grade and as-constructed surveying will be established and done by LADWP at Applicant's expense. When specifically approved by LADWP, this work can be performed by a Professional Engineer or Professional Land Surveyor licensed to practice in the State.

Chapter 4 - **INSTALLATION REQUIREMENTS FOR CONTRACTORS**

Section 401 - Procedures

401.1 Scope

These requirements are provided for the construction of an intact Applicant/Contractor-Installed Water Distribution System as shown on the approved project drawings. When designing the system, the most current version of these Standards must be utilized. The requirements presented herewith apply to any main line installation consisting of pipe diameters 16-inches (16") and smaller. For water lines larger than 16-inches (16"), special provisions are provided in LADWP's Trunk Line Design Standards. Under most conditions, connections to the active pipelines will be made by the Contractor and setting of the small water meters (two-inches (2") and under) will be made by LADWP, unless otherwise permitted by LADWP. The agreement must set forth the division of work prior to the start of design. See Section 401.24 for additional details.

401.2 Ordinances and Codes

In addition to these requirements, the Applicant shall comply with the latest version of all laws, ordinances, rules, regulations and codes relating to the work, use of premises and highways, and safety of persons and property. LADWP shall reserve the right to request a determination by appropriate authorities to resolve the problem of a potentially hazardous site condition. The Applicant shall stop all work related to the area in question until the appropriate agency has resolved the problem. Any work performed and materials or equipment furnished that does not conform to said laws, ordinances, rules, regulations and/or codes shall be removed and replaced at the Applicant's expense.

All work performed shall be in accordance with the requirements of all permits applicable to the project. Agreements for the receipt of water from LADWP and the design and installation of all such systems are subject to all rules and regulations of the City Charter and Rules Governing Water and Electric Service in the City of Los Angeles. These requirements apply only to main extensions, replacement, and alterations to the Water System.

401.3 Additional Requirements

In addition to these requirements, all work within the public right-of-way shall be in accordance with the latest revision of the Standard Specifications for Public Works Construction (SSPWC) issued by BOE, and LADBS applicable codes and requirements. The Contractor shall also comply with the provisions of the Work Area Traffic Control Handbook (WATCH), and with the permit requirements of the City Engineer. LADWP will assist with the application for the Excavation Permit when required by BOE. Under certain conditions, LADWP will grant a letter to the Applicant to make it possible to apply for an excavation permit.

Potable water crossing to other non-potable water lines are subject to the most current requirements determined by the California State Water Resources Control Board (SWRCB). See Appendix D for more information.

401.4 Contractor's Qualifications

Contractors performing all water work related to the distribution facilities shall be competent, licensed with a C-34 in the State and possess an active SWRCB D2 Certification. Companies must show adequate manpower and equipment to accomplish the work in accordance with the approved plans and requirements. LADWP will not allow any proposed water work to proceed without the use of acceptable equipment and

adherence to applicable permit requirements. A representative of the Applicant or Contractor shall be present at the jobsite whenever work is being conducted by Subcontractors.

Contractors and Applicants shall meet the following requirements with regard to qualification, and guarantees:

A. Qualification

Contractors desiring to install water distribution facilities for LADWP on behalf of an Applicant shall be prequalified. Appendix A - Request for Contractor Prequalification and Appendix B - Water Work Contractor Experience forms may be obtained from, and returned to LADWP's Engineer at least 20 business days prior to the date the Contractor anticipates beginning installation of the distribution facilities. Failure to provide the prequalification forms will cause delays to the water work schedule. Following evaluation of the completed forms, written notice of acceptance or denial will be transmitted to the Contractor. The Contractor shall provide proof of similar installation experience per the requirements of the Approved Plans.

B. Guarantee of Workmanship, Materials, and Equipment

The Applicant shall guarantee that the water distribution facilities installed by the Contractor be free from any and all liens and encumbrances. The facilities shall be free from any and all defects in materials and workmanship for a period of one (1) year after final acceptance by LADWP. This guarantee shall be in the form of an irrevocable Letter of Credit for an amount determined by LADWP, the year will start at the date of final acceptance of the distribution facilities by LADWP. If repairs are not made by the Contractor at the end of one (1) year, LADWP will make any necessary repairs and charge the Letter of Credit. The Applicant must notify LADWP to perform a final walk through, to inspect and approve the completed work.

401.5 **Start of Construction**

In addition to all construction requirements contained in other sections of this document, the Applicant and Contractor shall observe the following:

- A. Construction shall commence within twelve (12) months of the approval date shown on the approved plans. Beyond the twelve (12) month period or if design changes occur, the plans shall be resubmitted for review and approval. If the plans are resubmitted after the twelve (12) month period, LADWP shall implement any modifications to standards and installation requirements. If construction of the main installation is halted for more than twelve (12) months, plans shall be resubmitted for review and approval.

The approved water work contractor shall contact the PCE at the telephone number shown on the approved plans under "Notice to Contractors" to arrange a pre-construction meeting. The meeting can be scheduled after two (2) weeks upon approval of the plans and must be scheduled four (4) weeks prior to the start of construction. The attendees shall include: project manager, LADWP personnel, and Applicant. The purpose of the meeting shall be to discuss the project constructability, scheduling, procurement of materials, and to define responsibilities for the personnel involved in the project. The Contractor will

receive a “Field Notes” print and Field Notes and As-Constructed Drawings Manual. The Contractor shall give at least three (3) working days’ notice to LADWP prior to commencing construction by calling or emailing LADWP PCE assigned to the project. A formal inspection requests shall be made using Appendix C - Inspection Request.

In case of an emergency related to water facilities during non-working hours and in the absence of the assigned LADWP Inspector, LADWP’s customer telephone service (1-800-DIAL-DWP) shall be notified. No personnel outside LADWP shall operate any gate valves, fire hydrants, or services. If LADWP identifies unauthorized use of these appurtenances, the water service to the jobsite will be suspended.

401.6 Cleanup

Upon completing the installation of the Water System facilities, all rubbish, unused materials, removed water appurtenances, concrete forms and other like material shall be removed from the jobsite. All excess excavation material shall be disposed of properly and the area shall be left in a state of order and cleanliness. If LADWP is subjected to remove materials, it shall be done at the expense of the Applicant. All gate valves, vaults, meter boxes, and fire hydrants must be maintained cleaned and accessible. If gate valves are found buried or obstructed, the required cleanup cost will be the responsibility of the Applicant.

401.7 Street Preparation

All mains shall be installed in the paved roadway section of dedicated streets having alignments and grade approved by the City Engineer. When LADWP determines it is not feasible for an installation to be made in a public street and must be made in a private street or property, the water facility will require an easement. The conditions under which such an exception will be allowed will be determined on a case-by-case basis. If the Applicant is constructing a new street prior to installation of water mains, curbs and gutters shall be in place. Road construction shall have progressed to within 15 inches (15”) of the finished street grade prior to placing water main. The road surface shall be smooth, clear of debris, and free from deep holes, ruts and large rocks which may hamper main installation.

401.8 Surveying

Line and grade for Distribution Mains, in the absence of curbs and gutters, will be established by a Professional Land Surveyor hired by the Applicant and must be licensed to practice in the State. All work shall be done in a professional manner.

When surveying is performed, the correct alignment and elevation of the water mains as shown on the approved drawings becomes the responsibility of the Applicant and Contractor. Approval of the staked alignment and elevations by LADWP’s Inspector does not relieve the Applicant and Contractor in any manner from the responsibility for field errors. Sufficient line and grade shall be staked to ensure continual work progress. When survey errors are identified that will impact right-of-way agreements, LADWP may choose to perform a survey using LADWP surveyors at the Applicant’s expense.

When surveying is required, hubs and stakes shall be set on an offset line to mark the location of the centerline of the main. Centerline hubs and stakes may be used in addition to the offset hubs and stakes; however, they may not be set in place of the

offset hubs and stakes. Normal practice is to set offset hubs and stakes five feet (5') to ten feet (10') off the centerline of the main.

Survey points shall be set at a maximum distance of 100 feet (100') apart. All valves, crosses, tees, horizontal and vertical bends, and fire hydrants shall be staked for location and grade. Points of curvature and points of tangency of curves, as well as points on the curve, shall be staked for location and grade. All stakes shall be flagged to increase their visibility. The Applicant and the Contractor shall take reasonable steps to prevent alteration, displacement or removal of hubs and stakes.

Stakes shall be positioned so that the survey hub is between the stake and the main. The side of the stake facing the main shall be marked to show the point being referenced and the distance from the hub to the centerline of the main. The back side of the stake shall be stationered. Grade stakes shall be set at each hub and shall state the vertical distance from the top of the hub to the top of the pipe. The cover on pipes smaller than 12 inches (12") in diameter shall be not less than 30 inches (30") nor more than 42 inches (42"); and on pipe 12 inches (12") or larger in diameter, the cover shall be not less than 36 inches (36") nor more than 48 inches (48") unless shown otherwise in the project drawings. Cover shall be measured to the nearest gutter flow line grade. Under unusual circumstances, it may be necessary to lay pipe at shallow depth with the approval of LADWP's Inspector. In this case, an engineered concrete protective slab shall be used over the pipe to protect it from traffic or any other external load. The slab shall be designed to support traffic loads without transmitting the impact or load to the pipe whenever the pipe cover is less than or equal to 24 inches.

401.9 Inspection of Water System Installation

LADWP requires continuous inspection of all work related to the installation of the Water System. Work that is not properly inspected during installation will not be accepted. If an approved water Contractor fails to request timely inspection and proceeds to install water related facilities without the presence of a LADWP Inspector, the work will be rejected at the Applicant's expense. Inspection request forms (Appendix C - Inspection Request) must be completed and sent to LADWP's Engineer for approval and are subject to the following criteria:

- Request for night inspection lasting more than three (3) days requires ten (10) working day notice.
- Request for night inspection lasting less than three (3) days requires a five (5) working day notice.
- Weekend inspection request requires a 72-hour notice.
- Extended regular work shift inspections require a 48-hour notice.

LADWP will ensure compliance with the provisions of the approved plans and these Standards, including the quality of workmanship and materials. Issues which may require sound field judgment, in lieu of strict interpretation of the requirements, shall be resolved by LADWP and the Applicant, and any resulting monetary differences for the agreed upon installation shall be resolved between the Contractor and the Applicant.

All work shall be performed in accordance with accepted workmanship practices and these requirements. Any work not accepted by LADWP shall be redone until compliance with these requirements is achieved.

All appropriate permits from other city departments or agencies shall be on the jobsite and shall be checked by the Inspector at his discretion before starting construction. See Section 101.3.

The Contractor shall promptly comply with orders relating to quality of materials and workmanship given by LADWP. Any work completed without the presence of a LADWP Inspector is subject to rejection and may require the Contractor to remove and replace at their cost.

No materials shall be used prior to inspection and approval by LADWP's Engineer or Inspector. LADWP has the right to perform any testing deemed necessary to ensure compliance to latest LADWP material specifications, see Section 201.5 for further requirements. LADWP will not accept materials found to be substandard when compared to the most current Material Specifications and when their inferiority becomes evident at any time during installation. Materials rejected by LADWP shall be immediately removed from the jobsite.

401.10 Material Approval by the LADWP

Throughout these Standards, many handling and installation procedures, tools, equipment, and materials require approval by LADWP. Material specifications are subject to change and the Contractor is responsible to ensure the latest specifications are used for the project. The Contractor must obtain the latest material specifications from LADWP by contacting the PCE. Approval by LADWP is used solely as a means to ensure quality control, safety, adherence to drinking water standards, and in no manner shall it render LADWP liable for any injuries suffered or equipment damaged. Safety of workers shall be provided as required by the Cal/OSHA.

401.11 Material Inspection, Handling, and Storage

All materials to complete the work shall be available on site at the start of construction to avoid project delays. LADWP is no longer selling materials, see "LADWP material procurement policy". All materials require an official submittal for approval. Materials purchased without prior LADWP approval and/or inspection will be rejected. Long lead items requiring special fabrication by the manufacturer require special attention to coordinate plant inspection. When required LADWP will designate an Inspector to travel to the manufacturer's plant at the Applicant's and/or Contractor's expense. LADWP shall be notified at least six (6) weeks prior to the start of manufacturing.

- A. Inspection, handling, and storage of materials shall be in accordance with the American Water Works Association (AWWA) Standards and Manuals for installation of water mains and their appurtenances, as last revised.
- B. Materials shall be delivered free of damage at the site of installation. LADWP shall have the right to inspect all materials delivered to the site and reject any damaged material not complying with the current material specifications.

Pipe and fittings shall be loaded and unloaded by lifting so as to avoid shock or damage. Under no circumstances shall such material be dropped. If, however, any part of the coating or lining is damaged, the replacement or repair of the damaged pipe shall be done to the satisfaction of LADWP. Any pipe or fittings that are not acceptable to LADWP shall be removed from the jobsite immediately. All pipe handling equipment and pipe handling methods shall be

approved by LADWP. All materials at the site must be kept clean and accessible to the Inspector.

- C. The Applicant shall furnish materials of the size and type shown on the project drawings and further described in the material specifications. All materials shall be new and unused and clearly marked to allow field identification during installation for compliance with the material specifications. Everything necessary to complete all installations in accordance with the Standards of LADWP shall be furnished and installed whether shown on the approved drawings or not. All installations shall be completed to provide operable functioning parts of LADWP's Water System.
- D. Current detailed technical specifications (or a reference to industry requirements) for purchase or approval of materials can be obtained from LADWP through the PCE. The Applicant or Contractor should be aware that certain items must be ordered from waterworks suppliers well in advance of the start of construction. Steel pipe is subject to plant inspection and testing in accordance with the latest specification, at the Applicant's expense. LADWP shall be notified at least four (6) weeks prior to start of manufacturing. Lack of proper coordination between the Applicant or Contractor and the waterworks supplier will not be accepted as a reason to purchase materials from LADWP.
- E. LADWP reserves the right of refusal for all materials installed in, or connected to, the Water Distribution System. The Applicant shall submit to LADWP a proposed list of materials to be used, including a complete description of the brand name, catalog number, and any other designating information to allow LADWP to determine compliance with the most current material specifications. Acceptance of materials, or the waiving of inspection thereof, shall in no way relieve the Applicant of the responsibility to furnish materials meeting the latest specifications. New water industry products or materials will be tested at the expense of the Applicant if the Engineer deems the product or material has some merit and exceeds the latest specifications. LADWP will establish the criteria for testing and evaluating the product. Adequate lead time shall be allowed for testing of materials as to not delay the project construction. LADWP reserves the right to accept or reject any product or material regardless of the test results.
1. Preconstruction Meeting – The Contractor shall prepare a project schedule identifying dates on which key construction activities will be initiated and completed. The schedule shall be submitted to LADWP for review at the pre-construction meeting at least 40 working days prior to initiating any water-related construction. The meeting is required in order to provide ample time for material procurement, coordinating inspection, discussing inspection schedule, and any other related items.
 2. Long Lead Items –It is the responsibility of the Contractor to adhere to LADWP's material specification and submit the necessary material submittals for approval. When materials require a special inspection at the manufacturing plant, the plant inspection will be coordinated once the material submittals are approved. Items known to have long lead times include but are not limited to: gate valves larger than 12 inches, bypass

valves, materials requiring “Buy America” certification, steel pipe, special seismic joints, etc.

401.12 Earthwork and Excavation

Earthwork shall be defined to include all clearing, grubbing, grading, excavation, fill, backfill, excess excavation, bedding material, borrow material, and surface restoration as may be required to complete the work. All required permits must be obtained prior to the beginning of work, see Section 201.7. When excavating within 24 inches of an existing water line, inspection must be requested prior to excavation. Any existing water lines damaged during the excavation will be repaired by the Contractor as determined by LADWP at the Contractor’s expense. In cases where the damaged pipe is determined to be fragile or in case of an emergency, LADWP may perform the repair.

- A. LADWP shall not be held liable for inaccurate records of existing Water System facilities, it shall be the Applicant’s responsibility to verify the location and extent of all existing substructures prior to starting the project. All underground utilities and structures that may interfere with construction shall be properly potholed and verified in advance to permit necessary relocations without delays.
- B. All excavations shall be made to lines and grades established by the approved drawings, with the exception that LADWP’s Inspector has the authority to change the plan and profile to meet unforeseen field conditions. Prior to the installation of water mains in streets, curbs and gutters shall be in place and road construction shall have progressed to within 15 inches (15”) of the finished street grade. Pipe trenches shall be excavated to a minimum depth of six inches (6”) below the bottom of the pipe. Deviation from grades will be allowed when approved by LADWP, in accordance with Sections 401.16 and 401.17 of these requirements. When the cover is not specified, or a profile is not provided, the cover on pipes smaller than 12 inches (12”) in diameter shall be not less than 30 inches (30”) nor more than 42 inches (42”); and on pipes 12 inches (12”) or larger in diameter, the cover shall be not less than 36 inches (36”) nor more than 48 inches (48”) from the final grade. Cover shall be measured to the nearest gutter flow line grade.

The bottom portion of the trench shall be excavated, trimmed, graded and cleaned, and shall be free from stones and irregularities. The bottom of the trench excavation shall be graded so that joining ends of the pipe will be centered.

Bell holes shall be provided at the joints where necessary and shall be of the size that will enable installation of the joints.

- C. For 12-inch (12”) and smaller diameter pipe, the trench shall be excavated to a minimum width of 18 inches (18”) or a minimum of six inches (6”) on each side of the pipe, whichever is greater, for proper placement and densification of the bedding and backfill material. For 16 inch (16”) and larger diameter pipe, the trench must be a minimum of 12 inches (12”) on each side of the pipe.

All existing asphalt or concrete surfacing shall be sawcut vertically in a straight line that is slightly wider on each side than the trench excavation to prevent raveling of the remaining pavement during excavation and construction.

Trenches on public streets are subject to the latest requirements established by

BOE. Removed asphalt or concrete surfacing material in its existing form shall not be used in any fill or backfill.

- D. The Contractor shall comply with the latest edition of the California Labor Code by preparing a detailed plan for the excavation of all trenches five feet (5') or more in depth showing the design of shoring, bracing and sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of such trenches. On public streets, BOE shall approve the shoring system prior to trenching. A copy of the approved shoring plan shall be submitted to LADWP, for information only, in advance of construction. On private streets, if such plan varies from the shoring system standards established by the Construction Safety Order of the Division of Industrial Safety, the plan shall be prepared by a Civil or Structural Engineer registered by the State. The PCE will confirm that a Registered Engineer has prepared the plan. Where water mains are installed in private property, the layout plans and calculations for shoring shall be submitted to LADWP for review (including the geotechnical report).

All excavations shall have proper shoring in accordance with the latest edition of the California Department of Industrial Relations Construction Safety Orders, Article 6, Excavations, and all other related Sections. All shoring systems must meet BOE requirements as part of the City permitting process.

All water and non-water utility lines and appurtenances exposed by the excavation shall be protected and supported, if necessary, in accordance with the latest requirements set by the owner of the utility. In cases where LADWP's Inspector or PCE identifies a poorly supported facility posing a safety hazard, the Inspector or PCE has the right to shut down the work until the condition is corrected.

- E. All surplus excavation material shall be removed from the jobsite and disposed of properly. If the surplus excavation is disposed of on private property, written permission shall be obtained from the owner and a copy given to LADWP. The disposal method must comply with local, state and federal regulations. AC pipe and any other hazardous material removal are subject to additional requirement by the state and local regulations.
- F. Except as otherwise dictated by construction conditions, the excavation shall be of such dimensions as to allow for the proper installation and removal of concrete forms, or precast slabs and panels, and to permit the construction of the necessary pipe connections. Care shall be taken to ensure that the excavation does not extend below established grades. If the excavation is made below such grades, the resulting excess excavation shall be filled in with sand or graded gravel, deposited in horizontal layers not more than six inches (6") in thickness after being compacted, and shall be compacted and moistened to within two percent (2%) of the optimum moisture content required for compaction of that soil. After being conditioned to have the required moisture content, the layers shall be compacted in accordance with Section 401.14B - Structures of these Standards. In public streets under the jurisdiction of BOE, compliance shall be verified through the issued excavation U-permit. For locations on private property, the Applicant (at their cost) shall submit qualifications of their compaction testing company and submit compaction reports. Testing frequency for compaction shall be discussed in the pre-construction meeting.

- G. In general, blasting will be allowed only if a permit by the local authority having jurisdiction is granted. All explosives and appurtenances shall be transported, handled, stored, and used in accordance with the laws of the local, state, and federal governments as applicable.
- H. All pipe trenches or structure excavation shall be kept free from water during pipe installation and other related work. The method of dewatering shall provide for a completely dry foundation at the final lines and grades of the excavation. No water shall be drained into other work being completed or under construction.

The dewatering operation shall continue until such time as it is safe to allow the water table to rise in the excavations. Pipe trenches shall contain enough backfill to prevent pipe floatation. When pipe is laid in a casing or tunnel longer than 30 pipe diameters, the pipe inside the casing or tunnel shall be secured so floatation does not occur when the pipe is empty.

Water shall not be allowed to rise in the excavation until the concrete has set a minimum of 24 hours and the forms have been removed. Water shall not be allowed to rise unequally against unsupported structural walls.

- I. If the bottom of the trench or excavation is soft or unstable per LADWP's assessment, and is deemed that it cannot support the pipe or structure, the Contractor must submit a proposed solution to be approved by LADWP. The solution must provide a firm foundation for the pipe or the structure.

401.13 Pipe Bedding

A. Installation of Bedding and Pipe

After completion of the trench excavation and proper preparation of the foundation, pipe shall be laid a minimum of six inches (6") above the trench bottom on washed concrete sand bags adjacent to pipe bells before placement of bedding material. The use of wood or organic materials for permanent pipe support is not permitted and must be removed prior to placing bedding. All pipe shall be installed in such a manner as to ensure full support of the pipe barrel over its entire length. Bedding material shall be in accordance to the current LADWP Standards.

LADWP requires a minimum bedding of six inches (6") below the bottom of the pipe to six inches (6") above the top of the pipe. A BOE approved backfill material may then be placed above the pipe to the ground line. See Section 401.14 for backfill and compaction of backfill requirements.

B. Bedding Material

The bedding material shall be an approved Concrete Low Strength Mixture (CLSM) having a minimum compressive strength of 50 psi to a maximum of 100 psi. In cases where the bedding material must be used to backfill the entire trench, the CLSM bedding mix within the public right-of-way, or within easements to the City, must be approved by both BOE and LADWP. LADWP reserves the right to specify the type of bedding material to be used at any time. Slurry backfill shall be allowed to cure for a minimum of 24 hours prior to paving or compacting above it.

401.14 Backfill and Compaction

- A. Pipes
Backfill shall be the fill placed above the bedding limit, according to the requirements of the approved plans. The approved backfill consists of concrete mix specified as a Controlled Low Strength Material (CLSM) having a maximum strength of 100 psi. All backfill shall be placed as specified in the latest edition of the Standard Specifications for Public Works Construction. Backfill within the State right-of-way shall be in accordance with Caltrans' latest specifications and permit requirements for the project.

Excavations performed under permit by the City within the public right-of-way shall be backfilled with the latest LADWP and BOE approved slurry mix. The mixture of slurry and backfill shall be controlled to prevent pipe floatation. Under certain circumstances, the backfill may be poured in one single pour without needing a separate pour for the bedding. The final backfill condition will be detailed on the approved plans. Backfilling shall be conducted in a manner that prevents damage to the pipe and its coating. Any exemption for materials not specified within these requirements shall be approved by both LADWP and the City Engineer.

- B. Structures
Backfill for structures shall be from the subgrade of the structure to ground level on dirt surfaces or bottom of base layer on paved surfaces. Compaction, material, and other requirements shall be the same as backfill for pipes.

401.15 Preparation and Inspection of Pipe and Fittings for Installation

Throughout these requirements, many handling and installation procedures, tools, equipment, and materials require approval by LADWP. Approval by LADWP is used solely as a means to ensure quality control and safety, and in no manner shall it render LADWP liable for any injuries suffered or equipment damage. Safety of workers shall be provided as required by the Cal/OSHA. All pipe and appurtenances purchased by the Contractor shall be inspected to assure adherence to the latest LADWP's material specifications. LADWP will reject any material which has not been approved and inspected. Before placing pipe in the trench, each pipe length or fitting shall be thoroughly cleaned of all foreign material, kept clean thereafter, and carefully examined for cracks and other defects before installation. Bell ends and spigot ends are to be examined with particular care. If any part of the coating or lining is damaged at any point during the installation process, LADWP's Inspector will determine if materials need replacement.

Joint lubricant shall be as supplied by the pipe manufacturer and approved by the LADWP. Joint lubricant shall be nontoxic and water soluble.

Pipe shall be cut, whenever necessary, to conform to location of fittings, line, or grade. All cuts shall be straight and true, and made in a workmanlike manner so as to leave a smooth end without damaging the pipe. The cut ends of pipe shall have all burrs removed and be lightly rasped or filed. All tools used in cutting pipe shall be approved by the Inspector.

SPECIAL CONDITIONS FOR EXISTING ASBESTOS CEMENT (AC) PIPE:

The State requires all Contractors and employees who work on asbestos-related projects to register with the Asbestos Contractor's Registration Unit. All applicable State requirements must be followed when working with AC or Transite pipe. It is the responsibility of the Contractor to assure proper personnel licensing, and permitting requirements when working on AC pipe. **POWER-DRIVEN SAWS WITH ABRASIVE DISCS (MASONRY BLADES) SHALL NOT BE USED FOR DRY CUTTING OR BEVELING ABSESTOS-CEMENT PIPE.** This is in recognition of efforts to reduce the incidence and corresponding danger of airborne pipe fragments wherever cutting is necessary. The Contractor is responsible to comply with all applicable laws and regulations per the latest version of the California Labor Code. Validation of training and certification shall be submitted during the submittal process. LADWP does not allow hot-tapping of AC pipe. The allowed type of connection method to such pipe will be specified on the approved plans.

The following practice is required:

1. When connecting a new DI pipe lateral to an AC main, a tee connection is required. The tee connecting to the existing AC main must be DI pipe.
2. When connecting copper services to AC main, the existing AC main must be replaced by installing a straight piece of DI pipe. The copper service can then be installed by tapping the DI pipe under pressure using a service clamp. The new straight piece of DI pipe shall be a minimum of six feet (6') long. A two foot (2') minimum horizontal clearance must be maintained between the AC main to the new connection, and a two foot (2') horizontal clearance must be maintained between adjacent connections.

401.16 Pipe Alignment and Grade

In laying pipe on vertical curves, the intent is to lay and set line and grade within a tolerance of three inches (3") plus or minus. On relatively level ground, the intent is to lay to grade. Fittings, valves and hydrants shall be installed at specified locations and elevations.

When laying pipe on horizontal curves, the intent is to lay to the alignment. The pipe shall be kept in alignment by placing all the joints on the curve. When laying DI pipe, short lengths of pipe shall not be used. LADWP limits joint deflections to three degrees (3°). When using lock joint gaskets, no deflection is allowed. The deflection limits are set by LADWP regardless of higher limits recommended by the pipe manufacturer. Eleven and one quarter (11¼) degree bends shall be used as necessary to accomplish the curvature without exceeding the individual joint deflections. When laying steel pipe, specified alignment may be accomplished by pulling joints, trimming spigots, using elbows, and using short lengths of pipe in accordance with the project drawings. The maximum radius allowed for DI pipe segments 18 feet in length is 343 feet using a three-degree (3°) deflection.

The cover on all potable water pipes smaller than 12 inches (12") in diameter shall be not less than 30 inches (30") nor more than 42 inches (42"); and on pipe 12 inches (12") or larger in diameter, the cover shall be not less than 36 inches (36") nor more than 48 inches (48"). Cover shall be measured to nearest final gutter flow line grade. If difficulties arise when crossing substructures, deviations from cover limits will be permitted in accordance with the project drawings. When the specified cover cannot be achieved, the

Engineer of Record will be required to place a protective concrete slab over the water line meeting LADWP requirements.

Any changes in alignment and grade shall be authorized by LADWP and shall be accomplished by the installation of additional fittings. Pulling of joints is permitted only when installing pipe where the finished surface has horizontal or vertical curves.

Pipes with bell and spigot rubber gasket joints shall be laid with bell ends facing the direction of laying, unless directed otherwise by the Inspector.

Whenever the installed pipe is left unattended, temporary plugs shall be installed at all openings. Temporary plastic end caps shall be watertight and designed to prevent children and animals from entering the pipe. All temporary caps shall be approved by LADWP.

401.17 Deviation from Alignment and Grade Occasioned by Other Structures

Whenever unexpected obstructions or site conditions not shown on the plans interfere to such an extent that an alteration in the plans is required, LADWP shall have the authority to determine the best method of correction. LADWP will request the plans to be modified and order a deviation from line and grade. Arrangements may be made with the owners of the structure for its removal, relocation, or reconstruction. If the extent of the plan modification requires a revised permit of any kind, the modified plans shall be submitted to the appropriate department for approval.

401.18 Installation of Fittings

All fittings shall comply with the latest LADWP's Material Specifications. Acceptable joint types for straight lengths of DI and steel pipe are push-on joints and slip-joint welding, respectively. Mechanical joints for straight lengths of pipe will be allowed only when specifically approved by LADWP. Fittings shall be set and joined in the manner described in Sections 2 and 3 of this chapter. The use of "wyes" in main installations is strictly prohibited.

Lead joints are not allowed under any circumstance. Flange joints are required when installing four-inch (4") and larger line valves in steel pipe, four-inch (4") and larger tapping sleeves, and four-inch (4") and larger services. No other type of joint shall be used without the specific approval by LADWP.

Flanges and flanged fittings shall have a rating that meets the maximum static pressure at the location of installation. Care should be exercised to select flanges and flanged fittings that have matching drilling templates. After the flange has been welded, there shall be no draft or layback of the flange face.

Mechanical couplings shall be of a gasketed sleeve type, with a diameter that properly fits the pipe. Tolerance on pipe and coupling, together with proper bolt and gasket arrangements, shall be sufficient to ensure permanent watertight joints under all conditions. The two sections of pipe connected by the mechanical coupling shall be separated by a maximum of one-inch (1") and shall not exceed manufacturer recommendations. Where pipes of different outside diameter are to be connected, or where pipe is connected to fittings of different materials, care shall be taken to select the proper ring or adapter by accurately measuring the outside diameter of the pipe. On existing CI and AC pipe, the Contractor shall field verify the outside diameter in advance

of scheduling the water shutdown. Mechanical couplings shall be mechanically restrained by the use of rod and yokes except when connecting to AC pipe.

Repair clamps, repair sleeves, joint clamps, and similar devices shall not be used to repair or join a newly installed water main. Pipe damaged during installation shall be removed and replaced at the expense of the Contractor.

Adapters, plugs, end caps, bulkheads, slip sleeves, anchor boxes, lock-joint gaskets, yokes and rods, and other appurtenances shall be used where appropriate throughout the system, subject to the approval of LADWP. LADWP does not intend to unreasonably limit the installation of any type of fitting, joint, or proprietary device; however, the installation of any such fitting not specifically approved by these Standards is subject to the approval of LADWP. In the event a new technology or material is proposed, testing and engineering certification will be required by LADWP. Written request for approval of deviating items shall be made in advance through LADWP.

All fittings installed in DI main extensions shall be wrapped with polyethylene encasement material as instructed by these Standards. All fittings installed in steel main extensions shall be coated in accordance with Section 402.2402.2C.

401.19 Installation of Bolts

This section applies to all bolts including the “yoke and rod” restraint system, where the rod is considered to be a bolt. Whenever bolts are buried, they must be protected against corrosion by an approved method. See corrosion protection standards per latest AWWA requirements. The materials used to wrap the bolts must conform to the LADWP’s material specifications.

401.20 Installation of Joint-Restraint Fittings

Ductile iron fittings subjected to unbalanced hydrostatic forces and the adjacent 60 linear feet (60’) of pipe or three 18 feet (18’) of full pipe lengths shall be restrained with lock-joint gaskets (U.S. Pipe “Field Lok” or equivalent). Each lock-joint gasket shall be marked with blue paint on the bell. Additional restraining will be required in the form of yokes and rods at connection points and when installing mechanical couplings. For horizontal 11¼ degree bends, ten linear feet (10’) shall be restrained with lock-joint gaskets or yokes and rods. Any other proposed method used for restraining joints must be approved by LADWP.

Steel pipe shall be welded throughout the entire length. Non-insulating mechanical couplings shall be fitted with anchor boxes in accordance with these Standards and shall be electronically bonded in accordance with LADWP’s latest Cathodic Protection Standards. Anchor boxes conforming to PC9194 of the Standard Drawings shall be provided on all mechanical couplings installed on steel main extensions.

Lock-joint gaskets or yokes and rods shall be installed for the entire length of DI fire hydrant, fire service, and domestic service laterals.

401.21 Thrust Blocks

Concrete thrust blocks shall be provided for all bends and fittings subjected to an unbalanced hydrostatic force. Concrete thrust blocks shall be sized for the test pressure of the main and the allowable soil bearing capacity. The test pressure is generally one and one-half times the maximum static pressure. For design purposes, a minimum of

200 psi shall be used for all main installations. Standard sizes and shapes of thrust blocks based on 200 psi water pressure and various types of soil are shown within these Standards. When a non-standard thrust block must be used to meet site conditions, the design must be stamped by a professional engineer registered in the State. LADWP will review the design and approve accordingly. Concrete thrust blocks shall have a minimum compressive strength of 2,500 psi. The proposed concrete mix must be stamped by a professional engineer registered in the State and approved by LADWP.

When a project requires the temporary removal of concrete thrust blocks due to a full street excavation or deep excavations, an engineered thrust block system is required to replace each concrete thrust blocks. The design of the thrust block system must meet AWWA standards and provide an equal balancing force to resist the thrust per drawing PC9441. In order to meet LADWP standards, all bends, tees and fittings shall have a thrust block system. The design of the thrust block system will require approval from LADWP and must be stamped by a professional engineer registered in the state.

A. Installation

Care shall be taken not to block outlets or to cover services, other existing utilities, bolts, nuts, clamps, or other fittings, or to make them inaccessible. Ductile iron pipe shall be polyethylene encased prior to installing thrust blocks. If a large thrust block is to be poured, it shall be separated into sections by a suitable material. If, in the opinion of LADWP, the soil-bearing capacity is not sufficient to provide adequate restraint based on minimum bearing areas as shown within these Standards, then the minimum bearing area shall be increased to a size that will ensure adequate restraint. In every instance, the thrust block shall bear against undisturbed soil.

Before placing concrete, all equipment for mixing and transporting the concrete shall be clean. All debris or water shall be removed from the place to be occupied by the concrete. Concrete shall be placed only in the presence of the Inspector unless inspection has been waived prior to the placement.

B. Form Work

All forming for concrete thrust blocks shall be done by bulk heading around the shape of the thrust block with wood, burlap, or reinforced paper sacks filled with sand. Sacks shall be of a size easily handled when full, and shall be removed before backfilling. All forming material shall be removed prior to backfilling the water main.

Large Excavations

In cases where large excavations exceed the typical trench limits, forms may be used to provide the trench with the approved backfill protection around the pipe. The forms around pipes must be removed after backfill has cured. No forms of any type will be allowed to remain around the pipe.

If the water main must be placed into service immediately, sandbags may be used to form up thrust blocks. Wood forms shall be of such design as to support the thrust until the concrete has set and shall not be considered a substitute for the concrete thrust block. Any wood forms or supports must be removed prior to backfilling the trench.

No horizontal struts or braces required for trench shoring shall remain in the concrete thrust blocks. Prior to placing concrete, the forms and trench wall shall be inspected and approved by the Inspector.

When concrete is placed against the ground without the use of forms, the ground shall be thoroughly moistened or other provisions made to prevent the ground from absorbing water from the concrete.

C. Minimum Curing Time

Newly placed concrete thrust blocks shall be allowed to set undisturbed for a minimum of 24-hours. Cure time may be reduced with the use of a fast curing agent, approved by LADWP prior to use. It is the Contractor's responsibility to have prior approval when connections to the existing Water System are being made in order to avoid longer connection times. Additional restrictions to concrete curing time may be required when placing thrust blocks on public streets subjected to paving and traffic.

D. Compaction of Fill Over Thrust Blocks

Backfill may be placed over thrust blocks after the surface has set sufficiently to resist the weight of the backfill. However, no tamping or compacting shall be allowed above the thrust block for a minimum of 24-hours after placement.

401.22 Installation of Valves and Standpipes

Valves shall be located as shown on the approved project drawings. Any deviations from this shall be at the sole discretion of LADWP.

Valves shall be handled in a manner which prevents injury or damage. At no times shall the valves be lifted by the valve stem or nut. Valves shall be operated prior to installation to ensure good operating condition. Valves shall be set with the valve stems plumb and be accessible for maintenance. Valves installed in DI main installations shall be wrapped with polyethylene encasement material as instructed in PC9440 of the Standard Drawings and Sections 302.7A and 402.2D of these Standards. Valves installed on steel main extensions shall be coated in accordance with Section 402.2402.2C.

A valve standpipe and gate cap shall be provided for every valve not installed above ground or in a vault. Twelve-inch (12") and smaller line valves shall be provided with a six-inch (6") CI gate cap, steel split sleeve, and steel standpipe. Eight-inch (8") and 12-inch (12") gate valves also require a steel standpipe bottom. Gate valve caps, split sleeves, standpipe bottoms, and standpipes shall be obtained from LADWP. The standpipe shall be electronically isolated from the valve, shall not bear, transmit shock or external loads to the valve, and shall be centered and plumb over the wrench nut of the valve, with gate cap set to finished grade or an elevation determined by LADWP. See PC9442 of the Standard Drawings.

401.23 Fire Hydrants

All hydrants shall be field staked for location and grade. Final location shall be in accordance with approved drawings and these Standards. Fire hydrants shall be four-inch by two and half-inch (4" x 2½") set so the elevation of the bottom of the top section flange is set at the finish grade of the ground or top of the curb. All hydrants shall stand plumb.

Fire hydrant installations shall have all joints within the DI lateral restrained. Push-on joints, cast mechanical couplings, and steel mechanical couplings shall be fitted with lock-joint gaskets, yokes and rods, and anchor box assemblies, respectively. Ductile iron fire hydrant installations shall have the lateral, bury elbow and mid-section encased in polyethylene material in accordance with Section 302.7A and Section 402.2402.2C.

All steel mains shall have fire hydrant laterals of steel only. Steel hydrants are a special built up type with a four-inch by two and half-inch (4" x 2½") threaded angle valve meeting LADWP standards. Ductile iron mains can have fire hydrant laterals of steel with corrosion protection requirements per the latest revisions to LADWP's Cathodic Protection Standards.

401.24 Service Laterals and Meters

Water is conveyed from mains to the plumbing of customer's premises by service laterals. The LADWP's facility right-of-way and responsibility ends at the outlet point of the meter. For additional requirements, refer to the Rule 16 of the Rules Governing Water and Electric Service in the City of Los Angeles. All services must be 1 inch or greater. Existing ¾ inch services must be replaced by 1-inch services per current LADWP standards. Any existing Dual Cast Iron (DCI) service shall be replaced with new copper service laterals. In the context of these requirements, service laterals include all pipe, fittings, valves, and appurtenances up to and including the meter outlet. All water pipe beyond the meter is controlled by the latest version of the Los Angeles Plumbing Code.

Applications for service shall be received and approved by the LADWP before tapping the main. Tapping of an active main for a service four inches or greater requires a special Subcontractor specializing in larger taps. Service meters less than three inches in size shall be set by the LADWP except when specifically approved by the LADWP. Service installation orders will be prepared by the LADWP. Under special circumstances the LADWP may direct the Applicant to perform the installation. The Applicant shall cooperate with the Inspector in compiling as-constructed service data. All services shall be flushed with water after the laterals are installed.

Services shall be installed as shown on the project drawings. Small services (two inches (2") and smaller) shall be installed in accordance with these Standards.

Service laterals shall not be installed within a three-foot (3') horizontal distance of other utilities. Adjacent taps shall be spaced a minimum of 2 feet from each other or from any bell, fitting and other appurtenance.

Cover from top of service lateral to nearest gutter grade shall be a minimum of two feet (2') for two-inch (2") and smaller service laterals, a minimum of 2½ feet for four-inch to eight-inch (4"-8") service laterals, and three feet (3') for 12-inch service laterals. The service lateral shall be installed at lower depths if the LADWP determines that the installation at normal depth is not desirable.

Four-inch (4") and larger gate valves used with steel or DI service pipe within the service vault shall be flanged gate valves with CI or DI bodies conforming to the Materials requirements. All eight-inch (8") and larger gate valves installed in a vault or aboveground shall be supported by concrete stands or grout-filled concrete blocks.

Unless installed in a vault or aboveground, all gate valves shall be equipped with a CI vertical gate cap, steel split sleeve, and steel standpipe, and, if appropriate, a steel standpipe bottom. See PC9442 of the Standard Drawings and Section 303.9.

The main to be tapped shall extend along the front lot line of the property to be served. In the case of corner lots, the property may be served from the side lot line. If service is requested for lots at the end of a cul-de-sac, the main to be tapped shall not be more than 50 feet (50') from any property line in the cul-de-sac. Tapping of a main with an equal diameter pipe (size-on-size) or greater is not allowed. A tee is required when connecting to an equal diameter pipe.

401.25 Service Taps

A. Existing Water Mains

Service taps (connections) on existing mains are made by LADWP. No tap shall be made without written consent by LADWP. When approved, a specialty tapping Contractor will be allowed to tap for services while the main is in service. See California Contractors State License Board (CSLB). No size on size tap are allowed.

B. New Water Mains

Service taps two-inch (2") and smaller can be made by the Contractor. Service taps larger than two-inch (2") shall be made by a specialty Contractor approved by LADWP to make connections. All tap connections shall be hot-tapped and shall be made after pressure testing and disinfection of the new main installation. Refer to Section 401.28 for other conditions which must be met prior to hot-tapping.

C. Tapping Sleeves and Tees

Tapping sleeves and tees shall conform to the most current LADWP material specifications. Tapping sleeves or clamps are used to tap mains that are under pressure without interrupting service. Care shall be exercised to select sleeves and gaskets which are properly sized to fit the type and class of pipe to be tapped. Where four-inch (4") and larger tees and tapping sleeves are used, a thrust block shall be formed and poured behind the sleeve or tee to prevent possible damage to the main from pressure shocks which develop as valves are first opened.

D. Tapping

Adjacent taps shall be spaced a minimum of two feet (2'). When tapping water mains, it may be necessary to dig out bedding material, to cut or remove part of the polyethylene wrapping in DI pipe, and to remove part of the enamel undercoating and cement coating in steel pipe. When tapping steel pipe, the reinforcing wire in the cement coating must not come in contact with the pipe or corporation valve. After the taps are made, the polyethylene wrap in DI pipe shall be repaired or replaced in accordance with PC9440 of the Standard Drawings. The steel pipe coating shall be repaired using the latest protective coating procedures that conforms to LADWP's latest corrosion protection requirements. Any backfill material removed during excavation shall be replaced in kind and compacted in accordance with LADWP's latest backfill requirements. No size on size tapping is allowed, LADWP must approve each proposed tap. Tapping is only allowed in CI, DI and steel pipe. **NO TAP SHALL BE MADE IN ANY**

EXISTING WATER MAIN WITHOUT WRITTEN CONSENT OF THE LADWP. LADWP DOES NOT ALLOW HOT-TAPPING OF AC PIPE. Refer to Section 401.15 for special conditions for working with AC pipe.

E. Meter Locations

Meter locations shall be identified by chiseling a “W” on the face of the curb. Service taps that cannot be located from the “W” shall be identified by a “T” chiseled in the face of the curb perpendicular to the main at the tap location.

401.26 Hydrostatic Testing

No hydrostatic testing shall be made on any portion of the pipeline until field-placed concrete has had adequate curing time as defined for thrust blocks in Section 401.21. All slurry bedding shall be placed prior to pressure testing.

LADWP shall be notified 48-hours in advance of testing. The main being tested shall not be restrained against the existing main or its appurtenances. Testing against closed gate valves is prohibited. All testing shall be made in the presence of a LADWP Inspector.

Only the following methods are acceptable for supplying potable water for hydrostatic testing:

1. Water may be taken from a nearby pressurized water source which has been previously disinfected, tested and accepted by LADWP, such as a fire hydrant equipped with a temporary meter and check valve assembly previously installed by LADWP.
2. Water may be delivered to the site by a certified and pre-approved water truck having a minimum capacity of 300-gallons. The water truck shall be used exclusively for the transportation of potable water. A water hauler license in accordance with the provisions of Division 104, Part 5, Chapter 5, Article 12 of the California Health and Safety Code or latest version of these requirements is required and shall be sent to LADWP for verification.

In any event, the method of supplying water as well as the source of water for hydrostatic testing shall be certified and approved by LADWP. Use of barrels, sanitary or otherwise, to supply water for hydrostatic testing is strictly prohibited.

LADWP will not furnish the calibrated meter or the pump required for testing. The main shall be properly backfilled and shall be in a state of readiness for testing. All bulkheads, pumps, taps, and appurtenances necessary to fill the main and maintain the required pressure shall be in place. The main shall be filled with water at a rate which will not cause any surges or exceed the rate at which the air can be released. The main shall be subjected to a hydrostatic pressure of one and one-half ($1\frac{1}{2}$) times the maximum static pressure at the lowest point and one and one-quarter ($1\frac{1}{4}$) times at the highest point along the test section by means of a continuously operating pump, equipped with a bypass valve for regulating pressure. The specified test pressure shall be based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge.

All air in the main shall be properly purged. Where blow offs or hydrants are not available or not effective in purging air from the line, LADWP shall require a tap to purge the main. The location and size of tap shall be at LADWP's discretion.

The test pressure shall be maintained at plus or minus five (5) psi for a period of two (2) continuous hours during which an examination of the main shall be made. Any leaks discovered shall be repaired, and the system will be re-tested. Any part of the pipe or any fitting found to be faulty shall be removed and replaced. No leakage shall be allowed through the bonnet of line valves. Any valve leaking shall be removed and replaced. Cutting and replacing pavement, excavating, and backfilling may all be necessary parts of locating and repairing leaks discovered by pressure testing of pipe.

After all visible leaks have been stopped, the full test-pressure shall be maintained for two (2) continuous hours. No leakage shall be allowed for steel and DI pipe.

Testing against closed valves is prohibited. When fire hydrants are in the test section, the test shall be made against the closed fire hydrants.

Should testing show a leakage, the main shall not be accepted. Repair clamps, repair sleeves, joint clamps, and similar devices shall not be used to repair or join water mains. Any proposed repair method shall be approved by LADWP. All portions of the pipe found to be leaking shall be removed and replaced at the Contractor's expense.

All pressure testing shall be done in accordance to AWWA C600 as last revised. LADWP will determine any special circumstances requiring a variance on the testing method.

401.27 Disinfection

All main extensions will be disinfected by a specialty disinfection Contractor before they are accepted by LADWP. The Contractor must be pre-approved by LADWP and must submit disinfection procedures for approval prior to scheduling disinfection. If the main fails disinfection three times, LADWP will require replacement of the main or part of the main that is failing. The Applicant or Contractor is required to hire a Subcontractor possessing a State T3 Certification that is familiar with LADWP's testing procedures. The Contractor shall install temporary blow off(s) at points designated by the Inspector to enable disinfection and flushing of the mains. Disinfection of the completed main installation shall be done after successful completion of the hydrostatic testing, in accordance with AWWA Standard C651, as last revised. The disinfection plan must be submitted to LADWP for approval. Before filling the pipe with water, the pipe shall be clean and free from debris to the satisfaction of LADWP's Inspector. LADWP shall be notified at least 48-hours prior to the desired disinfection time. The Engineer will provide the latest requirements for dewatering in public streets. Contractors are encouraged to utilize water to be recycled on site for dust control.

401.28 Release for Hot Taps

A main will be released for hot taps only when the following conditions have been met:

- A. The main and all appurtenances have been installed to the satisfaction of LADWP and all pertinent notes and measurements have been made.

- B. The main has been successfully pressure tested to the requirements of Section 401.26.
- C. The main has successfully passed disinfection tests to the requirements of Section 401.27.
- D. No hot-tapping will be allowed on existing AC mains. See Section 302.5D.

401.29 Connections to the LADWP's System

A. Connections

Connections to the Distribution System are generally made by the Contractor unless LADWP determines it is in its best interest to have LADWP make the connection. All connections shall be subject to approval by LADWP and must be detailed on the plans. Under no circumstances shall a non-disinfected main, which cannot be isolated, be connected to a disinfected main.

LADWP is not responsible for water tightness of its valves on existing facilities. If existing valves leak, LADWP will assist in reducing the influx of water, but the Contractor shall use methods at his or her own disposal to work with the resulting leakage.

All connections to Trunk Lines owned or controlled by LADWP will be made by LADWP, unless otherwise noted on the drawings. At the applicant's expense, LADWP will provide and install all fabricated pipe, tapping sleeves, valves, etc., that are necessary to construct the connection, unless otherwise noted on the drawings. Under special circumstances, the Applicant may be asked to provide materials which are not readily available to LADWP under current material contracts.

LADWP will require a dewatering procedure as part of the shutdown plan. No water is permitted to be disposed of at gutters or on public streets. Dewatering to city non-potable lines are subject to permitting by the City of Los Angeles Bureau of Sanitation (LASAN).

B. Operation of Valves

When connecting to LADWP's system, it may be necessary to operate existing LADWP valves. All valves in LADWP's system **shall be operated by LADWP personnel only**. The Contractor shall give LADWP a minimum of five (5) working days notice to arrange for operation of the valves. If the Contractor operates a valve, it may cause damage or adverse effects on the Water System. In such cases, the Contractor operating the valve will be liable for all damages caused to the Water System including private customer systems. LADWP's Inspector shall be present when the valves are operated. Operation of gate valves to facilitate a shutdown for connections to the system will require a shutdown plan to be submitted to LADWP for approval. The shutdown plan must be approved a minimum of 15 working days prior to scheduling the shutdown.

C. Interruption of Service

The Contractor shall provide written notification five (5) working days in advance to all LADWP customers affected by a planned shutdown. Customer outreach and implementation of mitigation measures to minimize interruption in service will

be the Contractor's sole responsibility and shall be outlined in the shutdown plan. Outages shall be kept to a minimum and shall be detailed in the shutdown plan. LADWP may require the use of a side-line water source to temporarily serve the affected customers for shutdowns lasting more than eight (8) hours.

401.30 Temporary Resurfacing

- A. Temporary public street patch material shall be placed where pavement has been removed for installation of water facilities. All pavement work shall be approved by the latest Public Works standards and must adhere to the permitting requirements from BOE. The temporary paving material shall be spread, rolled and finished in accordance with the current edition of Section 302 of the Standard Specifications for Public Works Construction. The Contractor shall maintain the temporary surfacing in good order until permanent resurfacing is placed.
- B. Temporary resurfacing material shall conform to the current requirements of Section 306-1 of the Standard Specifications for Public Works Construction.

401.31 Permanent Surfacing

Arrangements for placement of permanent surfacing in public streets shall be the responsibility of the Contractor and in accordance with the current edition of Section 306-1.5.2 of the Standard Specifications for Public Works Construction. All public streets shall be restored in accordance with the regulations and requirements of the agency having control or jurisdiction over the street, roadway, or easement. All standpipes, gate caps, maintenance holes, fire hydrants, and other main appurtenances shall be adjusted to the final finished grade by the Contractor in the presence of LADWP's Inspector. Each of the areas to be permanently surfaced shall be identified by the use of a surveyor's type tag, fixed by a PK masonry nail driven into the center of the resurfaced area of scattered cuts and at 50-foot intervals for trenches. The tag shall be furnished and installed by the Contractor and shall include the Contractor's name, Los Angeles Department of Water and Power, Water System (DWPWS), and the year that the resurfacing was placed. LADWP reserves the right to modify the identification system. Inspection is required for all final grading and paving activities.

- A. Unsurfaced Areas
All surface cuts shall be restored to a condition equal to that prior to construction.
- B. Surfaced Areas
All surface cuts shall be, at a minimum, restored to a condition equal to that prior to construction.
- C. Easements, Cultivated or Agricultural Areas
In easements, cultivated or agricultural areas, topsoil to a depth of eight inches (8") shall be removed from the area of general disturbance and stockpiled. After installation of all pipelines, appurtenances and structures, and completion of all backfill and compaction, the stockpiled topsoil shall be redistributed evenly over all disturbed areas. Care should be taken to conform to the original ground contour or final grading plans.

401.32 As-Constructed Data

The Applicant or Contractor shall be responsible for submitting the as-built drawings to LADWP in an AutoCAD 2022 format. LADWP will not accept the Water System until the as-built drawings have been submitted. The as-built drawings shall be in accordance with LADWP's latest General Standards for Preparing Pipe Location Reports (PLR). A Pipe Location Report or "PLR" is a permanent construction record used to report the installation, abandonment, removal and/or relocation of Water System facilities such as pipe, fire hydrants and gate valves. Accuracy shall be to within 0.5 feet horizontally and to within 0.1 feet vertically. The Contractor shall provide as-constructed survey data for all newly installed Distribution Mains.

401.33 Protective Concrete Slabs Over Pipes

Under unusual circumstances, it may be necessary to lay pipe at shallow depths. Concrete slabs shall be used over the pipe to protect it from traffic loads. The slabs shall be designed to support traffic loads without transmitting the impact, or load, to the pipe whenever the pipe cover is less than two feet (2'). Concrete slabs shall be installed only with the approval of LADWP. The Contractor will be responsible for acquiring and meeting all requirements for public streets with the agency having jurisdiction over the street, roadway, or easement.

401.34 Concrete Structures

A. Form Work

Forms shall conform to shapes, lines and dimensions of the members as shown on the drawings. Form work shall comply with the latest version of applicable local building and construction codes. Embedded metal ties with snap-off ends shall be used for internal form ties. Use of ordinary wire ties will not be allowed, nor will withdrawal of form ties through the walls be permitted.

Forms may be made of wood or metal, subject to the approval of LADWP. Where the finished concrete surface will be exposed, the forms shall be void of any irregularities, such as knotholes and chips.

Before concrete is placed, all forms shall be carefully cleaned, all reinforcement securely tied, and all necessary openings blocked out. Any material necessary for the support of piping and valves shall be supplied by the Contractor.

Forms shall not be disturbed until concrete has hardened sufficiently to permit their removal with safety. The removal of forms shall be carried out in such a manner as to ensure the safety of the structure. The LADWP Inspector shall be present at the time the forms are removed, and shall be responsible for the safety of this operation.

B. Workability of Concrete

Concrete shall be of a consistency and composition that it can be worked readily into the corners and angles of the forms and around the reinforcement without permitting the materials to segregate, or free water to collect on the surface. No chlorides shall be added to the concrete mix.

C. Mixing and Placing Concrete

Before placing concrete, all equipment for mixing and transporting concrete shall be clean. All debris or water shall be removed from the places to be occupied by

the concrete. Wooden forms shall be thoroughly wetted or oiled. No concrete shall be placed until forms, reinforcing steel, and cleanup have been approved by LADWP.

Concrete shall be placed only in the presence of a LADWP Inspector unless inspection has been waived prior to the placement.

Concrete shall be conveyed from the mixer to the place of final deposit by methods which will prevent separation or loss of materials. All concrete placed shall have a temperature of at least 50 degrees Fahrenheit (50° F or 10° C), but not more than 90 degrees Fahrenheit (90°F or 32° C).

Concrete shall be deposited, as nearly as practicable, in its final position to avoid segregation due to re-handling or flowing. No concrete that has partially hardened or been contaminated by foreign materials shall be deposited, nor shall re-tempered concrete be used.

D. Finishing Concrete

All unformed surfaces shall be screeded and wood float-finished. Floor surfaces shall be roughened by light brooming following the wood float-finish.

After the form work is removed, the voids in all formed surfaces shall be filled with patching mortar and form ties cut back and dry packed, if necessary.

E. Curing and Protecting Concrete

The finished concrete shall be protected for a period of three days and maintained at a temperature of not less than 50 degrees Fahrenheit (50° F or 10° C). Precaution must be taken during hot weather to prevent cracks due to thermal contraction. Newly placed concrete shall be allowed to set undisturbed for a minimum curing time of 24 hours.

When concrete is deposited against the ground without use of forms, the ground shall be thoroughly moistened or other provisions made to prevent the ground from absorbing water from the concrete.

Concrete shall be protected with a LADWP-approved curing membrane immediately after removal of the forms, or on completion of finishing of floors or slabs. White membrane shall be used on non-water-bearing surfaces where concrete is exposed to the direct rays of the sun. The membrane shall be of a nontoxic type.

401.35 Reinforcing Steel for Concrete Structures

A. Installation

Reinforcing steel shall be accurately formed to the dimensions indicated on the drawings. Bends in bars shall be made cold. Bars with kinks or bends not shown on the drawings shall not be used.

Splices shall be located where shown on the drawings. Splices at other locations shall be approved by the Engineer of Record. Welded wire mesh shall be lapped one space and securely wired together. Before the reinforcement is embedded in concrete, the surfaces of the bars, and bar supports, shall be cleaned of heavy

flaky rust, loose mill scale, dirt, grease, or other foreign substances which are objectionable. Reinforcement will be inspected for compliance with requirements as to size, shape, length, splicing position, and amount after it has been placed.

B. Placing of Reinforcing Steel

Reinforcing steel shall be accurately placed and secured in position by using annealed iron wire ties so that it will not be displaced during the placing of the concrete. Chairs, hangers, spacers, and other supports for reinforcement may be concrete, galvanized, or plastic-coated metal, or other approved material.

Steel reinforcement shall be protected by the thickness of concrete indicated on the plans. Where not otherwise shown, the thickness of concrete over the reinforcement shall be as follows:

1. Where concrete is deposited against the ground without the use of forms, not less than three inches (3").
2. Where concrete is exposed to the weather, or exposed to the ground but placed in forms, not less than two inches (2") for bars more than 5/8-inch (5/8") diameter and 1½ inches (1½") for bars 5/8-inch (5/8") diameter or less.
3. In slabs and walls not exposed to the ground or to the weather, not less than ¾-inch (¾").
4. In all cases, the thickness of concrete over the reinforcement shall be "clear" and at least equal to 1½ diameters that of the reinforcement bars.

Section 402 - Installation of Welded Steel Pipe (WSP)

402.1 Special Conditions

A. General

The pipe shall be electric-resistance welded, double cement-lined and coated steel water pipe, slip-jointed for field welding. The steel pipe shall comply with the latest LADWP Steel Pipe Specifications.

The Contractor shall furnish LADWP with a certified copy of the mill test reports showing the chemical and physical test results of the steel. The pipe shall be inspected by LADWP prior to cutting, belling, lining and coating. LADWP shall retain the right to inspect and/or test the pipe at each of these phases. LADWP shall be notified five (5) days in advance of the required inspection.

Installation of steel pipe and appurtenances shall be in accordance with the AWWA M11 Steel Pipe Manual and these Standards or the Trunk Line Design Standards for pipe sizes 24 inches (24") and larger.

402.2 Pipe Installation

A. Welding

Field-welded joints and connections shall be performed in accordance with the procedure of the AWS and the latest LADWP installation standards. Welders are required to have a LADBS structural welding certification. Joints shall be welded externally only. The weld shall be equal in thickness to the thinnest member being joined. Special welding inspection is required when installing steel pipe. The Contractor shall request such inspection 48 hours prior to starting the work. All field welded joints shall be repaired by the contractor to meet the latest LADWP exterior cement coating requirements.

LADWP requires all welders to be pre-qualified by performing a test in the presence of a LADWP Welder. The expense of such tests shall be paid by the Contractor. LADWP retains the right to require welding inspections during the course of the project. The LADWP Engineer must be notified five (5) working days prior to scheduling the welding to request inspection.

B. Flanged Joint

Before joining flanged joint fittings, all parts and joining surfaces shall be thoroughly cleaned to remove rust-preventing grease, oil, grit, burrs, excess coating, and other foreign matter.

Prior to bolting flanges, connecting fittings and pipe shall be properly supported to reduce stress on the flanges. With the flanges properly aligned, the gasket shall then be slipped into position and secured by inserting the bolts through the flanges. All nuts shall be turned finger tight, then tightened in a staggering sequence using a wrench.

C. Coatings

Field-joints, connections, gate valves, mechanical couplings and all other fittings shall be coated in accordance with AWWA C217 standard for wax tape-coating, and AWWA C205 standards (reinforced cement-mortar coating). Irregular shaped fittings such as gate valves or mechanical couplings shall be coated with

LADWP's latest corrosion protection procedures provided during installation. All coatings shall be air dry prior to backfilling. Mortar-coated steel pipe shall have the pipe joints coated with a primer, a wax tape coating, followed by a ¾-inch (¾") thick overcoat of wire-mesh (2" x 2" grid 12½ gauge, electro galvanized) and a reinforced cement mortar coat. At the request of LADWP, all field applied coating or wrapping shall be tested by the Contractor using an electrical holiday detector in accordance with AWWA C203 and AWWA C217 for wax tape, and any flaws or holidays found shall be repaired by the Contractor in accordance with LADWP's procedures.

Irregular shaped fittings such as gate valves or mechanical couplings shall be coated with two coats of pipe mastic. Fiberglass mat fabric, coal-tar saturated, 20 by 20 mesh, shall be used as a reinforcement in the first coat, and after allowing for air drying, the second coat shall be applied. All mastic coatings shall be air dry prior to backfilling.

Mortar-coated steel pipe shall have the pipe joints coated with a cold-applied tape coating, followed by a ¾-inch (¾") thick overcoat of wire-mesh (2" x 2" grid no. 12½ gauge, electro galvanized) and a reinforced cement mortar coat.

All field applied coating or wrapping shall be tested by the Applicant using an electrical holiday detector in accordance with AWWA C203 and AWWA C209 for wax tape, and any flaws or holidays found shall be repaired by the Applicant in accordance with AWWA C209 for wax tape.

D. Mechanical Couplings

Mechanical couplings installed on steel main extensions shall be non-insulating type and shall be bonded in accordance with LADWP's Corrosion Standards, as last revised. When installing mechanical couplings, care shall be taken to ensure that the connecting pipe ends, couplings, and gaskets are clean and free of all dirt and foreign matter with special attention given to the contact surfaces of the pipe, gaskets, and couplings. These couplings shall be assembled and installed in conformity with the recommendation and instructions of the coupling manufacturer.

Anchor boxes conforming to drawing PC9194 shall be installed on all mechanical couplings.

E. Insulating Joints (IJ)

IJ's are required to be installed between dissimilar metals, between new steel and old steel, and at every 2,500 feet (2,500') of new steel main. Pipe connections shall be insulated from each other at the locations indicated, using insulating assemblies as noted on the approved project drawings. IJ's must be approved by LADWP prior to installation. Special care shall be exercised during the installation of these fittings to prevent electrical conductivity across the insulating joint. LADWP, at its discretion, will inspect and test all IJ's as required by the Engineer.

Copper service connections, two inches (2") and smaller, shall incorporate an insulating fitting between the corporation valve and the copper service lateral. The corporation valve and insulating fitting shall be coated prior to backfilling.

F. Service Taps

Service taps shall be hot-tapped. The portions of the pipe coating removed or damaged during tapping shall be repaired using materials conforming to the material requirements. Meter location shall be marked by chiseling the face of the curb with a "W".

G. Cathodic Protection (CP)

When noted on the project drawings, a cathodic protection system shall be installed on the new main line. The cathodic protection system shall be in accordance with the approved construction drawings and per the latest revisions to LADWP's Cathodic Protection Standards.

When approved by LADWP, the cathodic protection system shall be installed and tested by a Contractor certified by NACE for Cathodic Protection. Inspection is required when a specialty Contractor is allowed to install and test the system. All tests results must be provided to LADWP.

H. Gate Valve Location

Each gate valve location shall be referenced on the curb. At a convenient nearby location, an arrow approximately four to five inches (4" to 5") shall be chiseled on the top of the curb pointing to the gate. The distance, in feet, from the arrow to the gate shall be chiseled on the top of the curb adjacent to the arrow.

402.3 **Miscellaneous Metalwork and Piping**

All fabrication shall be equal to the best practice in modern fabricating shops. Welding shall be performed by LADWP-approved operators currently qualified under the Standard Qualification Procedure of the AWS, as last revised. All exposed welds shall be ground smooth, and all weld splatter shall be properly removed to the satisfaction of the Inspector.

Installations involving steel pipe shall have field-welded joints, gate valves, mechanical couplings, and all other fittings coated in accordance with AWWA C209 standards (cold-applied, tape-coating, type I or II) and AWWA C205 standards (reinforced cement-mortar coating), as last revised. As an alternative, field-welded joints and mechanical couplings may be fitted with heat shrink sleeves made for corrosion protection that conform to the materials specifications.

All metal exposed to weather shall be painted with a minimum of two coats each of red oxide primer and paint of the type and color specified on the plans or by the Inspector. Surfaces to be painted shall be cleaned of oil, grease, weld spatters, burrs, grit, dust, or other objectionable surface irregularities. Copper, aluminum or galvanized pipe need not be painted, unless otherwise directed by LADWP.

All miscellaneous piping shall be installed in the best workmanlike manner. All threads on steel pipes shall be cut with sharp dies to standard depth, left clean cut, and tapered. Threaded pipe joints shall be properly sealed with an approved joint compound applied on the male threads only. Copper tubing shall be used with compression fittings per LADWPs approval.

Section 403 - Installation of Ductile Iron (DI) Pipe

403.1 Special Conditions

A. General

The methods of installation for Water Distribution Systems using DI pipe and appurtenances shall comply with these requirements and the latest version of AWWA Standards. The design of DI pipe shall be in accordance with the latest version of the AWWA M41 Ductile Iron Pipe Design Manual.

403.2 Pipe Installation

A. Rubber Gasket (RG) Joints

RG joints shall be installed in accordance with the manufacturer's instructions except that the deflection angle per joint shall not exceed one degree (1°) regardless of limits established by the manufacturer. All other proposed deflections will require LADWP approval. Immediately before joining two lengths of DI pipe, the inside of the bell, the outside of the spigot end, and the rubber gasket shall be thoroughly cleaned to remove oil, dirt, grit, excess coating, and other foreign matter. Lubrication shall be placed along the joining surfaces of the pipe. All joint lubricants shall be NSF 61 compliant. The rubber gasket shall be flexed inward and inserted in the gasket recess of the bell socket. Caution shall be exercised to ensure the correct type of gasket is used. The two sections of pipe together with the rubber gasket shall then be the sole element of the joint depended upon to provide water tightness, and care shall be taken to prevent pinching or tearing of the rubber gasket. See further requirements on Section 401.20.

The spigot end of the pipe shall be placed in the bell end with care to prevent the joint from contacting the ground. The joint shall be completed by slowly and steadily pushing the pipe home. Pipe furnished without a depth mark shall be marked before assembly to assure insertion to full depth of the joint. The spigot end of field-cut pipe lengths shall be filed, or ground to resemble the spigot end of such pipe as manufactured. The Inspector will verify if the gasket is installed correctly and will direct the Contractor to remove the gasket if it has been compromised. This will avoid leaks during pressure testing.

B. Flanged Joint

Before joining flanged joint fittings, all parts and jointing surfaces shall be thoroughly cleaned to remove oil, dirt, grit, excess coating, and other foreign matter.

Prior to bolting flanges, connecting fittings or pipe shall be properly supported to reduce stress on the flanges. With the flanges properly aligned, the gasket shall then be slipped into position, and secured in position by inserting the bolts through the flanges. All nuts shall be turned finger tight; then tightened in a staggering sequence using a wrench per manufacturer's torque specification.

C. Mechanical Couplings

When installing mechanical coupling, care shall be taken to ensure that the connecting pipe ends, couplings, and gaskets are clean and free from all dirt and foreign matter with special attention given to the contact surfaces of the pipe, gaskets, and couplings. These couplings shall be assembled and installed in

conformity with the recommendations and instructions of the coupling manufacturer. The two sections of pipe connected by the mechanical coupling shall be separated by a maximum of one inch (1"). Coupling bolts shall be tightened so as to secure a uniform annular space between the follower rings and the body of the pipe and all bolts tightened approximately the same amount. Diametrically opposite nuts shall be tightened progressively and evenly. Final tightening shall be done with a torque-limiting wrench set for the torque recommended by the coupling manufacturer.

On pipes 12 inches (12") and smaller, mechanical couplings installed within 60 feet (60') of fittings subjected to unbalanced hydrostatic forces shall be restrained by using yokes and rods. On pipes 16 inches (16") and larger, other forms of restraint shall be used, per the approved drawings.

D. Polyethylene Encasement

Ductile iron pipe and all appurtenances shall be wrapped with polyethylene tubes. The pipe must be clean prior to installation of the polyethylene tubes. The polyethylene encasement shall prevent contact between the pipe and bedding material and must be kept snug along the length of the pipe per the direction of the Inspector.

Polyethylene pipe wrap material shall be applied to line pipe and appurtenances in the manner shown on drawing PC9440. When valves, tees, crosses, and other odd shaped fittings cannot be wrapped using the tube material, wrapping shall be accomplished by using a flat sheet or split length of polyethylene tube; passing the sheet under the fitting and bringing it up around the body of the pipe. Make up the seams by bringing the edges together, folding them over twice, and taping with dielectric tape. The polyethylene shall be clear colored, have a minimum wall thickness of eight (8) mils, and shall conform to the Materials Specifications. A ten (10) mil thick dielectric pressure-sensitive tape shall be used to close seams or hold overlaps. Damage to polyethylene pipe wrap in the trench prior to and during backfill shall be repaired to the satisfaction of LADWP's Inspector. Exposure to sunlight of the polyethylene pipe wrap shall be minimized to prevent deterioration. Installation shall be per the manufacturer's recommended procedure.

E. Service Taps

Service taps two-inch (2") and smaller on new mains not connected to an active system shall be hot-tapped. Hot-tap connections shall be made after testing and chlorination of the main installation. Polyethylene wrap damaged during the tapping operations shall be repaired in accordance with these Standards. Meter locations shall be identified by chiseling a "W" on the face of the curb. Service taps that cannot be located from the "W" shall be identified by a "T" chiseled in the face of the curb perpendicular to the main at the tap location. Service taps on existing mains shall be approved by LADWP. Adjacent taps shall be spaced a minimum of two feet (2') apart. Tapping sleeves or clamps can be used to tap existing mains that are in service and under working pressure in the presence of the Inspector. Where four-inch (4") and larger tees and tapping sleeves are used, a thrust block is required. Refer to Section 401.25 for required size of taps.

F. Gate Valve Location

Each gate valve location shall be referenced on the curb. At a convenient nearby location, an arrow approximately four to five inches (4" to 5") shall be chiseled on the top of the curb pointing to the gate. The distance, in feet, from the arrow to the gate shall be chiseled on the face of the curb below the arrow.

Chapter 5 - DRAFTING STANDARDS

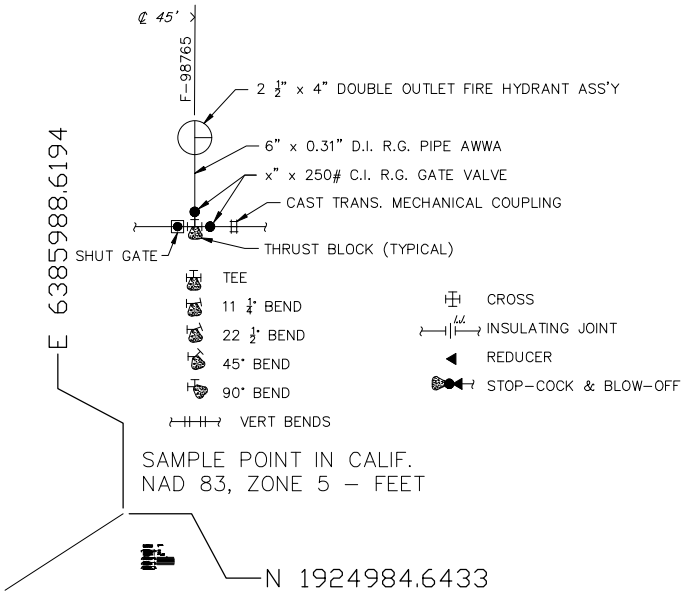
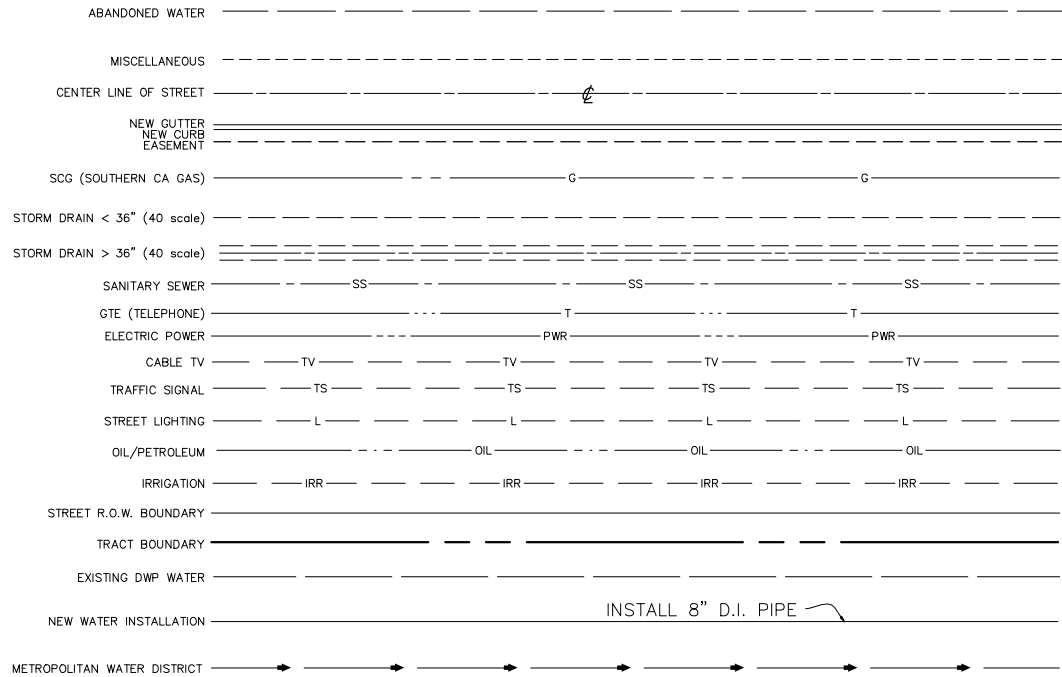
Section 501 - General

LADWP requires independent designers to follow the latest drafting standards to assure uniformity in drawings and notation practices. The Applicant can request the drafting standards and AutoCAD files from the District Engineer. It is recommended that the drafting standards be used during the initial preparation of the design plans to avoid additional plan check iterations.

List of items to be provided:

- Border Sheet (.dwg) (Attached)
- Title Sheet (.dwg) (Attached)
- Plotting File (.ctb) (Available upon request)

(THIS SPACE RESERVED FOR BINDING)



SAMPLE POINT IN CALIF.
NAD 83, ZONE 5 - FEET

N 1924984.6433

DEVELOPER INSTALL:

- 565' - 8" x 0.33" D.I. R.G. PIPE AWWA
- 1 - 8" x 250# C.I. R.G. GATE VALVE
- 1 - 8" x 0.33" x 18" LONG D.I. R.G. NIPPLE AWWA
- 2 - 8" x 8" D.I. R.G. TEE AWWA (B-B-B)
- 1 - 8" x 6" D.I. R.G. REDUCER AWWA (S-B)
- 1 - 8" x 45" D.I. R.G. BEND AWWA (B-B)
- 1 - 8" x 11" D.I. R.G. BEND AWWA (B-B)
- 1 - 8" x 2" D.I. R.G. TAPPED PLUG AWWA
- 1 - 2" STOP-COCK & BLOW-OFF ASS'Y
- 2 - 8" CAST TRANS. MECHANICAL COUPLING
- 4 - 8" SAFETY YOKE W/RODS

①

CURVE DATA				
①	ANGLE	RADIUS	LENGTH	TANGENT
①	xx' xx' xx"	xx.xx'	xx.xx'	xx.xx'
②	xx' xx' xx"	xx.xx'	xx.xx'	xx.xx'

BLOCK NAME: SYMB-116 G.V. #123

INSTALL 8" D.I. PIPE

DEVELOPER INSTALL:

- 4 - 2 1/2" x 4" DOUBLE OUTLET FIRE HYDRANT ASS'Y
- 4 - 8" x 6" D.I. R.G. F.H. TEE AWWA (B-B-S)
- 4 - 6" x 250# C.I. R.G. GATE VALVE
- 24' - 6" x 0.31" D.I. R.G. PIPE AWWA

LINCOLN BLVD.

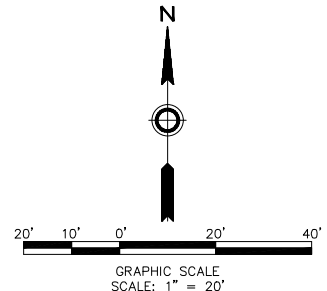
--- NEW WATER SHOWN AND CALLED-OUT ON ANOTHER SHEET

DEVELOPER INSTALL:

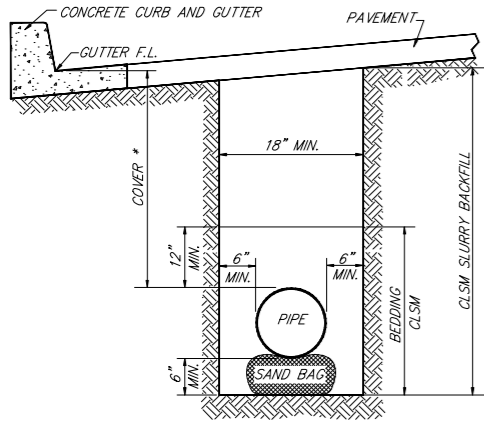
- 1 - 4" DOMESTIC SERVICE ASS'Y
- 1 - 8" x 4" D.I. R.G. TEE AWWA (B-B-B)
- 1 - 4" x 250# D.I. R.G. GATE VALVE
- 1 - 4" x 18" LONG D.I. R.G. NIPPLE AWWA
- 35' - 4" x 0.29" D.I. R.G. PIPE AWWA

DWP RELOCATE:

- 1 - 8" x 8" D.I. R.G. TEE AWWA (B-B-B)
- 1 - 8" x 250# C.I. R.G. GATE VALVE
- 2 - 8" CAST TRANS. MECH. COUPLING
- 4 - 8" SAFETY YOKES WITH RODS
- 2 - 8" BELL YOKE
- 3 - 8" x 0.33" x 18" LONG D.I. R.G. NIPPLE AWWA



DISTRICT:		MAX. STATIC PRESSURE (PSI)		SUBSTRUCTURES		DRAWING COMPLETED		CITY OF LOS ANGELES DEPARTMENT OF WATER AND POWER			
S.C.O.:		CORROSION INDEX		<input type="checkbox"/> S.D. <input type="checkbox"/> S.S. <input type="checkbox"/> GAS <input type="checkbox"/> TEL. <input type="checkbox"/> PWR. <input type="checkbox"/> T.V. <input type="checkbox"/> WTR. <input type="checkbox"/> OIL <input type="checkbox"/> T.S. <input type="checkbox"/> S.L. <input type="checkbox"/> MISC.		DRAWN: _____ CHECKED: _____ APPROVED: _____ DESIGNED BY: _____ PHONE: _____		P.O. BOX 81111, LOS ANGELES, CALIFORNIA 90081-0111 WATER DISTRIBUTION ENGINEERING			
PERMIT APPL.:		PROJECT:		<input type="checkbox"/> BACKFILL SAND <input type="checkbox"/> NATIVE <input type="checkbox"/> SLURRY SOIL TYPE: _____		JOB COMPLETED INSTALLED: _____ INSPECTED: _____ APPROVED: _____		STANDARD TEMPLATE FOR TYPICAL NEW DUCTILE IRON WATER MAIN			
GATE SECTION(S):		THOMAS GUIDE:		WATER SERVICE MAP(S):		AS-CONSTRUCTED DRAWING FIELD NOTES: _____ DRAWN: _____ APPROVED: _____ COVER NOTED IN BOXES		PIPE LOCATION REPORT: _____ SHEET _____ OF _____			
WORK ORDER(S):		REV. NO.		REVISION DESCRIPTION		CHK'D		APP'D		DATE	

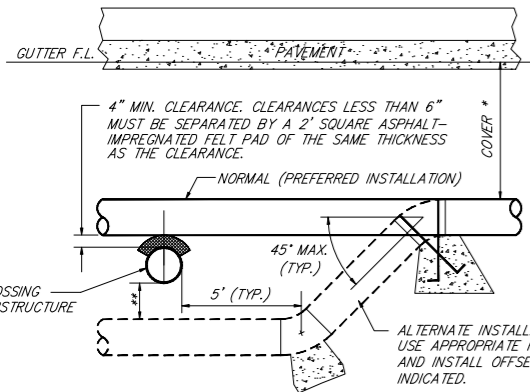


* - 48" MAX./ 36" MIN. FOR 12" DIA. AND LARGER PIPE
 42" MAX./ 30" MIN. FOR 8" DIA. AND SMALLER PIPE

TYPICAL TRENCH SECTION

N.T.S.

1



* - 48" MAX./ 36" MIN. FOR 12" DIA. AND LARGER PIPE
 42" MAX./ 30" MIN. FOR 8" DIA. AND SMALLER PIPE
 ** - 6" MIN. CLEARANCE FOR 12" AND SMALLER DWPWS PIPE
 12" MIN. CLEARANCE FOR LARGER THAN 12" DIA. DWPWS PIPE

NOTES:

- THE MINIMUM CLEARANCES FOR UNDERCROSSING SHOWN HEREON SUPERCEDE THE MINIMUM OF 4" SHOWN IN STANDARD DRAWING A943B. SEE STANDARD DRAWING A943B FOR SPECIFICS OF SEWER CROSSING.

TYPICAL SUBSTRUCTURE CROSSING DETAIL

N.T.S.

2

GENERAL NOTES:

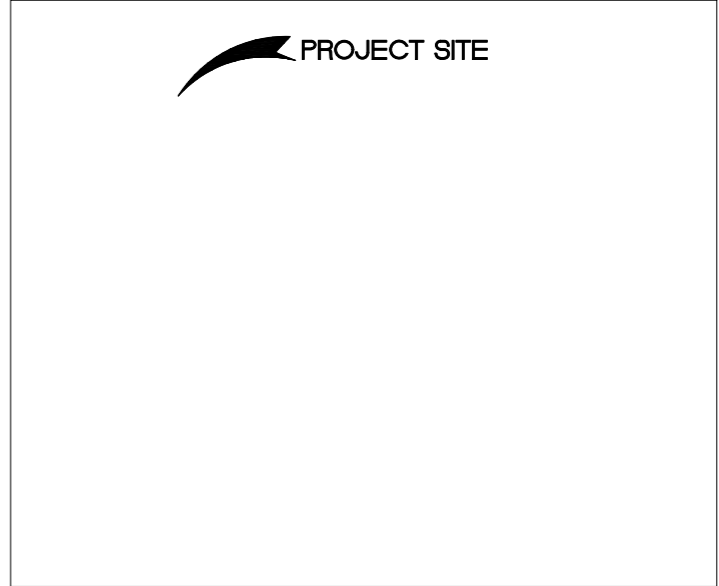
- DEVELOPER TO INSTALL (43) 1" DOMESTIC SERVICES, (30) 2" DOMESTIC SERVICES, (2) 1.5" IRRIGATION SERVICES.
- VERIFY LOCATION OF DRIVEWAYS IN FIELD PRIOR TO INSTALLATION OF FIRE HYDRANTS.
- TELEPHONE, GAS AND CABLE TV IN JOINT TRENCH WITH UNDERGROUND POWER SYSTEM.
- SERVICE LOCATED IN ROLLED CURB AREAS WILL REQUIRE POUR IN PLACE CONCRETE METER BOXES WITH STEEL COVERS AND FORMED CONCRETE VAULTS.
- WHENEVER NEW DWP-WS PIPE FALL WITHIN THE BOUNDARIES OF A 1:1 SLOPED PLANE FROM THE BOTTOM OF ANY EXCAVATION FOR A PROPOSED DWP-PS VAULT (IRRESPECTIVE OF WHETHER OR NOT THE VAULT EXCAVATION WILL ACTUALLY BE SLOPED), THE PIPE EXCAVATION SHALL BE BACKFILLED WITH A CONTROLLED LOW-STRENGTH MATERIAL (CLSM) CONFORMING TO BROWN BOOK SECTION 201-6. THE LIMITS OF THE CLSM SHALL BE A MINIMUM OF FIVE FEET BEYOND THE ENDS OF THE VAULT. HOWEVER, THE CONTRACTOR SHALL INCREASE THE LIMITS OF THE CLSM BACKFILL IF DIRECTED BY DWP-WS INSPECTORS, UP TO A MAXIMUM OF TEN FEET BEYOND THE ENDS OF THE VAULT.

NOTICE TO CONTRACTORS

- ALL WORK DETAILED ON THIS PLAN, EXCEPT AS OTHERWISE STATED OR PROVIDED FOR HEREON, SHALL BE CONSTRUCTED IN ACCORDANCE WITH DWPWS STANDARD SPECIFICATION D-101 (REVISED NOVEMBER 1, 1994) (DWPWS D-101); THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" 2009 EDITION, THE BROWN BOOK, AS LAST REVISED, AND STANDARD PLANS REFERRED TO THEREIN.
- THE CONTRACTOR SHALL COMPLY WITH ALL CONDITIONS OR REQUIREMENTS OF PERMITS APPLICABLE TO THIS PROJECT.
- CURB AND GUTTER SHALL BE IN PLACE PRIOR TO START OF CONSTRUCTION.
- ALL MATERIAL, EQUIPMENT, AND CONSTRUCTION WILL BE SUBJECT TO CONTINUOUS INSPECTION BY DWPWS.
- THE CONTRACTOR AND/OR DEVELOPER SHALL CONTACT THE WATER SERVICES REPRESENTATIVE AT (213) 367-3554 TO ARRANGE FOR A PRE-CONSTRUCTION MEETING TO BE HELD AT LEAST TWO WEEKS PRIOR TO THE ANTICIPATED START OF CONSTRUCTION AND NO SOONER THAN TWO WEEKS AFTER APPROVAL OF THIS PLAN.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR IDENTIFYING AND LOCATING ALL SUBSTRUCTURES THAT MAY AFFECT THIS INSTALLATION IN ACCORDANCE WITH SECTION 2.07 OF DWPWS D-101.
- THE LOCATION OF ALL FITTINGS WILL BE VERIFIED AND APPROVED IN THE FIELD BY THE DWPWS INSPECTOR PRIOR TO INSTALLATION.
- BEDDING SHALL BE PLACED IN ACCORDANCE WITH SECTION 2.08 OF DWPWS D-101 AND AS DETAILED 1 ON THIS SHEET OR ON DWPWS STANDARD DRAWING A9435
- BACKFILL SHALL BE PLACED IN ACCORDANCE WITH SECTION 2.09 OF DWPWS D-101 AND AS DETAILED 1 ON THIS SHEET, EXCEPT AS IT MAY BE MODIFIED BY CONDITIONS OF APPLICABLE PERMITS. WHERE REQUIRED, SLURRY BACKFILL SHALL CONSIST OF C.L.S.M. PER BROWN BOOK SECTION 201-6, AND APPROVED BY PUBLIC WORKS BUREAU OF ENGINEERING (BOE).
- ALL FITTINGS SUBJECTED TO AN UNBALANCED HYDROSTATIC FORCE SHALL BE RESTRAINED WITH 2000 PSI CONCRETE THRUST BLOCKS BEARING AGAINST UNDISTURBED SOIL. IN ADDITION, SAME FITTINGS AND ADJACENT 60 LINEAR FEET SHALL BE RESTRAINED WITH LOCK-JOINT GASKETS (U.S. PIPE "FIELD LOK" OR EQUIVALENT) OR YOKES AND RODS WHERE APPLICABLE.
- DUCTILE IRON PIPE AND APPURTENANCES SHALL BE ENCASED IN 8-MIL CLEAR POLYETHYLENE FILM TUBES.
- THE CONTRACTOR SHALL LOCATE AND INSTALL ALL SERVICES AND METER BOXES REQUIRED FOR THIS INSTALLATION. METER BOXES SHALL BE LOCATED IN FRONT OF THE PROPERTY BEING SERVED AND A MINIMUM OF 5 FEET OUTSIDE THE TOP OF THE DRIVEWAY "X". SERVICE LATERALS SHALL BE LOCATED NO CLOSER THAN 3 FEET FROM OTHER UTILITIES.
- ALL PIPE JOINTS FITTED WITH LOCK-JOINT GASKETS SHALL HAVE A 6-INCH WIDE BAND PAINTED ON THE

NOTICE TO CONTRACTORS CONT'D:

- TOP PORTION OF BELL WITH "SAFETY-PRECAUTION BLUE" PAINT TO THE SATISFACTION OF THE DWPWS INSPECTOR.
- UNLESS OTHERWISE NOTED HEREON, TAPPING OF EXISTING STEEL OR C.I./D.I. MAINS SHALL BE MADE BY A DWPWS-APPROVED TAPPING CONTRACTOR WHO SHALL INSTALL AND TEST THE FLANGED OUTLET OR THE TAPPING SLEEVE PRIOR TO TAPPING THE MAIN.
- INSTALLATION SHALL COMPLY WITH THE LATEST EDITION OF DWP'S "RULES GOVERNING WATER AND ELECTRIC SERVICE".
- A SERVICE CONNECTION TO PREMISES SHALL NOT BE USED TO SUPPLY ADJOINING PREMISES OF A DIFFERENT OWNER OR TO SUPPLY THE PREMISES OF THE SAME OWNER WHICH IS ON THE OPPOSITE SIDE OF A PUBLIC OR PRIVATE STREET OR ALLEY, ADDITIONALLY, SAID SERVICE LINES SHALL NOT CROSS PUBLIC OR PRIVATE STREETS OR ALLEYS TO SUPPLY IRRIGATION TO MEDIAN, STREETSCAPE OR OPEN SPACE AREAS.
- A SHUT-DOWN PROCEDURE MAY BE REQUIRED WHEN CONSTRUCTING OVER 35 FEET OF NEW MAIN WATERLINE AND FIRE HYDRANT LATERALS. WHEN EXECUTING THE SHUT-DOWN, THERE MAY BE CUSTOMER SERVICES THAT WILL BE DISRUPTED FOR AN EXTENDED PERIOD OF TIME WHICH MAY REQUIRE A TEMPORARY WATER LINE (SIDE-LINING) TO BE PROVIDED, UNLESS SOME OTHER CONSTRUCTION METHOD CAN BE DESIGNED BY THE CONTRACTOR AND APPROVED BY THE LADWPWS ENGINEER.



VICINITY MAP
 NTS

NOTES:

- ALL VALVES ARE TO BE TAGGED UPON INSTALLATION.
- ADJACENT TAPS SHALL BE SPACED A MINIMUM OF TWO FEET (2').
- TYPE "C" CURB AND GUTTER PER CITY OF LA BOE STANDARD DETAILS #S-410-2 IS TO BE USED AT ALL WATER METER BOXES AND FIRE HYDRANTS.
- THIS MAINLINE DESIGN WAS PREPARED WITH CONSIDERATION OF THE NEED TO SAVE WATER.



KEY MAP
 1"=500'

REV. NO.	REVISION DESCRIPTION	CHK'D	APP'D	DATE

DISTRICT:	MAX. STATIC PRESSURE (PSI)	SUBSTRUCTURES	DRAWING COMPLETED		CITY OF LOS ANGELES DEPARTMENT OF WATER AND POWER 1201 N. ST. LOUIS, LOS ANGELES, CALIFORNIA 90001-2098 WATER DISTRIBUTION ENGINEERING
S.C.O.:	CORROSION INDEX	<input type="checkbox"/> S.D. <input type="checkbox"/> S.S. <input type="checkbox"/> GAS <input type="checkbox"/> TEL. <input type="checkbox"/> PWR. <input type="checkbox"/> T.V. <input type="checkbox"/> WTR. <input type="checkbox"/> OIL <input type="checkbox"/> T.S. <input type="checkbox"/> S.L. <input type="checkbox"/> MISC.	DRAWN: _____ CHECKED: _____ APPROVED: _____ NAME: _____ DATE: _____		
PERMIT APPL.:	BACKFILL <input type="checkbox"/> SAND <input type="checkbox"/> NATIVE <input type="checkbox"/> SLURRY	<input type="checkbox"/> INSTALLED <input type="checkbox"/> IMPROVED <input type="checkbox"/> AS-CONSTRUCTED DRAWING	SERVICE NO.: _____ GATE SECTION(S): _____ THOMAS GUIDE: _____ WATER SERVICE MAP(S): _____ WORK ORDER(S): _____	JOB COMPLETED NAME: _____ DATE: _____	STANDARD TEMPLATE FOR TYPICAL NEW DUCTILE IRON WATER MAIN
PROJECT:	SOIL TYPE	REAL NOTES DRAWN: _____ APPROVED: _____ COVER NOTED IN BOXES	PIPE LOCATION REPORT: _____	SHEET 1 OF _____	

(THIS SPACE RESERVED FOR BINDING)

Chapter 6 - MATERIAL SPECIFICATIONS

Section 601 - Material Specification Summary

Specifications for materials to be used in the installation of the Water System shall comply with state water quality requirements. Once the design plans are approved and signed, it is the responsibility of the Applicant to obtain the latest material specifications from the PCE. The approval is valid for 12 months. This will ensure that Contractors installing the Water System use the appropriate materials meeting LADWP's current specifications. All materials supplied by a Contractor must be approved by LADWP before construction can begin. For further details on material acceptance and approval process, see Sections 401.10 and 401.11.

The following are the major components which will affect both schedule and cost of construction if LADWP specifications are not adhered to:

- Brass Fittings and Valves
- Copper Tube
- DI Pipe – 18-foot (18') length, double cement-lined
- DI and Steel Pipe Fittings and Valves
- Fire Hydrant
- Gate Valves – Four inches (4") and greater
- Mechanical Couplings
- Meter Boxes – For services 1-inch to 2-inch (1" to 2")
- Steel Pipe – 20-foot (20') length, double cement-lined and cement-coated
- Vaults – For services four inches (4") and greater
- Yokes

Chapter 7 - **FORMS & EXHIBITS**

Appendix A - Request for Contractor Prequalification

**City of Los Angeles Department of Water and Power
Water Distribution Division**

REQUEST FOR CONTRACTOR PREQUALIFICATION

Contractor:

1. Enter the type and expiration date of all licenses issued to you by the State of California that you wish to have considered. A State of California issued Water Distribution Operator Grade D2 Certification is required.
2. Provide a list and brief description of work completed within the last 24 months related to the installation of water facilities. In addition, provide names of references for each project. Please be specific and only list projects using identical materials as specified by the project (i.e. Welded Steel Pipe, Cast Iron, Ductile Pipe, Asbestos Cement pipe, Copper, Shutdowns, Side-lines).

Notes:

1. The minimum liability insurance coverage required is \$1,000,000. The Los Angeles Department of Water and Power (LADWP) reserves the right to require additional insurance coverage from the Applicant when deemed necessary.
2. Prequalification is subject to yearly application and renewal.
3. LADWP reserves the right to require a performance test for Contractors or their Subcontractors who tap existing mains.

Contractor's Representative

Print Name Date

D2 Certificate Number Expiration Date

Signature

Appendix B - Water Work Contractor Experience

**City of Los Angeles Water and Power
Water Distribution Division**

WATER WORK CONTRACTOR EXPERIENCE

Project Name:

Project Scope, include total length of pipe installed:

Type of pipe material(s) used:

Project duration of water work:

Water Agency (Owner) and contact information:

Project Manager's name:

Subcontractors to be used for the following specialties:

1. Welding:
2. Hot-Tapping:
3. Chlorinating:
4. Cathodic Protection:

Appendix C - Inspection Request

**DEPARTMENT OF WATER AND POWER
WATER DISTRIBUTION DIVISION
INSPECTION REQUEST**

Date submitted: _____
 Contractor: _____
 Agency/Developer
 Representative
 Approving request: _____

Contact information

	Name	Phone
Foreman:		
Safety Coordinator:		

Required Inspection Date(s)	Hours: (see note 4)		Scope of work: describe work details for the duration of the overtime schedule. Attached drawing showing limits of work, reference approved drawing set.
	FROM	TO	

Required Overtime (If any)	FROM	TO	Reason for Overtime: Include description of why the overtime is being requested outside of the normal work hours

Restriction Notes:

- 1. All non emergency and weekend overtime request must be submitted for approval 3 business days prior to the commencement of work.**
- 2. All night shift overtime request must be submitted for approval 5 business days prior to the commencement of work.**
- 3. Once Overtime request is approved cancelation must be made 4 hours before the start of the overtime.**
- 4. Normal inspection hours range from 7:00 am to 2:30 pm depending on job location**

LADWP USE	
Approved By: _____	
Approved Date: _____	
Inspector Assigned: _____	Hours of Inspection: _____
Phone Number: _____	

Appendix D - Criteria for the Separation of Water Mains and Non-Potable Pipelines

Criteria for the Separation of Water Mains and Non-Potable Pipelines

The contents of this section are excerpts from the California State Water Resources Control Board ("State Board"), Division of Drinking Water's ("Division") "Criteria for the Separation of Water Mains and Sanitary Sewers" dated April 5, 1983 and "Separation of Water Mains and Non-Potable Pipelines – Requests for Alternatives to the Waterworks Standards" dated December 14, 2017. These documents can be found at the end of this section for reference. The Applicant/Designer is responsible for obtaining and ensuring the state's latest criteria are met during design.

A. Basic Separation Standards

The "California Waterworks Standards" sets forth the minimum separation requirements for water mains and non-potable pipelines. These standards, contained in California Code of Regulations (CCR), Title 22, Division 4, Chapter 16, Section 64572 establish criteria for the separation of new water mains from non-potable pipelines. Public Water Systems should ensure these distances are met, whenever feasible, for all new construction. Please note CCR, Title 22, Section 64630 has been repealed as of March 9, 2008.

- (a) New water mains and new supply lines shall not be installed in the same trench as, and shall be at least ten feet (10') horizontally from and one-foot (1') vertically above, any parallel pipeline conveying:
 - (1) Untreated sewage
 - (2) Primary or secondary treated sewage
 - (3) Disinfected secondary-2.2 recycled water (defined in section 60301.220)
 - (4) Disinfected secondary-23 recycled water (defined in section 60301.225)
 - (5) Hazardous fluids such as fuels, industrial wastes, and wastewater sludge
- (b) New water mains and new supply lines shall be installed at least four feet (4') horizontally from, and one-foot vertically above, any parallel pipeline conveying:
 - (1) Disinfected tertiary recycled water (defined in section 60301.230)
 - (2) Storm drainage
- (c) New supply lines conveying raw water to be treated for drinking purposes shall be installed at least four feet (4') horizontally from, and one-foot (1') vertically below, any water main.
- (d) If crossing a pipeline conveying a fluid listed in subsection (a) or (b), a new water main shall be constructed no less than forty five degrees (45°) to and at least one-foot (1') above that pipeline. No connection joints shall be made in the water main within eight horizontal feet (8') of the fluid pipeline.
- (e) The vertical separation specified in subsections (a), (b), and (c) is required only when the horizontal distance between a water main and pipeline is less than ten feet (10').

- (f) New water mains shall not be installed within 100 horizontal feet (100') of the nearest edge of any sanitary landfill, wastewater disposal pond, or hazardous waste disposal site, or within 25 horizontal feet (25') of the nearest edge of any cesspool, septic tank, sewage leach field, seepage pit, underground hazardous material storage tank, or groundwater recharge project site.
- (g) The minimum separation distances set forth in this section shall be measured from the nearest outside edge of each pipe barrel.
- (h) With State Board approval, newly installed water mains may be exempt from the separation distances in this section, except subsection (f), if the newly installed main is:
 - (1) less than 1,320 linear feet (1,320')
 - (2) replacing an existing main, installed in the same location, and has a diameter no greater than six inches more than the diameter of the main it is replacing
 - (3) installed in a manner that minimizes the potential for contamination, including, but not limited to:
 - (A) sleeving the newly installed main
 - (B) utilizing upgraded piping material

When water mains and non-potable pipelines are not adequately separated, the potential for contamination of the water supply increases. Therefore, when adequate physical separation cannot be attained, an increase in the factor of safety should be provided by increasing the structural integrity of both, the pipe materials and joints.

B. Exceptions to Basic Separation Standards

The Division of Drinking Water recognizes that certain conditions, such as available space, limited slope, existing structures, etc., may call for the installation of pipelines with less separation than what is required by the Basic Separation Standards. In these situations, the Water System may propose an alternative pursuant to CCR, Title 22, Section 64551.100:

64551.100. Waivers and Alternatives.

- (a) A Water System that proposed to use an alternative to a requirement in this chapter shall:
 - (1) Demonstrate to the State Board that the proposed alternative would provide at least the same level of protection to public health; and
 - (2) Obtain written approval from the State Board prior to the implementation of the alternative.

In proposing an alternative to the Waterworks Standards, Water Systems should observe the following:

- The Water System must accept responsibility for the adequacy of the proposed alternative. The Division may require a written statement, signed by the Water

System's management, certifying that the proposed alternative adequately protects public health.

- In most circumstances, the Division cannot offer technical assistance with pipeline or infrastructure design. The Water System proposing an alternative must demonstrate adequate expertise on the part of its own personnel or its hired consultants.
- The Water System should describe how the proposed alternative provides at least the same level of protection to public health as the minimum separation distances prescribed in the regulation.
- While exorbitant cost may present a hardship in meeting the regulatory separation requirements and can be considered, public health must be prioritized above construction costs in determining an acceptable alternative.

The Division has prepared a "Waterworks Standards Main Separation Alternative Request Example Checklist" that may be used by Water Systems in proposing an alternative to the Waterworks Standard. A copy of the form can be found in at the end of this section Appendix D. A fillable word version can be obtained from contacting the Division directly. The purpose of the checklist is to ensure that the Division has sufficient information to evaluate the proposal. **The Water System may submit the information in a different format from the checklist, provided that the submittal provides adequate information.** The checklist may also be used to provide written certification that the proposed alternative adequately protects public health.

Water mains and sewers of 24 inches (24") diameter or greater may create special hazards because of the large volumes of flow. Therefore, installations of water mains and sewer lines 24 inches (24") or larger should be reviewed and approved by the health agency prior to construction.

C. Special Provisions

1. The Basic Separation Standards are applicable under normal conditions for sewage collection lines and water distribution mains. More stringent requirements may be necessary if conditions, such as high groundwater exist.
2. Sewer lines shall not be installed within 25 feet (25') horizontally of a low head (five psi or less pressure) water main.
3. New water mains and sewers shall be pressure tested where the conduits are located ten feet (10') apart or less.
4. In the installation of water mains or sewer lines, measures should be taken to prevent or minimize disturbances of the existing line. Disturbance of the supporting base of this line could eventually result in failure of this existing pipeline.
5. Special consideration shall be given to the selection of pipe materials if corrosive conditions are likely to exist. These conditions may be due to soil type and/or the nature of the fluid conveyed in the conduit, such as a septic sewage which produces corrosive hydrogen sulfide.
6. Sewer Force Mains:

- a. Sewer force mains shall not be installed within ten feet (10') horizontally of a water main.
- b. When a sewer force main must cross a water line, the crossing should be as close as practical to the perpendicular. The sewer force main should be at least one-foot (1') below the water line.
- c. When a new sewer force main crosses under an existing water main, all portions of the sewer force main within ten feet (10') horizontally of the water main shall be enclosed in a continuous sleeve.

When a new water main crosses over an existing sewer force main, the water main shall be constructed of pipe materials with a minimum rated working pressure of 200 psi or equivalent pressure rating.

D. Alternate Criteria for Construction

The construction criteria for sewer lines or water mains where the Basic Separation Standards cannot be attained are shown as an attachment within the Division's "Criteria for the Separation of Water Mains and Sanitary Sewers." There are two situations encountered:

- Case 1: New sewer line - new or existing water main. For Case 1, the alternate construction criteria apply to the sewer line.
- Case 2: New water main - existing sewer line. For Case 2, the alternate construction criteria may apply to either or both the water main and sewer line.

The construction criteria should apply to the house laterals that cross above a pressure water main but not to those house laterals that cross below a pressure water main.

Case 1: New Sewer Being Installed

<u>Zone</u>	<u>Special Construction Required for Sewer</u>
A	Sewer lines parallel to water mains shall not be permitted in this zone without approval from the responsible health agency and water supplier.
B	A sewer line placed parallel to a water line shall be constructed of: <ol style="list-style-type: none"> 1. Extra strength vitrified clay pipe with compression joints. 2. Class 4000, Type II, AC pipe with rubber gasket joints. 3. Plastic sewer pipe with rubber ring joints (per ASTM 03034) 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: <ol style="list-style-type: none"> 1. Ductile iron pipe with hot dip bituminous coating and mechanical joints. 2. A continuous section of Class 200 (DR 14 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 DI pipe with hot dip bituminous coating.
 2. A continuous section of Class 200 (DR 14 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 ten feet by ten feet by four-inch thick (10' x 10' x 4") reinforced concrete slab.

Case 2: New Water Mains Being Installed

Zone Special Construction Required for Sewer

- A No water main parallel to sewers shall be constructed without approval from the health agency.
- 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 dip bituminous coating.
 2. Dipped and wrapped ¼-inch (¼") thick welded steel pipe.
 3. Class 200, Type II, AC pressure pipe.
 4. Class 200 pressure rated plastic water pipe (DR 14 per AWWA C900) or equivalent Zone.
 5. Reinforced concrete pressure pipe, steel cylinder type, per AWWA C300-74, 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 dip bituminous coating.
 2. Dipped and wrapped ¼-inch (¼") thick welded steel pipe.
 3. Class 200 pressure rated plastic water pipe (DR 14 per AWWA C900) or equivalent.
 4. Reinforced concrete pressure pipe, steel cylinder type, per AWWA C300-74, 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 (4') from either side of the sewer and shall be constructed of:
1. Ductile iron pipe with hot dip bituminous coating.
 2. Dipped and wrapped ¼-inch (¼") thick welded steel pipe.
 3. Class 200 pressure rated plastic water pipe (DR 14 per AWWA C900) or equivalent.
 4. Reinforced concrete pressure pipe, steel cylinder type, per AWWA C300-74 or C301-79 or C303-70.

E. Notes and Definitions

The following notes and definitions apply to this section only:

1. HEALTH AGENCY: The California State Water Resources Control Board, Division of Drinking Water (formerly Department of Health Services). For those Water Systems supplying fewer than 200 hundred service connections, the local health officer shall act for the State Board.
2. WATER SUPPLIER: "Person operating a public water system" or "supplier of water" means any person who owns or operates a public water system.
3. LOW HEAD WATER MAIN: Any water main which has a pressure of five (5) psi or less at any time at any point in the main.
4. Dimensions are from outside of water main to outside of sewer line or manhole.
5. COMPRESSION JOINT: A push-on joint that seals by means of the compression of a rubber ring or gasket between the pipe and a bell or coupling.
6. MECHANICAL JOINTS: Bolted joints.
7. RATED WORKING WATER PRESSURE OR PRESSURE CLASS: A pipe classification system based upon internal working pressure of the fluid in the pipe, type of pipe material, and the thickness of the pipe wall.
8. FUSED JOINT: The jointing of sections of pipe using thermal or chemical bonding processes.
9. SLEEVE: A protective tube of steel with a wall thickness of not less than ¼-inch (¼") into which a pipe is inserted.
10. GROUND WATER: Subsurface water found in the saturation zone.
11. HOUSE LATERAL: A sewer connecting the building drain and the main sewer line.

STATE WATER RESOURCES CONTROL BOARD
Division of Drinking Water
Waterworks Standards Main Separation Alternative
Request Checklist

Water System Name/Number:

Name of Applicant:

Phone Number and Email Address:

Project Name and Location:

Attach plans or field drawings to show the standard installation and the proposed installation for which the alternative is being requested. (e.g. vertical profile and horizontal alignment, specifications, and other exhibits, as appropriate).

The Waterworks Standards in the California Code of Regulations (CCR) Title 22, Chapter 16, Section 64572 provide separation criteria for new construction. When buried water mains are in close proximity to non-potable pipelines, the water mains are vulnerable to contamination that can pose a risk of waterborne disease outbreaks.

Per CCR Title 22, Chapter 16, Section 64551.100, a water system that proposes to use an alternative to a requirement in Chapter 16 shall: 1) demonstrate to the State Board that the proposed alternative would provide at least the same level of protection to public health; and 2) obtain written approval from the State Board prior to implementation of the alternative. Requests for alternatives to the Waterworks Standards must consist of information outlined in at least four of the attachments below. Information contained in Attachments A, B and E will be required for all alternative requests. Information contained in Attachments C and/or D will also be needed depending on your particular situation. Please review all the attachments and submit the information for your specific project. The information must be submitted to your local Division of Drinking Water District Office for review and approval prior to construction.

Attachment A represents the standard pipe material and construction that would be used if the standard separation criteria can be met by the utility.

Attachment B represents information on the current pipe in the ground that is being crossed by a new pipeline or being paralleled by a new pipeline.

Attachments C and **D** represent information on the new pipeline being installed. Attachment C is for parallel construction and Attachment D is for crossings.

Attachment E is certification language that is needed to consider the Waterworks Standard alternative application.

Please Note: The information may be submitted using this checklist or another format, but all relevant information must be provided to the Division of Drinking Water District Office for consideration. If multiple crossings or parallel pipelines in multiple locations are part of the application, please indicate in the comments field of the applicable attachment or

submittal. Alternatively, the applicant can provide an attachment or separate submittal for each location.

Attachment A (All Cases)

Water System's Standard Pipe Material and Construction Details

Attach the water system's standard pipe specification and construction details to this as Exhibit 1 and describe below.

Liquid Conveyed By New Pipeline:

- Domestic Water Raw Water Recycled Water
- Sewer Force Sewer Storm Drain
- Other (describe)

Nominal Size: inches

Operating Pressure: psi or Gravity flow/atmospheric

- Pipe Material:
- Ductile Iron Cast Iron Welded Steel
 - HDPE PVC Concrete Clay
 - Other describe

AWWA Material Designation Code:

Pressure Class/Thickness/Coating

- Joint Type Construction: Push On Restrained Welded Joints Fused
- Other describe

Depth of Cover:

Comments:

Attachment B (All Cases)

Existing Pipeline Material – Paralleling or Crossing the Proposed Pipe

List the condition of the existing pipeline being paralleled or crossed.

Liquid Conveyed By Existing Pipeline:

- Domestic Water Raw Water Recycled Water
 Sewer Force Sewer Storm Drain
 Other (describe)

Nominal Size: inches

Operating Pressure: psi or Gravity flow/atmospheric

- Pipe Material: Ductile Iron Cast Iron Welded Steel
 HDPE PVC Concrete Clay
 Other (describe)

AWWA Material Designation Code:

Pressure Class/Thickness/Coating

- Joint Type Construction: Push On Restrained Welded Joints Fused
 Other (describe)

Length of Project:

Age/Condition:

Depth of Cover:

Separation from proposed pipeline

Note: all distances are measured from the outside walls of both pipelines.

Vertical:

Horizontal:

Have there been many repairs on the existing pipeline in this area? Yes No

If yes, explain:

COMMENTS:

Attachment C

Can the new pipeline be installed in accordance with the Waterworks Standards? If not explain below:

Proposed additional protective measures (material construction methods, operational considerations, etc.):

Attach additional exhibits as necessary

Attachment D

Proposed Pipeline Crossing Material and Construction Information

Where the Waterworks Standards cannot be met, it is the responsibility of the water system proposing an alternative to demonstrate that its proposed construction will have at least the “same level of protection to public health” as the minimum separation distances prescribed in the regulations.

Intended Use of New Pipeline: Distribution Transmission Storage
 Other (describe)

Liquid Conveyed:

Domestic Water Raw Water Recycled Water
 Sewer Force Sewer Storm Drain
 Other (describe)

Nominal Size: inches

Operating Pressure: psi or Gravity flow/atmospheric

Pipe Material: Ductile Iron Cast Iron Welded Steel
 HDPE PVC Concrete Clay
 Other describe

AWWA Material Designation Code:

Pressure Class/Thickness/Coating

Joint Type Construction: Push On Restrained Welded Joints Fused
 Other describe

Length of Project:

Depth of Cover:

Number of Crossings:

Angle of Crossings:

Description of crossing pipelines:

Attachment D

Can the new pipeline be installed in accordance with the Waterworks Standards? If not explain below:

Proposed additional protective measures (material construction methods, operational considerations, etc.):

Attach additional exhibits as necessary.

Attachment E

Certification

CERTIFYING SIGNATURE:

For consultants, contractors, and developers: attach written concurrence from the governing water system and pipeline owners stating that the selected project alternative is the preferred alternative.

Attached concurrence?: YES NO N/A

I certify that the forgoing information is true and correct to the best of my ability, and that I believe this alternative would provide at least the same level of protection to public health as the minimum separation distances prescribed in the California Waterworks Standards (CCR, Title 22, Section 64572).

Signature

Name and Title

Date

Appendix E - 30%, 60%, 90% and 100% Plan Check Submittal Requirements

PLAN CHECK REVIEW PROCESS PERCENT COMPLETE SUBMITTALS OVERVIEW

The purpose of this document is to define the minimum elements necessary to constitute a complete water design plan and various percentages thereof for a contractor installation of water facilities for the Los Angeles Department of Water and Power (LADWP). It outlines the expectations of the LADWP Plan Check and Inspection Group when water system plans are submitted under a percentage complete format (e.g. 30%, 60%, 90% and 100% complete).

The design shall be defined as the engineering drawings (AutoCAD), maps, plans, calculations, computer software, estimates, and specifications necessary to install, operate and maintain the water system in accordance with the LADWP design standards. The design shall provide for: the protection of existing and newly installed facilities, the elimination of conflicts between the proposed waterline, existing and proposed above ground and subterranean facilities, the minimization of service outages to LADWP customers (in either number or duration) and in consideration of the long-term maintenance and operation of the proposed water system.

The project may be designed and constructed in segments or phases at the discretion of LADWP provided that each section is a logical segment that can be constructed, pressure tested, chlorinated and put in to service in totality. The proposed segment must be hydraulically independent such that it is able to provide the required flow to meet all fire and domestic demand on its own without sacrificing water flow to an existing adjacent segment of the water system. Temporary facilities may be designed to provide temporary fire or domestic demand to allow a segment of waterline to be removed during construction provided they provide adequate supply for fire or domestic demand, are protected, and are designed to withstand the anticipated temporary duration without fail.

The design shall be considered to consist of several phases: conceptual 30%, detailed 60%, completed 90%, and ready for approval 100%. The design shall be considered 90% complete after completion of the conceptual and detailed phases. The percentage complete applies to the level of detail of the design, not just the number of submittals.

The 100% submittal must be consistent with and built on the preceding submittals. Major design revisions to the vertical or horizontal alignments may not be made after the 90% submittal. In such cases, the designer will be asked to re-submit at the 60% phase. Submittals that deviate substantially from the original scope of work and the previous submittal at the 90% will need re-submittal of the previous level. Thus, it is possible to have multiple 60% or 90% submittals. No set of water plans will be accepted as a 100% submittal without the required plan set progression.

Conceptual Design (30%) – The conceptual design involves the review of both the District Engineer and the Plan Check engineer. The purpose of the conceptual design is to identify potential constructability issues and major design obstacles including: system flow and pressure requirement, service advisory request (SAR's), identifying a feasible corridor, locating substructures impacting the water system design. The 30% phase review is normally 20 working days. Once the conceptual design is approved by the District engineer, the designer will be directed to develop a detailed design and complete the plan check process with the Plan Check engineer who will approve the plans at the final 100% submittal.

Conceptual Design (60%) – The detailed design shall be consistent with the District's design report. It should illustrate the alignment of the proposed waterline relative to existing and proposed substructures allowing the identification of potential conflicts based on existing documentation. The 60% phase review is normally 20 working days. At a minimum, it shall include the following elements:

- The title sheet, layout sheets and detail sheets on the LADWP border.
 - Vicinity map showing the general location of the project (approximate scale 1:500 feet, panel 4 of title sheet).
 - Key map showing the scope of the project, the basic sheet layout and the section covered by each of the layout sheets (approximate scale 1:100 feet).
 - The basic sheet layout including the initial intersections, match lines, scale and north arrow.
 - The proposed streets and/or street modifications showing the existing and proposed major structures (e.g. sewer, storm drain, power, water, telephone, etc.) drawn to an appropriate scale oriented with north to the upper left quadrant.
 - The maximum static water system pressure, backfill and soil type.
 - Stationing, street names, street dimensions, right of way lines, easement lines, and general dimensions with respect to the pipeline and other major structures.
 - The existing street condition, i.e. existing curb and gutter, property line, etc.
 - Identify all existing water facilities (e.g. mains, hydrants and services) that will be impacted by the project.
 - The water set sheet numbering, sheet referencing and detail referencing.
 - The Public Works job title & plan numbers, SCO and agreement numbers, if any.
 - General Notes (panel 2 of title sheet).
 - Notice to Contractor (panel 3 of title sheet).
 - Work order number(s).
 - Business/Design Engineer block.
 - Paving limits.
 - Gate Valve and Fire Hydrant Numbers (provided by LADWP).
 - Thomas Guide location, water service map and gate map numbers.
 - Water District and S.C.O. number.
- Electronic AutoCAD drawing files 2022 version of water plans, based in the North American Datum – 1983

Detailed Design (90%) – The detailed design shall consist of a detailed alignment and layout of the waterline. It shall contain sufficient information to build the proposed line without conflict to existing and proposed substructures based on pothole and survey data and shall contain sufficient information to order most materials including long lead items. The detailed design shall incorporate the conceptual design of the waterline. The 90% phase is anticipated to take 20 working days. At a minimum, it shall include the following elements:

- All of the Conceptual Design elements.
- Typical Trench Section detail, Typical Substructure Crossing detail (panel 1 of the title sheet).
- The size, type, and specific location of the existing water facilities such as mains, fire hydrants, and large services (4" and over).
- The size, type, and specific location of all proposed water facilities such as mains, fire hydrants, and large services, indicated graphically on the plan and complimented with the corresponding material call-outs.
- The size and type of all bends, tees, crosses, valves, blow-offs, casings, insulating joints and any other required fittings of the proposed waterline.
- Location of water facilities such as mains, fire hydrants, fittings and large services as follows:
 - For projects North of Mulholland Drive, as measured from the nearest street centerline along the street centerline from the nearest intersecting street centerline.
 - For projects South of Mulholland Drive, as measured from the nearest street property line along the waterline from the nearest intersecting street property line.
- Gate valve number boxes (One for each proposed new valve, bypass valve and blow-off). To be provided by the plan checker.
- Adjacent substructures and their distances to the waterline.
- Street, easement, and rights of way, labeling and dimensions.
- Pipe curve data tables.
- Waterline profile when crossing major or multiple substructures showing any necessary vertical offsets, the depth of the waterline and substructures shown from the existing and proposed grade (as measured from the gutter flow line if it exists), and the vertical clearances between the waterline and the substructures.
- Loading calculations where pipe is expected to be subject to greater than normal loading (Assume normal loading to be loads experienced under a standard design street at a depth of 30 to 48 inches).
- Pipe support details if pipe is to be supported either vertically or horizontally.
- Proposed temporary or sideline facilities.
- Cathodic protection, notes, details, anode and test station locations.
- Thrust blocks, indicated both on the plan layout sheets and on any profiles or details.

- Material call-out lists for all proposed waterline facilities such as mains, fire hydrants and services.
- Material call-out lists for any abandoned or removed waterline facilities such as mains, fire hydrants and services.
- Detail drawings showing each specific connection to an existing water main, and each type of hydrant and service.

Completed Design (100%) – The complete design shall consist of all elements necessary to provide a complete legible presentation of the water facilities in the proper format. The complete design shall incorporate all elements of the detailed design of the water facilities. The 100% phase is anticipated to take 10 to 15 working days. At a minimum it shall include the following elements:

- All of the Detailed Design elements.
- Final design drawings plotted on Mylar.
- All appropriate line styles and weights, text font, size and weight, fitting and substructure labels.
- Engineer's stamp and signature.
- Electronic files in AutoCAD 2022 format including resource and plot files (resource and plot files should allow DWP to be able to plot plans exactly as they appear on the Mylar final design set submitted.)

The 30%, 60%, 90% and 100% submittals must be accompanied by all supplemental information (e.g. street improvement plans, grading plans, bridge plans, survey control points, etc.) necessary to allow for a thorough review of the water facility plans. Final public work plans signed by the district engineer approved or approved for construction shall be submitted prior to approval of the water plans.

Exhibit 1 - Standard Dedication Certificate for Roadway Easements

STANDARD DEDICATION CERTIFICATE FOR ROADWAY EASEMENTS

We also hereby grant and dedicate to the City of Los Angeles forever, for the use of Los Angeles Department of Water and Power (LADWP), those permanent and exclusive easements and rights-of-way, for the construction, operation, maintenance and removal and replacement, at any time and from time to time, of lines of pipe, of vaults, manholes, service and distribution connections and of all appendages, structures and equipment necessary or convenient thereto, and for the use and operation in, on and over the easement area for its full width, without obstruction or interference of any kind, of every sort and type of machinery and equipment necessary or convenient for the purposes of transporting, conveying and distributing water, in, under, on, over and across each and every strip of land shown and designated on said map as a water line right-of-way; and no building or other structure shall ever be placed, constructed or maintained within any such right-of-way.

LADWP shall have no obligation for maintenance or repair of the surface of any street or thoroughfare in such Right-of-Way, except for the repair or replacement of surfacing required to be cut or removed by LADWP for the purpose of maintaining, repairing, replacing, or removing mains or appurtenances.

**Exhibit 2 - Standard Dedication Certificate for Non-Roadway
Easements**

STANDARD DEDICATION CERTIFICATE FOR NON-ROADWAY EASEMENTS

We also hereby grant and dedicate to the City of Los Angeles forever, for the use of the Los Angeles Department of Water and Power, those permanent and exclusive easements and rights of way, for the construction, operation, maintenance and removal and replacement, at any time and from time to time, of lines of pipe, of vaults, manholes, service and distribution connections and of all appendages, structures and equipment necessary or convenient thereto, and for the use and operation in, on and over the easement are for its full width, without obstruction or interference of any kind, of every sort and type of machinery and equipment necessary or convenient for such construction, maintenance, removal and replacement, for the purposes of transporting, conveying and distributing water, in, under, on, over and across each and every strip of land shown and designated on said map as a water line right-of-way; and no building or other structure shall ever be placed, constructed or maintained within any such right-of-way.

Grantor shall not modify grading, construct surface improvements or structures, plant trees, reduce capacity or alter path of existing surface drainage, park vehicles or store materials directly over the main, or reduce or increase the depth of cover over the main in the easement(s) hereby granted. Grantor will exercise only such reserved rights in said land as will not interfere with or prohibit the free and complete use and enjoyment by Grantee, its successors or assigns, of the easement(s) hereby granted.

Grantor hereby undertakes and agrees to release, hold harmless and indemnify the City of Los Angeles and its Department of Water and Power and all officers and employees of each from and against any and all claims, loss, demands, expense, damage or liability whatsoever for injuries to or death of persons or damage to property in any manner arising out of any failure on the part of Grantor to keep or perform any of the terms or conditions hereof.

Exhibit 3 – Developer Install Agreement Sample

AGREEMENT FOR INSTALLATION AND TRANSFER
OF TITLE OF WATER SYSTEM FACILITIES

AGREEMENT NO. WO-XXXXX

This Agreement is entered into and effective as of PLEASE DO NOT DATE by and between the DEPARTMENT OF WATER AND POWER OF THE CITY OF LOS ANGELES, hereinafter referred to as "LADWP", and Toll Brothers, Inc., hereinafter referred to as the "Developer", who agree as follows:

The Developer is the owner of certain land described as Tract XXXXX, and as more fully (or further) shown on Exhibit "A" attached hereto. In developing this land, the Developer is desirous of obtaining a water supply adequate for domestic uses and public fire protection purposes and is desirous of Water System clearance for this project.

In order to provide facilities for a water supply to said land, it is the intention of the parties to this Agreement that the Developer will furnish and install those water mains, fire hydrants, service laterals, valves, and all pertinent fittings, and other facilities required for a complete water system to serve the land shown on Exhibit "A".

This Agreement binds Phase X of Tract No. XXXXX, and will not be broken into phases once construction has started. LADWP will only accept Phase X of Tract No. XXXXX as the entire facilities are completed and water will only be supplied once LADWP has accepted the whole tract.

Any illegal tap on facilities before the tract is completely accepted or before meters are set and turn-on will pay a flat fee of \$ 3,000.00 for each illegal tap uncovered. The flat fee is a fixed amount that constitutes complete payment for the performance of LADWP inspectors and Water Utility Specialists for uncovering the illegal tap service regardless of the amount of work involved which will be paid in whole to LADWP. The Revenue Security Group will assess separately the water usage fee and bill the developer or owner of the Tract.

In order to implement the foregoing and in consideration of the terms and conditions herein contained, the parties further agree as follows:

1.0 Term

The term of this Agreement shall be three years from the date of execution by all parties. Any amendments shall be in writing and will require the approval of the Board of Water and Power Commissioners and/or the City Council.

2.0 Developer shall design and construct, at the Developer's sole expense, the water facilities and appurtenances in accordance with LADWP-approved final plans, and in accordance with LADWP-approved design standards and specifications, and the terms and conditions of this Agreement.

2.1 Design shall be by a Professional Engineer registered in the State of California, hereinafter referred to as the "Design Engineer", in accordance with LADWP's Water Distribution Division's latest Design Standards and Installation Requirements for Contractors (DSIR).

- 2.2 A copy of LADWP's DSIR will be provided to the Developer upon payment of applicable charges.
- 3.0 LADWP, at the Developer's expense, shall review the Developer's plans for the purpose of ensuring the adequacy of the design and conformance with LADWP's standards and specifications. LADWP reserves the right to add, delete, modify, change, or amend any or all the plans and specifications.
- 3.1 In the event that the property to be developed includes multiple residential, condominiums, commercial or industrial uses, site plans, grading plans, and any available plumbing plot plans will be furnished to LADWP by the Developer.
- 3.2 During the course of the development and construction of the project, it is recognized that the City of Los Angeles or other regulatory authority may require, or the Developer may agree to, changes in existing streets, facilities, or installations which in turn may require the relocation, replacement or addition of water systems facilities. In the event that any such changes are required, or agreed to, the Developer shall, within 30 days thereof, submit to LADWP, for its review and approval, the final plans and specifications detailing the Developer's arrangements to accomplish such work. The Developer shall perform any additional water facility work at the Developer's sole cost. All work performed pursuant to this paragraph shall be subject to the terms and conditions of this Agreement and shall be considered a part hereof.
- 3.3 During the course of the development and construction of the project, it is further recognized that unforeseen circumstances including, but not limited to, surface or subsurface geological and earth features and the presence of artificial structures/ and/or equipment may prevent the construction of the system as theretofore designed and that changes in the design and construction will be required because of the aforementioned unforeseen circumstances. In such an event, the Design Engineer will modify the design to accommodate said unforeseen circumstances to the satisfaction of LADWP. The Developer will pay LADWP any applicable costs associated with such redesign in accordance with Paragraph 13 herein.
- LADWP retains in its sole and exclusive discretion, the option to perform such additional work itself. In the event the LADWP exercises such an option, the Developer shall pay LADWP's current costs in accordance with Paragraph 13 herein, for such additional water facility work.
- 4.0 The Developer shall procure, at the Developer's own expense, all licenses, guarantees, approvals, and certificates of inspection which are required by the laws, ordinances, rules, regulations, or codes of all government bodies having jurisdiction over said construction and property and shall, in addition, comply with all the requirements thereof.
- 4.1 LADWP at the Developer's expense will secure excavation/resurfacing permits. Permits/easements to install, maintain, and operate Water System facilities in private property shall be secured by the Developer at the Developer's own expense.

- 5.0 The water system facilities to be installed pursuant to this Agreement will become an extension of the distribution system of LADWP. All materials used must conform to LADWP specifications for such materials.
- 5.1 Procurement of materials will be the sole responsibility of the Developer.
- 5.2 LADWP will not provide materials to the Developer.
- 6.0 Any notice, demand, request, consent, approval, or communication that either Party desires or is required to give to the other Party or any other person shall be in writing and either served personally or sent by prepaid, first-class mail and shall be addressed to the other Party at the address set forth below. Either Party may change its address by notifying the other Party of the change of address. Notice shall be deemed communicated within 24 hours from the time of mailing if mailed as provided in this paragraph.
- DEVELOPER:
- DEPARTMENT OF WATER AND POWER:
- Ms. Liz Gonzalez
111 North Hope Street, Room 1425
Los Angeles, California 90012
Attention: Ricardo Buantello
Telephone No. (213) 367-1738
- 6.1 The Developer shall give written notice to LADWP at least five (5) days before initially starting work under this Agreement.
- 6.2 The Developer and Contractor shall attend a pre-construction meeting with LADWP no less than fourteen days prior to commencement of work.
- 6.3 No work on water facilities shall commence prior to the completion of all required curbs and gutters.
- 7.0 All work and materials shall be subject to inspection and testing by LADWP at the Developer's expense. In the event the Developer arranges to have materials fabricated for the project, the Developer may be required to arrange for LADWP to inspect that material during fabrication.
- 7.1 All material fabrications must conform to LADWP standards and specifications.
- 7.2 The LADWP's inspectors shall have unlimited access to perform continuous inspection and have the authority to stop work at any time, by written notice, without any liability whatsoever to LADWP, if, in the inspectors' judgment, the work called for by this Agreement or the plans, or the specifications are not being installed or performed in a satisfactory and workmanlike manner according to LADWP standards and specifications and/or in the event the materials do not comply with LADWP's standards and specifications.

- 7.3 Final acceptance by the Developer of all materials to be purchased or fabricated by the Developer under this Agreement shall be made only with the prior approval of LADWP. Approval by LADWP, however, shall not operate to relieve the material supplier or the Developer of any guarantees, warranties, or the duty of compliance with any of the requirements of the approved plans and specifications or of this Agreement.
- 8.0 The Developer shall and by this Agreement does guarantee the Developer's faithful performance of this Agreement and all of its terms and conditions by providing the following:
- 8.1 The Developer shall provide LADWP with a Letter of Credit or Corporate Surety Bond, presentable in Los Angeles, from a financial institution licensed by the State of California and authorized to do and doing business in said State, valid for the length of this Agreement, approved by the City Attorney and accepted by LADWP.
- 8.2 The Letter of Credit or Corporate Surety Bond shall be in the amount of \$X and withheld until all works are completed and facilities are accepted.
- 8.3 The Developer shall, in addition, and by this Agreement does guarantee to LADWP that for one year after the acceptance of the Developer-installed and completed water facilities and appurtenances, they shall be free from any and all liens and encumbrances and free from any and all defects in the materials or construction thereof. This one-year guarantee shall be an Irrevocable Letter of Credit or Certificate of Deposit in the amount of \$X beginning at the date of the acceptance of the water facilities by LADWP.
- 8.4 Upon acceptance of the Letter of Credit or Corporate Surety Bond in the amount provided herein and approval by the City Attorney and upon payment of applicable charges, pursuant to Paragraphs 13.0, LADWP shall notify the City Engineer that said Letter of Credit or Corporate Surety Bond has been provided to LADWP guaranteeing payment of the cost of installing the water system facilities and appurtenances.
- 9.0 In order for LADWP to accept the facilities, the Developer shall provide the following:
- 9.1 The Developer shall submit to LADWP field notes drawing prepared by the contractor or Developer's representative in accordance with LADWP's latest "Field Notes and As-Constructed Manual".
- 9.2 The Developer shall, in addition, submit as-constructed drawings prepared by the Design Engineer in accordance with LADWP's latest "Field Notes and As-Constructed Manual".
- 9.3 The Developer shall submit to LADWP, for accounting purposes, the total cost for furnishing and installing the water system facilities, itemized by size of water mains, type of pipe, type of fire hydrants, and size of service laterals.
- 10.0 The following options may be exercised by LADWP:

- 10.1 LADWP may require a Galvanic Cathodic Protection System designed and installed by someone under the direct supervision of or by a Corrosion Specialist certified by the National Association of Corrosion Engineers or a Corrosion Engineer registered by the State of California. LADWP retains the option of installing the Galvanic Cathodic Protection System. LADWP personnel shall be permitted access to perform the installation of Cathodic Protection facilities during the construction of the Water Supply System.
- 10.2 LADWP retains the option to furnish all labor and materials to perform the required hydrostatic test of the water system.
- 10.3 These options will be exercised by LADWP, if at all, at the time of plan approval.
- 11.0 The Developer accepts the responsibility for and the costs occasioned by any reconstruction, relocation, damages to, or changes of water services or facilities caused or contributed to directly or indirectly by any subsequent changes in the location of any of said facilities or water meters or water services.
- 12.0 In no event will permanent water service be provided to the Developer's installed system until all applicable charges have been paid by the Developer and all facilities have been conveyed to LADWP, including any easements which may be required. Such conveyance shall occur in a timely manner in accordance with the terms of Paragraph 17.
- 13.0 The Developer shall pay LADWP for all costs and charges in accordance with the following:
- 13.1 Payment of 'actual cost' by the Developer shall be the actual direct costs and indirect costs incurred by LADWP for such activities, work performed, materials acquired, contracts let, or permits obtained under the terms of this Agreement.
- 13.2 Direct costs shall include, but not limited to, direct labor, materials and equipment cost used specifically for work performed under this Agreement. Indirect costs shall include, but not be limited to, administrative and general expenses, retirement, and death benefits, health care costs, supervision and engineering, and tool expenses. Indirect costs shall be charged at LADWP's in-house percentage rate calculated by LADWP's Accounting Division.
- 13.3 Intentionally omitted.
- 13.4 A charge of \$X for the lineal foot of the main to be installed, plus \$X each for 3-inch and smaller domestic service laterals, plus \$X each for other service and fire hydrant laterals as shown on Exhibit "B" shall be paid by the Developer. In the event, the aggregate of such charges does not exceed \$X, a minimum charge of \$X shall apply. This charge will cover the following work items performed by LADWP:
- Review of construction plans and specifications
 - Engineering supervision
 - Review of field notes and as-constructed drawings (Final)

Valve operation
 Construction inspection
 Sanitization
 Contract Administration
 Preparation of Agreement

This work is based on a standard 40-hour, 5-day workweek, in the course of normal work. Services performed outside normal working hours or provided in an accelerated schedule are subject to additional charges.

- 13.5 The costs for LADWP-furnished Cathodic Protection, material inspection and testing, and hydrostatic testing shall be based on the actual time and materials used by LADWP personnel.
- 13.6 Any applicable charges for meters and installation of meters and meter boxes shall be the current cost from LADWP's Water Facility Charges.
- 13.7 All actual costs for (or from LADWP's Water Facility Charges, if applicable) all LADWP work or material performed pursuant to the provisions of this Agreement.
- 13.8 All existing water main charges, acreage supply charges, and main connection charges.
- 13.9 All costs for all applicable water fees, permits, licenses, material purchases, special estimates, and other charges or costs as may be required in accordance with this Agreement and LADWP Rules and Regulations.
- 13.10 The Developer shall pay any or all taxes assessed upon the water facilities being constructed pursuant to this Agreement.
- 13.11 The Developer shall make payment to LADWP within 30 days upon presentation of any bill prepared in accordance with this Agreement unless payment prior to a service or delivery of material is required. The calculation of all costs and charges by LADWP will be made on LADWP's costs and charges current at the time service is rendered.
- 14.0 Intentionally Omitted.
- 15.0 Insurance – General Statement

It is the policy of LADWP that upon entering into an Agreement, the selected Developer must provide evidence of insurance that conforms to the insurance requirements of the Agreement. Insurance requirements are explained in detail in the attached "Contract Insurance Requirements" sheet which specifically outlines the types and amounts of coverage required for this project/tenancy. For your information and use, "Special Endorsement Forms", "Guidance for Submitting Evidence of Insurance" and information on our insurance program for small vendors are available on our website.

When entering into an Agreement, acceptable evidence of required insurance from insurers acceptable to LADWP will be required to be submitted within 30 days of the

date of LADWP's execution of the Agreement and maintained current throughout the term of the contract. Said evidence of insurance must be on file with the Risk Management Section at all times during the term of the Agreement in order to receive permission to begin work and to continue work uninterrupted during the entire term of the Agreement.

For further information regarding these requirements, please contact:

Los Angeles Department of Water and Power
Risk Management Section
Phone: (213) 367-4674
Fax: (213) 367-0214
Web: <http://www.ladwp.com/riskmanagement>
Email: riskmanagement.risky@ladwp.com

15.1 Insurance – Applicable terms and conditions

Additional Insured Status Required

Developer shall procure at its own expense, and keep in effect at all times during the term of this Agreement, the types and amounts of insurance specified on the attached Contract Requirement page. The specified insurance shall also, either by provisions in the policies, by City's own endorsement form, or by other endorsement attached to such policies, include and insure the City, its Department of Water and Power, its Board of Commissioners (hereinafter referred to as "Board"), and all of its officers, employees and agents, their successors and assigns, as additional insureds (except for Professional Liability and Workers' Compensation), against the area of risk described herein as respects Developer's acts or omissions in its performance of the Agreement, use and occupancy of the premises hereunder or other related functions performed by or on behalf of Developer. Such insurance shall not limit or qualify the liabilities and obligations of the Developer assumed under the contract.

15.2 Severability of Interests and Cross Liability Required

Each specified insurance policy (other than Workers' Compensation and Employers' Liability and Property coverages) shall contain a Severability of Interest and Cross Liability clause which states, "It is agreed that the insurance afforded by this policy shall apply separately to each insured against whom claim is made or suit is brought except with respect to the limits of the company's liability," and a Contractual Liability Endorsement which shall state, "Such insurance as is afforded by this policy shall also apply to liability assumed by the insured under this Agreement with the City of Los Angeles."

15.3 Primary and Non-Contributory Insurance Required

All such insurance shall be Primary and Noncontributing with any other insurance held by the City's Department where liability arises out of or results from the acts or omissions of the Developer, its agents, employees, officers, assigns, or any person or entity acting for or on behalf of Developer. Any insurance carried by LADWP, which may be applicable, shall be deemed to be excess insurance and the Developer's insurance is primary for all purposes despite any conflicting provision in the Developer's policies to the contrary.

- 15.4 Deductibles Subject to LADWP's Discretion
Deductibles and/or self-insured retentions shall be at the sole discretion of the Risk Manager of LADWP (hereinafter referred to as "Risk Manager"). LADWP shall have no liability for any premiums charged for such coverage(s). The inclusion of the LADWP, its Board, and all of its officers, employees, and agents, and their agents and assigns, as additional insureds, is not intended to, and shall not, make them, or any of them a partner or joint venturer with Developer in its operations.
- 15.5 Proof of Insurance for Renewal or Extension Required
At least ten (10) days prior to the expiration date of any of the policies required on the attached Contract Requirement page, documentation showing that the insurance coverage has been renewed or extended shall be filed with LADWP. If such coverage is canceled or reduced in coverage, Developer shall, within fifteen (15) days of such cancellation or reduction of coverage, file with LADWP evidence that the required insurance has been reinstated or provided through another insurance company or companies.
- 15.6 Submission of Acceptable Proof of Insurance and Notice of Cancellation
The developer shall provide proof to LADWP's Risk Manager of all specified insurance and related requirements either by the production of the actual insurance policy (ies), by use of LADWP's own endorsement form(s), by other written evidence of insurance acceptable to the Risk Manager, but always in a form acceptable to the Risk Manager. The documents evidencing all specified coverages shall be filed with LADWP prior to Developer beginning operations or occupying the premises hereunder. Said proof shall contain at a minimum, the applicable policy number, the inclusive dates of policy coverages, the date the protection begins for LADWP, and the insurance carrier's name. It shall bear an original signature of an authorized representative of said carrier and shall provide that such insurance shall not be subject to cancellation, material reduction in coverage or non-renewal except after written notice by certified mail, return receipt requested, to the LADWP Risk Management Section at least thirty (30) calendar days prior to the effective date thereof. The notification shall be sent by registered mail to: The Risk Management Section, Los Angeles Department of Water and Power, Post Office Box 51111, JFB Room 465, Los Angeles, California 90051-5700.
- 15.7 Claims-Made Insurance Conditions
Should any portion of the required insurance be on a "Claims Made" policy, the Developer shall, at the policy expiration date following completion of work, provide evidence that the "Claims Made" policy has been renewed or replaced with the same limits, terms, and conditions of the expiring policy, or that an extended three (3) years discovery period has been purchased on the expiring policy at least for the contract under which the work was performed.
- 15.8 Failure to Maintain and Provide Proof as Cause for Termination
Failure to maintain and provide acceptable evidence of the required insurance for the required period of coverage shall constitute a breach of contract, upon which LADWP may immediately terminate or suspend the agreement.
- 15.9 Sub-Contractor Compliance

The Developer shall be responsible for all sub-contractors' compliance with the insurance requirements.

15.10 Periodic Right to Review/Update Insurance Requirements

LADWP and the Developer agree that the insurance policy limits specified on the attached Contract requirement page may be reviewed for adequacy annually throughout the term of this Agreement by the Risk Manager, who may thereafter require the Developer to adjust the amounts and types of insurance coverage however the Risk Manager deems to be adequate and necessary. The city reserves the right to have submitted to it, upon request, all pertinent information about the agent and carrier providing such insurance, including applicable licenses and ratings.

15.11 Specific Insurance Requirements

See Exhibit "C"

15.12 Indemnification

The Developer has inspected the premises, knows the condition thereof, and on behalf of itself and its successors, assigns and sub-Contractors undertakes and agrees to indemnify and hold harmless the City of Los Angeles, LADWP, the Board of Water and Power Commissioners of the City of Los Angeles, and all of their officers, agents, successors in interest, insurers, assigns and/or employees (individually and collectively, "Indemnitees"), and at the option of LADWP, defend by counsel satisfactory to LADWP, the Indemnitees from and against any and all liens and claims of lien, suits, causes of action, claims, charges, damages (including but not limited to indirect, consequential, and incidental), demands, judgments, civil fines, penalties, or losses of any kind or nature whatsoever that are brought against, incurred by or asserted against the Indemnitees, for death, bodily injury or personal injury to any person, including Developer's employees, agents and contractors of any tier, or damage or destruction or loss of use of any property of any type or nature whatsoever, of either party hereto, or third persons in any manner arising by reason of, incident to, or connected in any manner to the acts, errors, omissions to act, willful misconduct, or non-performance or breach by Developer of any term and/or condition of this contract, resulting from or incident to the Agreement or the activities of Developer its personnel or contractors, on the part of the Developer, or the Developer's officers, agents, employees, or Contractors of any tier, regardless of any negligence on the part of Indemnitees, except for the sole negligence or willful misconduct of LADWP. This indemnity shall apply whether occurring during the term of this Agreement and any time thereafter and shall be in addition to any other rights or remedies which Indemnitees have under law or under this Agreement.

- 16.0 Child Support Assignment Orders. This Agreement is subject to the Child Support Assignment Orders Ordinance, Section 10.10 of the Los Angeles Administrative Code. Pursuant to this Ordinance, Developer certifies that it will (1) fully comply with all State and Federal employment reporting requirements applicable to Child Support Assignment Orders; (2) that the principal owner(s) of the Developer is in compliance with any Wage and Earnings Assignment Orders and Notices of Assignment applicable to them personally; (3) fully comply with all lawfully served Wage and Earnings Assignment Orders and Notices of Assignment in accordance with California Family Code section

5230, et seq.; and (4) maintain such compliance throughout the term of this Agreement. Pursuant to Section 10.10.b of the Los Angeles Administrative Code, failure of the Developer to comply with all applicable reporting requirements or to implement lawfully served Wage and Earnings Assignment Orders and Notices of Assignment or the failure of any principal owner(s) of the Developer to comply with any Wage and Earnings Assignment Orders and Notices of Assignment applicable to them personally shall constitute a default by the Developer under the terms of this Agreement, subjecting this Agreement to termination where such failure shall continue for more than ninety (90) days after notice of such failure to Developer by LADWP or the City. Any subcontract entered into by the Developer relating to this Agreement, to the extent allowed hereunder, shall be subject to the provisions of this paragraph and shall incorporate the provisions of the Child Support Assignment Orders Ordinance. Failure of the Developer to obtain compliance of its subcontractors shall constitute a default by the Developer under the terms of this Agreement, subjecting this Contract to termination where such failure shall continue for more than ninety (90) days after notice of such failure to the Developer by LADWP or the City.

The developer shall comply with the Child Support Compliance Act of 1998 of the State of California Employment Development Department. Developer assures that, to the best of its knowledge, it is fully complying with the earnings assignment orders of all employees, and is providing the names of all new employees to the New Hire Registry maintained by the Employment Development Department as set forth in subdivision (1) of the Public Contract Code 7110.

- 17.0 Developer shall furnish an Itemized Bill of Sale or other acceptable document transferring title and ownership of the completed facility and shall request in writing the formal acceptance of the installed facilities when all applicable conditions of this Agreement have been completed. Upon compliance with all of the terms and conditions of this Agreement, LADWP will mail a written notice of acceptance thereof, to the address provided herein. Title to the ownership of said facilities and appurtenances shall thereby be conveyed to the City of Los Angeles and LADWP. LADWP will thereafter operate and maintain said facilities so as to furnish water service to the development (Exhibit "A) in accordance with LADWP'S Rules and Regulations.
- 18.0 Mechanics Liens The Developer shall not cause or allow any liens, mechanics liens, stop notices or other liens to be assessed against the Property or against the City of Los Angeles and/ or LADWP. The Developer shall be solely responsible for payment of all amounts charged or owed under this Agreement regardless of any liens brought against the Project against the Developer or recorded against the Property.
- 19.0 Assignment This Agreement may not be assigned without the consent of the LADWP and the consent of the LADWP may not be unreasonably withheld.
- 20.0 Governing Law This Agreement shall be governed in all respects by the laws of the State of California.
- 21.0 Attorney's Fees In the event any proceeding or lawsuit is brought by either Party in connection with this Agreement, each Party shall bear its own attorneys' fees and costs.
- 22.0 Agency Nothing contained herein shall be construed as creating any agency, partnership, or other form of joint enterprise between the parties. The Developer is

acting hereunder as an independent contractor and not as an agent or employee of LADWP. The Developer shall not represent or otherwise hold out itself or any of its Directors, officers, partners, employees, or agents to be an agent or employee of LADWP.

- 23.0 Waiver LADWP's failure to enforce any provisions of this Agreement or the waiver thereof in any instance shall not be construed as a general waiver or relinquishment on its part of any such provision, but the same shall nevertheless be and remain in full force and effect.

No waiver of any provision of the Agreement shall be effective, or shall be deemed to have occurred by implication or operation of law, unless such waiver is made in writing, is fully signed by a duly authorized representative of the Party against whom enforcement of the waiver is sought,

- 24.0 Entire Agreement It is understood and agreed that no promise, inducement, or agreement not herein expressed has been made to the Parties hereto and that this Agreement contains the entire agreement between the Parties hereto with reference solely to the matters herein addressed and not to any other matters. The Agreement may be modified only by a written signed by both of the Parties hereto.

- 25.0 Notice Any notice, demand, request, consent, approval, or communication that either party desires or is required to give to the other party or any other person shall be in writing and either served personally or sent by prepaid, first-class mail and shall be addressed to the other party at the address set forth below. Either party may change its address by notifying the other party of the change of address. Notice shall be deemed communicated within 24 hours from the time of mailing if mailed as provided in this paragraph.

DEVELOPER:

DEPARTMENT OF WATER AND POWER:

Ms. Liz Gonzalez
111 North Hope Street, Room 1425
Los Angeles, California 90012
Attention: Ricardo Buantello
Telephone No. (213) 367-1738

- 26.0 Counterparts This Agreement may be executed simultaneously in two (2) or more counterparts, each of which will be considered an original, but all of which together will constitute one and the same instrument.
- 27.0 Headings The section headings appearing in this Agreement are inserted only as a

matter of convenience and in no way define, limit, construe, or describe the scope or extent of such section or in any way affect this Agreement.

28.0 Authorization The persons signing this Agreement hereby warrant that they have full authority to sign this Agreement on behalf of the respective Parties. Each Party was represented by legal counsel during the negotiation and execution of this Agreement.

DEPARTMENT OF WATER AND POWER
OF THE CITY OF LOS ANGELES

MARTIN L. ADAMS
General Manager

Date _____

DEVELOPER

By: X

By: _____
Name: X
Title: X

Date _____

ALL-PURPOSE ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document, to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of _____)

County of _____)

On _____ before me, _____ (here insert name and title of the officer), personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____
(Seal)

Exhibit 4 - LADWP Guidelines for Infrastructure Modifications

LADWP GUIDELINES FOR INFRASTRUCTURE MODIFICATIONS

The Los Angeles Department of Water and Power (LADWP) owns and maintains infrastructure and appurtenances throughout the City of Los Angeles. Proposed projects may necessitate the relocation, abandonment, or removal of these assets. Following these guidelines will help ensure public and LADWP employees' safety, and guarantee service reliability for the City of Los Angeles. The following guidelines set forth LADWP's conditions for modifying water and power system infrastructure. To the extent of a conflict between any of the guidelines and the LADWP Rules Governing Water and Electric Service (Rules), the Rules shall preempt the conflicting guidelines(s).

CRITERIA FOR INFRASTRUCTURE MODIFICATION


- LADWP infrastructure is in direct conflict with any portion of a proposed project
- Meet all permit, code, regulation requirements, and LADWP standards
- Preserve safe access for operation and maintenance of water and/or power system infrastructure, follow LADWP's safety guidelines and standards
- Preserve structural integrity of existing water and/or power system infrastructure
- Proposed improvements including structures, bus pads and stops, sidewalks, curb and gutter, rail ways, walkways or other pedestrian staging areas are to be constructed or modified above or adjacent to water and/or power system infrastructure
- Reduce risk of damage caused by proposed construction activities
- Sustain public and LADWP employees safety and maintain water and power service reliability

DESIGN, CONSTRUCTION, AND FUNDING OF INFRASTRUCTURE MODIFICATION


- LADWP may design and construct infrastructure modifications based on resource availability
- If LADWP resources are not available, then proposing party shall procure design and/or construction services to perform infrastructure modifications
- LADWP shall perform all cable work related to power infrastructure modifications
- Design cost, permits and associated fees, construction, plan check, and inspection of water and/or power system infrastructure modifications shall be borne by the proposing party unless otherwise agreed upon with LADWP

COORDINATION FOR INFRASTRUCTURE MODIFICATION


- LADWP must review and approve all designs produced by proposing parties prior to construction to ensure compliance with the latest applicable Water/Power System design standards and the Rules Governing Water & Electric Service
- LADWP will inspect all construction activities to ensure compliance with the latest Water/Power System construction practices and standards
- The construction contractor for water related work must be pre-qualified and approved by LADWP water system, and for power related work must possess a Class A contractor's license
- Proposing parties shall coordinate in advance with LADWP to confirm the LADWP design, construction and plan check, and inspection resources are available


 Reiko A. Kerr
 Senior Assistant General Manager – Power System
 Engineering, Planning, and Technical Services


3/11/21
Date


 Andrew C. Kendall
 Senior Assistant General Manager – Power System
 Construction, Maintenance, and Operations

3/15/2021
Date


 Richard F. Harasick
 Senior Assistant General Manager – Water System

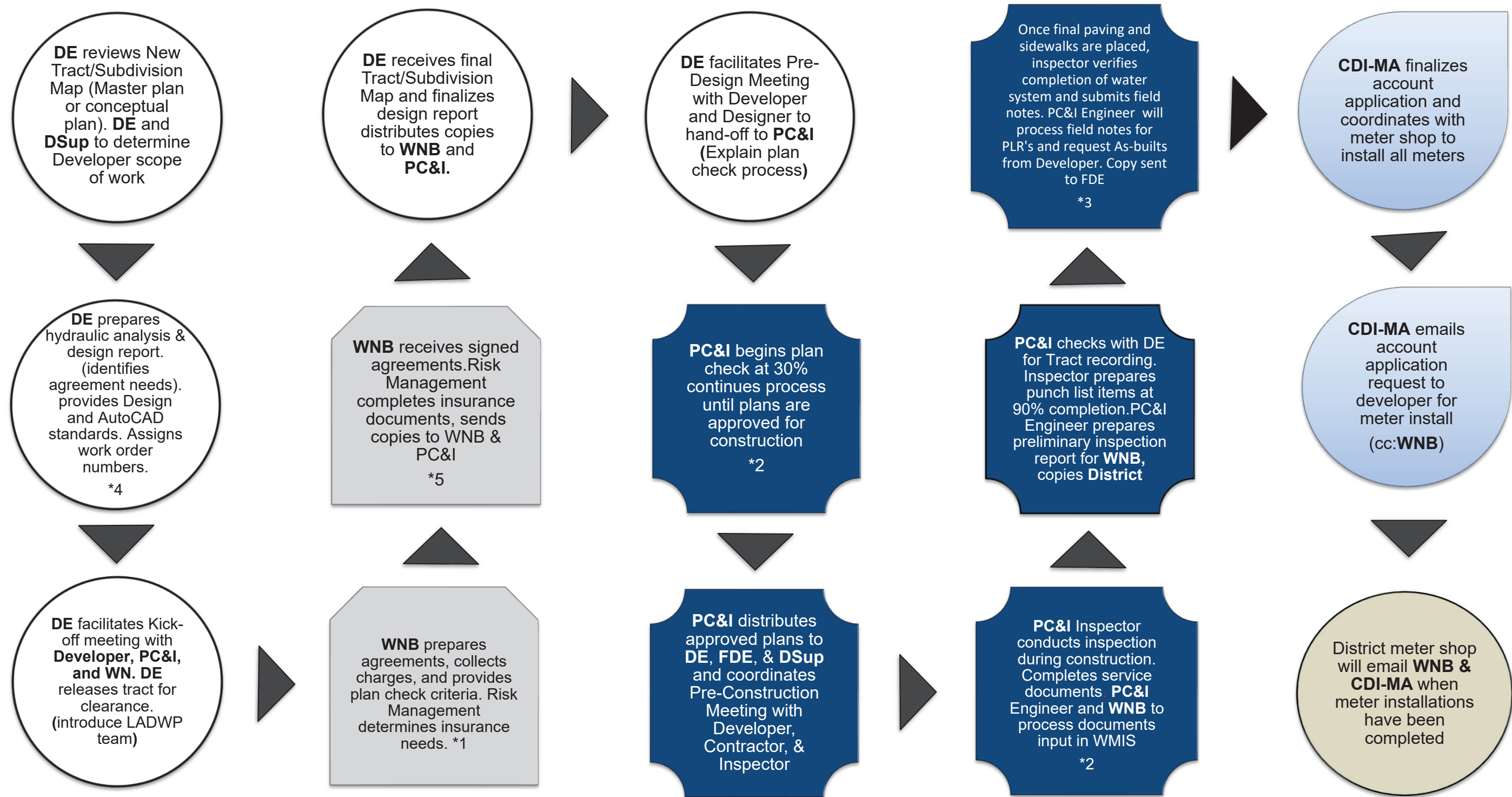
3-16-21
Date


 Martin L. Adams
 General Manager and Chief Engineer

3/25/21
Date

**Exhibit 5 - Requirement for the Water System Resilient Pipe
Network**

Developer Design/Install Process Flow Chart



*1 - See WDD-WNB Tract Developer Flowchart for more details

*2 - See WDD-PC&I Developer Flowchart for more details

*3 - Developer has up to one year to complete punch list items, from the date of the Preliminary inspection report

*4 - Elevation agreement, oversized plumbing agreement, etc.

*5 - Final Agreement between LADWP and Developer

DE LEAD -DISTRICT ENGINEER

PC&I LEAD - PLAN CHECK & INSPECTION

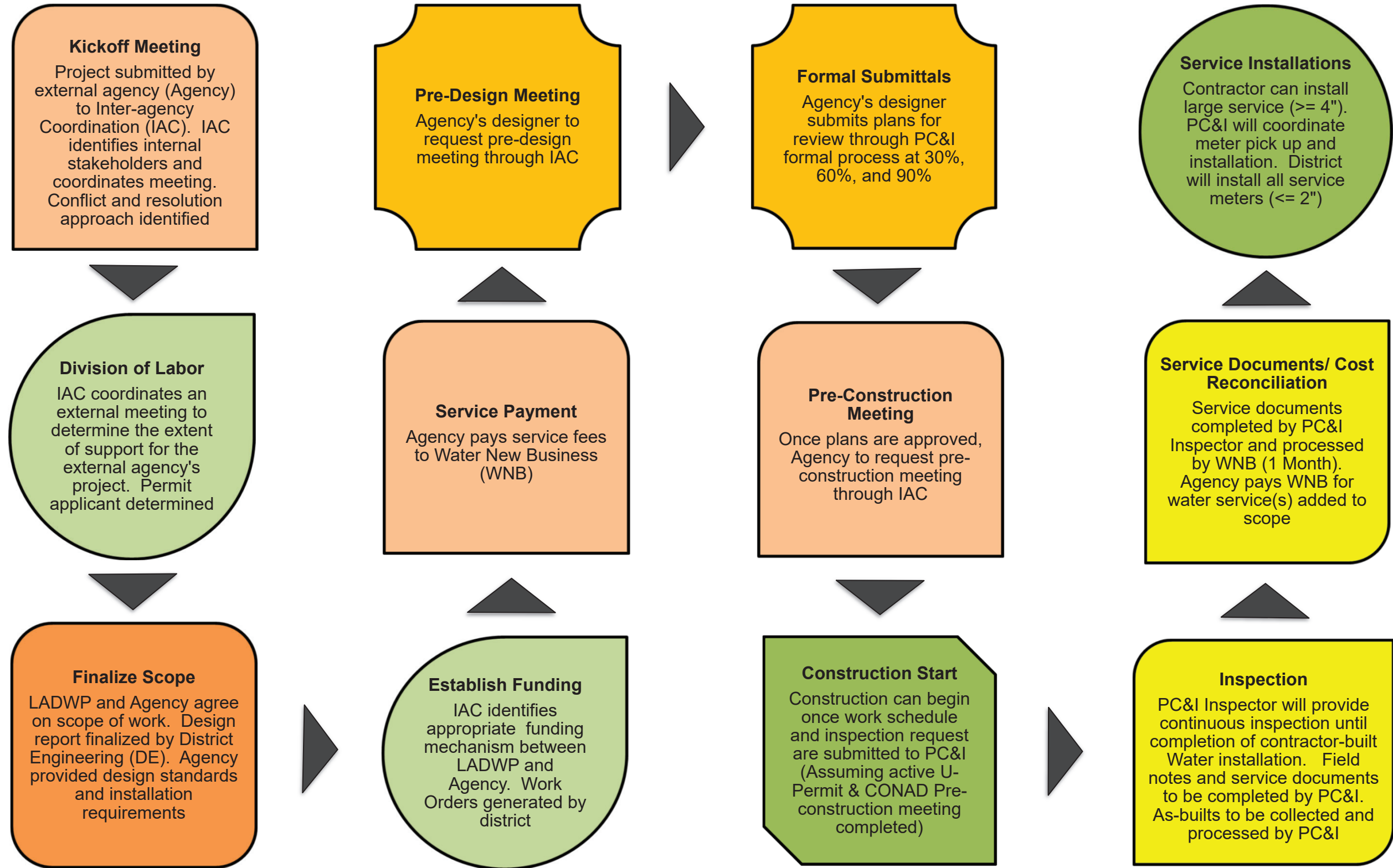
WNB LEAD -WATER NEW BUSINESS

CDI-MA LEAD - CUSTOMER DEVELOPER LIASON (MAJOR ACCOUNTS)

DSup - DISTRICT SUPERINTEDENT

FDE - FIELD DISTRICT ENGINEER

Agency Design/Install Process Flow Chart



External Agency Representatives

LADWP Representatives

EA	LEAD - EXTERNAL AGENCY	AD	LEAD - Agency Designer	AC	LEAD - Agency Contractor	IAC	LEAD - Inter-agency Coordination	PC&I	LEAD - Plan Check & Inspection	DE	LEAD - District Engineering
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Appendix F – Material Procurement Policy



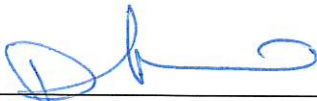
LADWP Material Procurement Policy for Infrastructure Modifications

The Los Angeles Department of Water and Power (LADWP) owns and maintains water system infrastructure and appurtenances throughout the City of Los Angeles. Proposed projects by an agency, developer, or public/private utilities may require the relocation, abandonment, or removal of these assets. The water system facilities to be installed for these proposed projects by contractors will become an extension of the distribution system of LADWP and must be in full compliance with LADWP-approved design standards and specifications. All materials installed must meet LADWP material specifications.

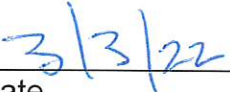
LADWP will no longer provide materials to contractors for these proposed projects. Procurement of materials is the sole responsibility of the agency, developer, public/private utility or contractor.

CONTRACTOR PROVIDED MATERIALS:

- All materials must conform to LADWP's latest material specifications. All materials shall be subject to inspection and testing in accordance with LADWP requirements and standards.
- For materials requiring special fabrication by the manufacturer, the Contractor shall arrange for LADWP to inspect that material during fabrication at the Contractor's expense.
- The Contractor is responsible to ensure the latest specifications are used for the project.
 - For major components, detailed technical specifications of materials can be obtained from LADWP.
 - For small components, LADWP can provide a list of current material contract vendors for reference.

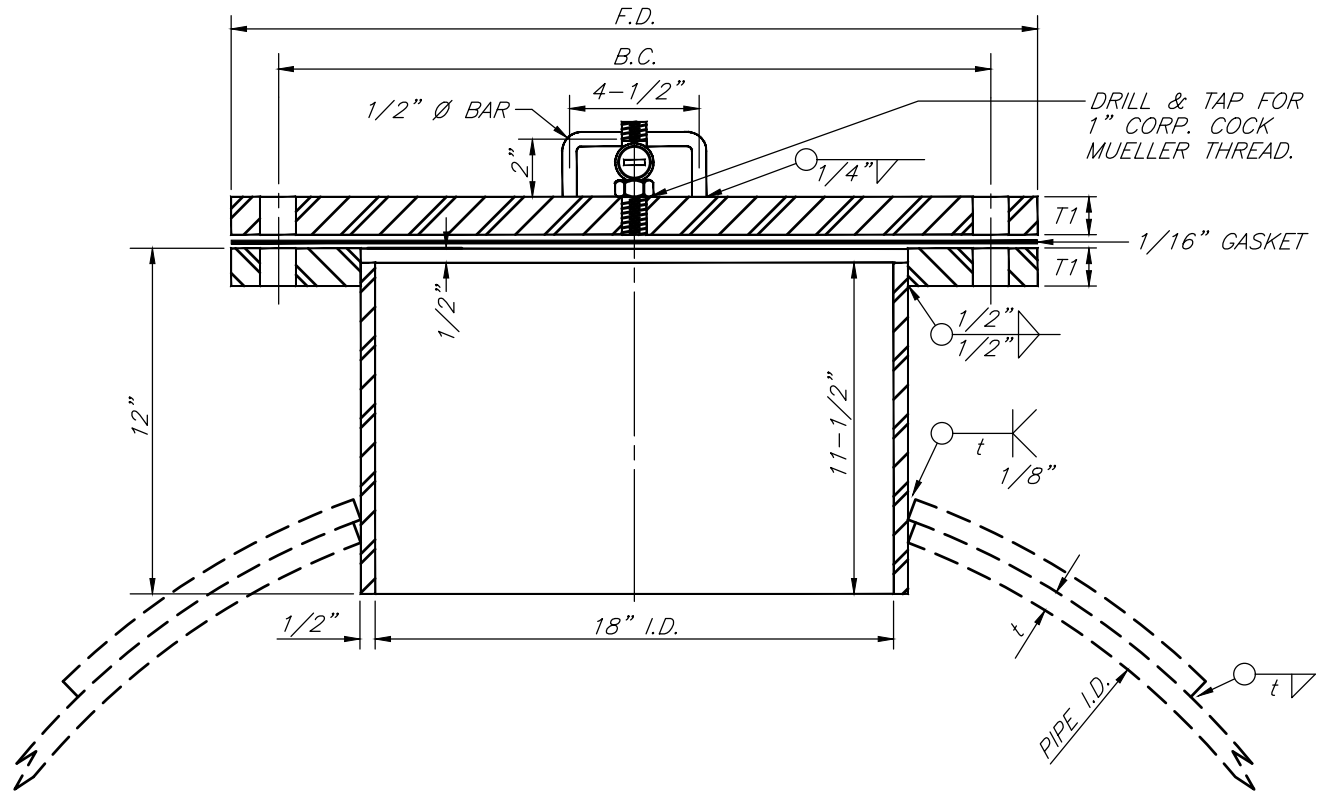


Breonia L. Lindsey
Director of Water Distribution

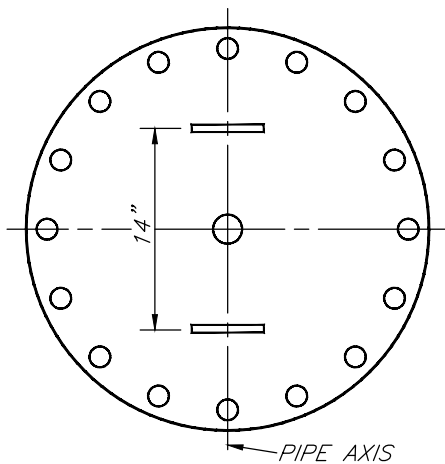


Date

Chapter 8 - **STANDARD DRAWINGS**



WELDED STEEL PIPE M.H. SECTION
NTS



M.H. COVER PLAN
NTS

NOTES:

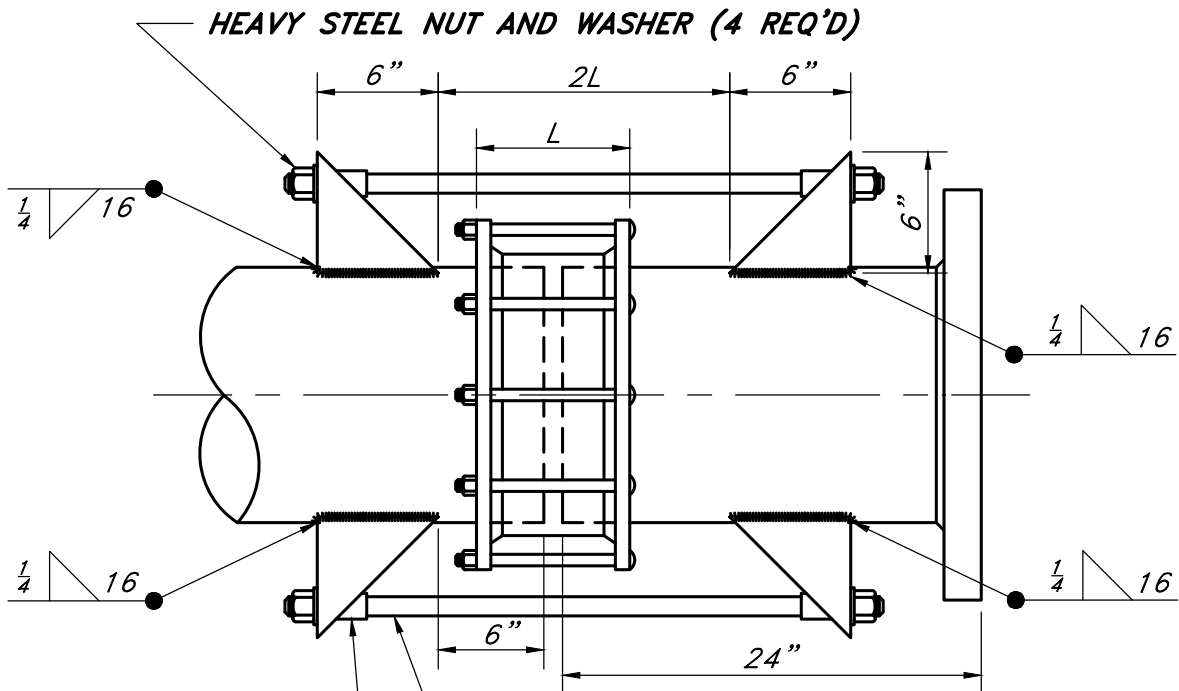
1. FLANGES DRILLED AND FACED AFTER WELDING.
2. FURNISH HEXAGONAL HEAD BOLTS AND NUTS.
3. FLANGES SHALL BE FULL FACED AND HAVE A SERRATED FINISH OVER THE ENTIRE FACE OF APPROXIMATELY 32 SERRATIONS PER INCH APPROXIMATELY 1/64" DEEP.
4. APPLY 1/4" CEMENT MORTAR LINING TO INTERIOR SURFACES.
5. COAL TAR ENAMEL PRIMER EXTERNAL SURFACES.

WORKING PRESSURE	F.D.	B.C.	T1	BOLTS	SIZE	BOLT HOLES
175 PSI	25"	22-3/4"	15/16"	16	1-1/8"	1-1/4"
250 PSI	28"	24-3/4"	1-5/16"	24	1-1/4"	1-3/8"

18" WELDED STEEL PIPE MAINTENANCE HOLE

REVISIONS				DEPARTMENT OF WATER AND POWER WATER SYSTEM CITY OF LOS ANGELES				
NO.	DATE	INIT.	REVISIONS	APP'D	DESIGNED	NAME	DATE	APPROVED
1	4/92	DSW	REVISED OLD A9013		DESIGNED	D. S. W.	4-92	APPROVED BY
2	10/16	T.N.	REVIEWED NO CHANGE		DRAWN	D. S. W.	4-92	MONTH 'YR
					CHECKED	C. HAMVAS	4-92	

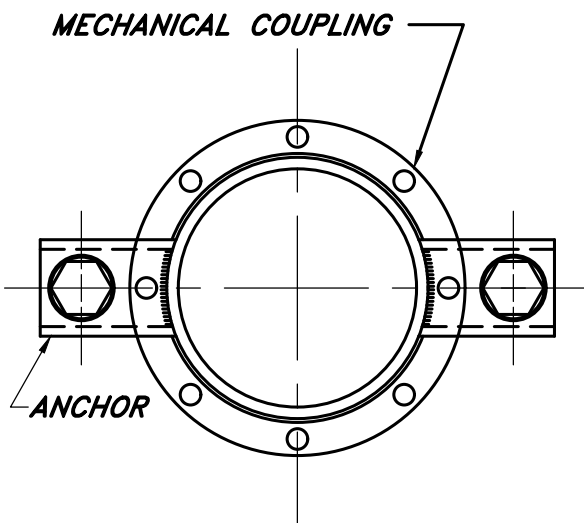
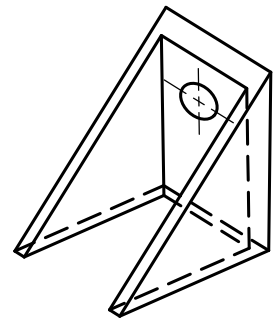
PC9013



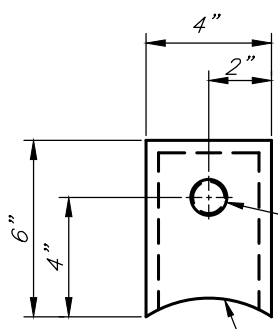
INSULATING BUSHING (TYP)
(IF REQUIRED)

-FOR 6" & 8" PIPE USE TWO 7/8" ϕ ,
32" LONG RODS, 7/8"-9 UNC THR'D.
-FOR 12" PIPE USE TWO 1-1/8" ϕ ,
32" LONG RODS, 1-1/8"-7 UNC THR'D.

PLAN VIEW



END VIEW



DRILL ALL HOLES IN SHOP
1" ϕ FOR 7/8" ϕ ROD AND
1-1/4" ϕ FOR 1-1/8" ϕ ROD

TORCH CUT PIPE RADIUS
AT INSTALLATION SITE (OD)

ANCHOR

NOTES:

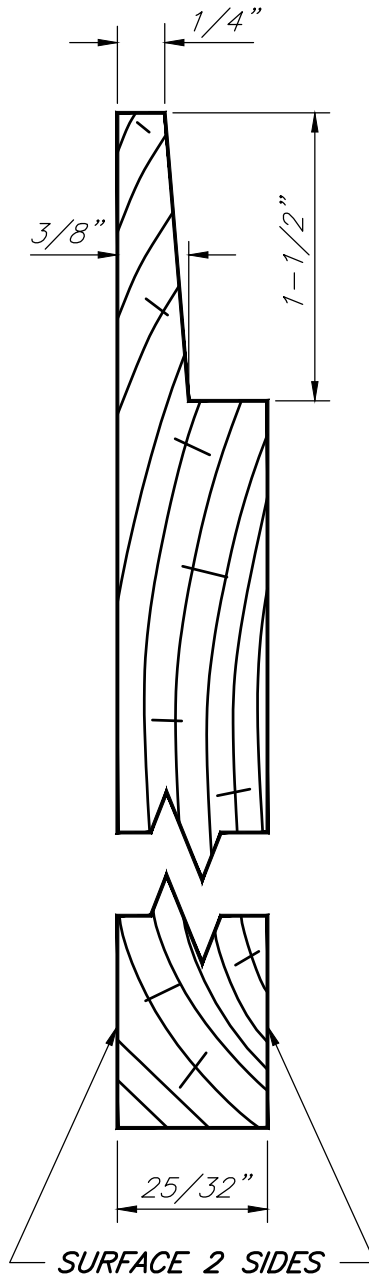
1. ANCHOR BOX ASSEMBLY FOR PIPE LARGER THAN 12" SHALL BE INDIVIDUALLY DESIGNED.
2. ANCHORS TO BE FABRICATED FROM 6"x4"x3/8" HOLLOW STEEL STRUCTURAL SECTIONS (4 REQ'D)

**ANCHOR BOX ASSEMBLY FOR MECHANICAL COUPLING
SIZES 6" THRU 12" ONLY**

REVISIONS			APP'D
NO.	DATE	INIT.	
10-1994	V.T.	REVISED OLD A9014	
10/16	T.N.	REVISED OLD A9114	

DEPARTMENT OF WATER AND POWER WATER SYSTEM				CITY OF LOS ANGELES	
DESIGNED	NAME	DATE	APPROVED		
L. NUNO		1-90	K. BROWN	JUNE 2007	
A. MILANES		8-07			
D. RICE		-07			

PC9194



























NOTES:

1. 1" X 12" RANDOM LENGTH CONSTRUCTION GRADE DOUGLAS FIR LUMBER SHALL COMPLY WITH THE STANDARD GRADING RULES OF THE WEST COAST LUMBERMEN'S ASSOCIATION, AND SHALL BE IN ACCORDANCE WITH THIS DRAWING.
2. THE LUMBER IS USED FOR FORMING THE TOP SECTIONS OF CONCRETE METER BOXES INCORPORATING COVERS PER DWP STANDARD DRAWINGS A9259, A9260, A9204-1 & 2.

CONCRETE BOX FORM LUMBER


REVISIONS				DEPARTMENT OF WATER AND POWER CITY OF LOS ANGELES			
NO.	DATE	INIT.	REVISIONS	APP'D	DESIGNED	NAME	DATE
1	3-92	M.N.	REVISED OLD DRAWING A9302		V. TOROMANIA		3-92
2	11/19/96	P.W.	REVIEWED BUT NO CHANGE		M. NORWALK		3-92
					C. HAMVAS		3-92
				APPROVED BY _____ MONTH 'YR			

PC9302

	LINESTYLE	PEN
PROPOSED WATER MAIN		4
EXISTING WATER MAIN		1
 ABANDONED WATER MAIN		1
TO BE ABANDONED WATER MAIN		3
METROPOLITAN WATER DISTRICT (MWD)		1
PROPERTY LINE		2
EASEMENT LINE		2
FORMER PROPERTY LINE		0
STREET CENTERLINE		00
CURB LINE		0
FORMER CURB LINE		00
SANITARY SEWER (S.S.)		0
SOUTHERN CALIFORNIA GAS (SCG) SOUTHERN COUNTIES GAS (SCoG)		0
DWP POWER SYSTEM (DWPPS) SOUTHERN CALIFORNIA EDISON (SCE)		0
PACIFIC TELEPHONE & TELEGRAPH (PTT) WESTERN UNION (WUT)		0
ELECTROLIER LIGHTING CONDUIT (L)		0
 CABLE TV		0
TRAFFIC SIGNAL CONDUIT (TS) POLICE & FIRE ALARM CONDUIT (FA)		0
OIL OR GASOLINE PIPE LINES (OIL)		0
STORM DRAIN (SD)		0
MISCELLANEOUS SUBSTRUCTURES (USE APPROPRIATE LABEL)		0
TEMPORARY UTILITIES		0

NOTE: USE DOUBLE LINES TO SHOW LARGE DIAMETER SUBSTRUCTURES WHERE SCALE PERMITS.

LINESTYLE STANDARDS

REVISIONS				DEPARTMENT OF WATER AND POWER			
NO.	DATE	INIT.	APP'D	WATER SYSTEM		CITY OF LOS ANGELES	
	10/16	F.C.		DESIGNED	V. TOROMANIA	DATE	9-91
						APPROVED	
						B. WEINSTEIN	JUNE '92
				DRAWN	V. TOROMANIA		
				CHECKED	L. NUNO		2-92

PC9430

GATES AND FITTINGS

SIZE OF SYMBOLS

LINE GATE OPEN - SHUT

LINE GATE WITH BYPASS - WITH REDUCERS

SEASONAL OPERATIONAL GATE OPEN - SHUT

SERVICE GATE - BLOW-OFF GATE

AIR VALVE (MANUAL) - AIR RELEASE VALVE (AUTO.)

AIR VACUUM VALVE (AUTO.) - COMB. AIR VALVE (AUTO.)

ROTO, PLUG, GLOBE, CONE, BALL, & SPHERICAL VALVES OPEN - SHUT

BUTTERFLY VALVE - ALTITUDE VALVE

CHECK VALVE - CLAPPER REMOVED

REGULATORS - RELIEF VALVE

PRESSURE RECORDER

OUTLET - PASS HOLE

MAINT. HOLE - AIR VALVE IN MAINT. HOLE (SHOW MAINT. HOLE ON WATER MAIN ONLY)

VENTURI METER - PITOT TUBE

SPARLING, ORIFICE, & FLOW METERS

SLIDE, LIFT OR SLUICE GATE - REDUCER

TEE - CROSS

CLAMP - DOUBLE CLAMP

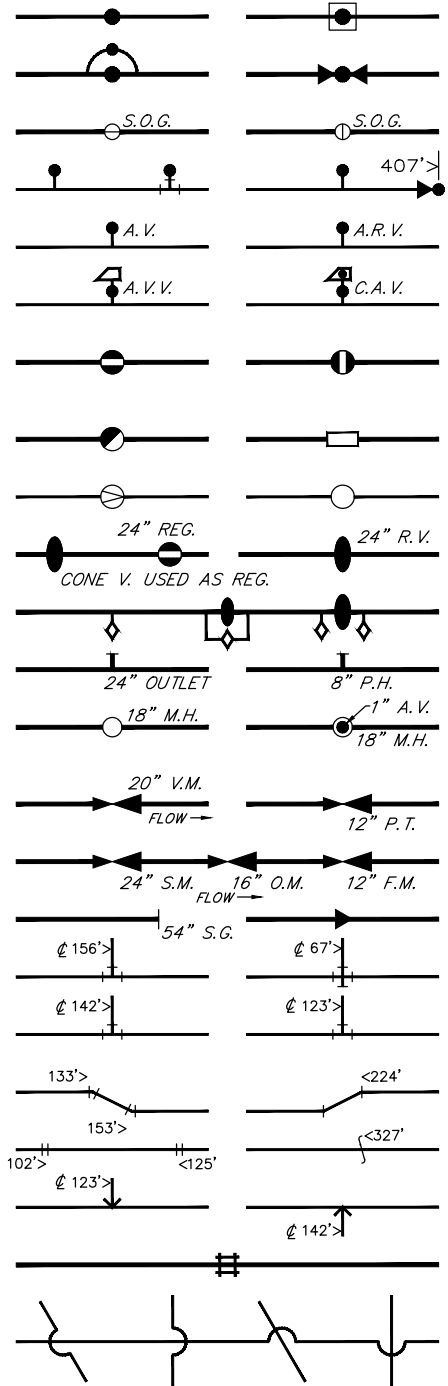
HORIZONTAL BEND - OFFSET

VERTICAL BENDS - OFFSET

WELDED CONNECTION - WELDED TEE

MECHANICAL COUPLING

MAINS NOT CONNECTED



STANDARD DRAFTING SYMBOLS

REVISIONS				DEPARTMENT OF WATER AND POWER			
NO.	DATE	INIT.	APP'D	WATER SYSTEM		CITY OF LOS ANGELES	
1	10/16	F.C.		DESIGNED	L. NUNO	DATE	9-91
				DRAWN	V. TOROMANIA	APPROVED	B. WEINSTEIN
				CHECKED	L. NUNO		JUNE '92

PC9431-1

FIRE HYDRANTS, WATER MAINS, ETC.

2 1/2" SINGLE BUILT-UP FIRE HYDRANT



4" SINGLE BUILT-UP FIRE HYDRANT



2 1/2" SINGLE OUTLET FIRE HYDRANT



4" SINGLE OUTLET FIRE HYDRANT



2 1/2" X 4" DOUBLE OUTLET FIRE HYDRANT



4" X 4" DOUBLE OUTLET FIRE HYDRANT



* DEPT. 2 1/2" SFH OR 2 1/2" ANGLE VALVE



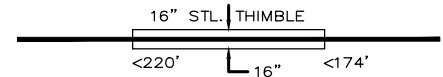
* DEPT. 4" SFH OR 4" ANGLE VALVE



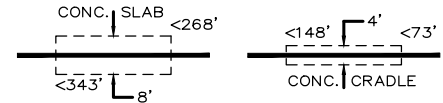
CONCRETE THRUST BLOCK



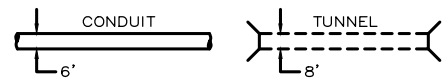
THIMBLE OR CONCRETE ENCASEMENT



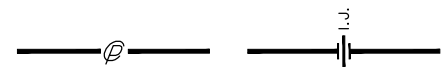
CRADLE - SLAB



CONDUIT - TUNNEL



CATHODIC PROTECTION - INSULATED JOINT



MAXIMUM STATIC PRESSURE



* FOR FIRE PROTECTION OF DEPARTMENT PROPERTY AND OTHER AGENCIES,
NOT BILLED TO L.A. FIRE DEPARTMENT.

STANDARD DRAFTING SYMBOLS (CON'T)

REVISIONS				DEPARTMENT OF WATER AND POWER WATER SYSTEM			
NO.	DATE	INIT.	APP'D	NAME	DATE	APPROVED	
▲	10/16	F.C.		DESIGNED	9-91	B. WEINSTEIN	
				DRAWN	9-91	JUNE '92	
				CHECKED	9-91		

PC9431-2

6" PIPE & FITTINGS

6" D.I. R.G. FLG./BELL ADAPTOR
 6" STL. ANCHOR BOX ASS'Y
 6" X11-1/4" DI-A RG BEND (B-B)
 6" X22-1/2" DI-A RG BEND (B-B)
 6" X 45° DI-A RG BEND (B-B)
 6" X 90° DI-A RG BEND (B-B)
 6"X 5/16" X 6" STL BUTTSTRAP
 6" STL WELD CAP
 6" CAST TRANS. MECHANICAL CPLG (DI-CI)
 6" STL MECHANICAL CPLG (NON-INS)
 6" X 6" DI-A RG. CROSS
 6" X 4" DI-A RG CROSS
 6" X 6" STL WELD CROSS
 6" X 15° STL WELD ELBOW
 6" X 30° STL WELD ELBOW
 6" X 45° STL WELD ELBOW
 6" X 90° STL WELD ELBOW
 6" X 150# STL BLIND FLANGE
 6" X 300# STL BLIND FLANGE
 6" X 150# STL WELD NECK FLANGE
 6" X 300# STL WELD NECK FLANGE
 6" PRE-ASSD IJ TYPE II-D
 6" PRE-ASSD IJ TYPE I-E
 6" PP IJ INSERT
 6"X18" LONG DI-A NIPPLE
 6"X24" LONG DI-A SPOOL
 6"X0.31" DI-A PW CL RG PIPE
 6"X1/4" STL ENUC-CC CL WWJ PIPE
 6"X1/4" STL CM/CTE CL WWJ PIPE
 6"X2" DI-A RG TAPPED PLUG
 6" DI-A RG PLUG W/1" CORP. COCK
 6"X90° DI-A BURY ELL FHY
 6"X4" DI-A RG REDUCER (B-S)
 6"X4" DI-A RG REDUCER (S-S)
 6"X4" STL WELD REDUCER
 6"X4" DI-A FLG REDUCER (F-F)

6" DI-A RG SS OFFSET (B-S)
 6" DI-A RG LS OFFSET (B-S)
 6"X6" DI-A FLG TAPPED SLEEVE
 6"X4" DI-A FLG TAPPED SLEEVE
 14"X14"X1/4" STL WELD PAD
 6"X6" DI-A TEE (B-B-F)
 6"X6" DI-A FLG TEE (F-F-F)
 6"X6" DI-A RG TEE (B-B-B)
 6"X4" DI-A RG TEE (B-B-B)
 6"X6" DI-A RG TEE (B-B-S)
 6"X6" STL WELD TEE
 6"X4" STL WELD TEE
 6"X250# DI-A RG GATE VALVE (valve #)
 6"X250# CI RG GATE VALVE (valve #)
 6"X200# DI-A FLG GATE VALVE (valve #)
 6"X200# CI FLG GATE VALVE (valve #)
 6"X250# DI-A FLG GATE VALVE (valve #)
 6"X250# CI FLG GATE VALVE (valve #)
 6"X350# DI-A FLG GATE VALVE (valve #)
 6"X350# CI FLG GATE VALVE (valve #)
 6" BELL YOKE W/RODS
 6" SAFETY YOKE W/RODS

OTHER PIPE & FITTINGS

32# MAGNESIUM ANODE
 2" STL. WELD HALF COUPLING
 4"X0.29" DI-A PW CL RG PIPE
 8"X0.33" DI-A PW CL RG PIPE
 12"X0.37" DI-A PW CL RG PIPE
 4"X 1/4" STL ENUC-CC CL WWJ PIPE
 4"X 1/4" STL CM/CTE CL WWJ PIPE
 8"X1/4" STL ENUC-CC CL WWJ PIPE
 8"X1/4" STL CM/CTE CL WWJ PIPE
 12"X1/4" STL ENUC-CC CL WWJ PIPE
 12"X1/4" STL CM/CTE CL WWJ PIPE
 2" STOP-COCK & BLOW-OFF ASS'Y
 TEST STATION

NOTE: FITTINGS IN OTHER SIZES ARE AVAILABLE.

COMMON PIPE & FITTING TERMS

REVISIONS				DEPARTMENT OF WATER AND POWER			
NO.	DATE	INIT.	APP'D	WATER SYSTEM		CITY OF LOS ANGELES	
6/12	E.C.	ABBREVIATED ANNOTATION	C.BEAS	DESIGNED	L. NUNO	DATE	9-91
10/16	F.C.	REVIEWED NO CHANGE		DRAWN	V. TOROMANIA	APPROVED	B. WEINSTEIN BW JUNE '92
				CHECKED	L. NUNO		

PC9432

A.C.	- ASBESTOS CEMENT	INS.	- INSULATING
A.R.V.	- AIR RELEASE VALVE	LB, #	- POUND
ASS'Y	- ASSEMBLY	L.R.	- LONG RADIUS
A.V.	- AIR VALVE	MC	- MECHANICAL COUPLING
A.V.V.	- AIR VACUUM VALVE	MECH.	- MECHANICAL
AWWA	- AMERICAN WATER WORKS ASSOCIATION	MH	- MAINTENANCE HOLE
B-B-B	- BELL-BELL-BELL	M.J.	- MECHANICAL JOINT
B-B-S	- BELL-BELL-SPIGOT	N.P.T.	- NATIONAL PIPE THREAD
C.A.V.	- COMBINATION AIR VALVE	NTS	- NOT TO SCALE
C.I.	- CAST IRON	O.D.	- OUTSIDE DIAMETER
C.L. & C.	- CEMENT LINED & COATED	PSF	- POUNDS PER SQUARE FOOT
D.F.H.	- DOUBLE-OUTLET FIRE HYDRANT	PSI	- POUNDS PER SQUARE INCH
D.I.	- DUCTILE IRON	R.G.	- RUBBER GASKET
EN. UC.	- ENAMEL UNDERCOATED	S.B.U.F.H.	- SINGLE-OUTLET BUILT-UP FIRE HYDRANT
F&B	- FLANGE & BELL	S.C. & B.O.	- STOP-COCK & BLOW-OFF
F.L.	- FLOW LINE	S.D.	- STORM DRAIN
FLG.	- FLANGE	S.J.	- SLIP JOINT
G.V.	- GATE VALVE	S.R.	- SHORT RADIUS
I.D.	- INSIDE DIAMETER	S.S.	- SANITARY SEWER
I.J.	- INSULATING JOINT	STL.	- STEEL

COMMON MAIN EXTENSION PLAN ABBREVIATIONS

REVISIONS				DEPARTMENT OF WATER AND POWER WATER SYSTEM CITY OF LOS ANGELES			
NO.	DATE	INIT.	APP'D	DESIGNED	NAME	DATE	APPROVED
▲	10/16	F.C.			L. NUNO	9-91	B. WEINSTEIN
					V. TOROMANIA	9-91	JUNE '92
					L. NUNO	9-91	

PC9433

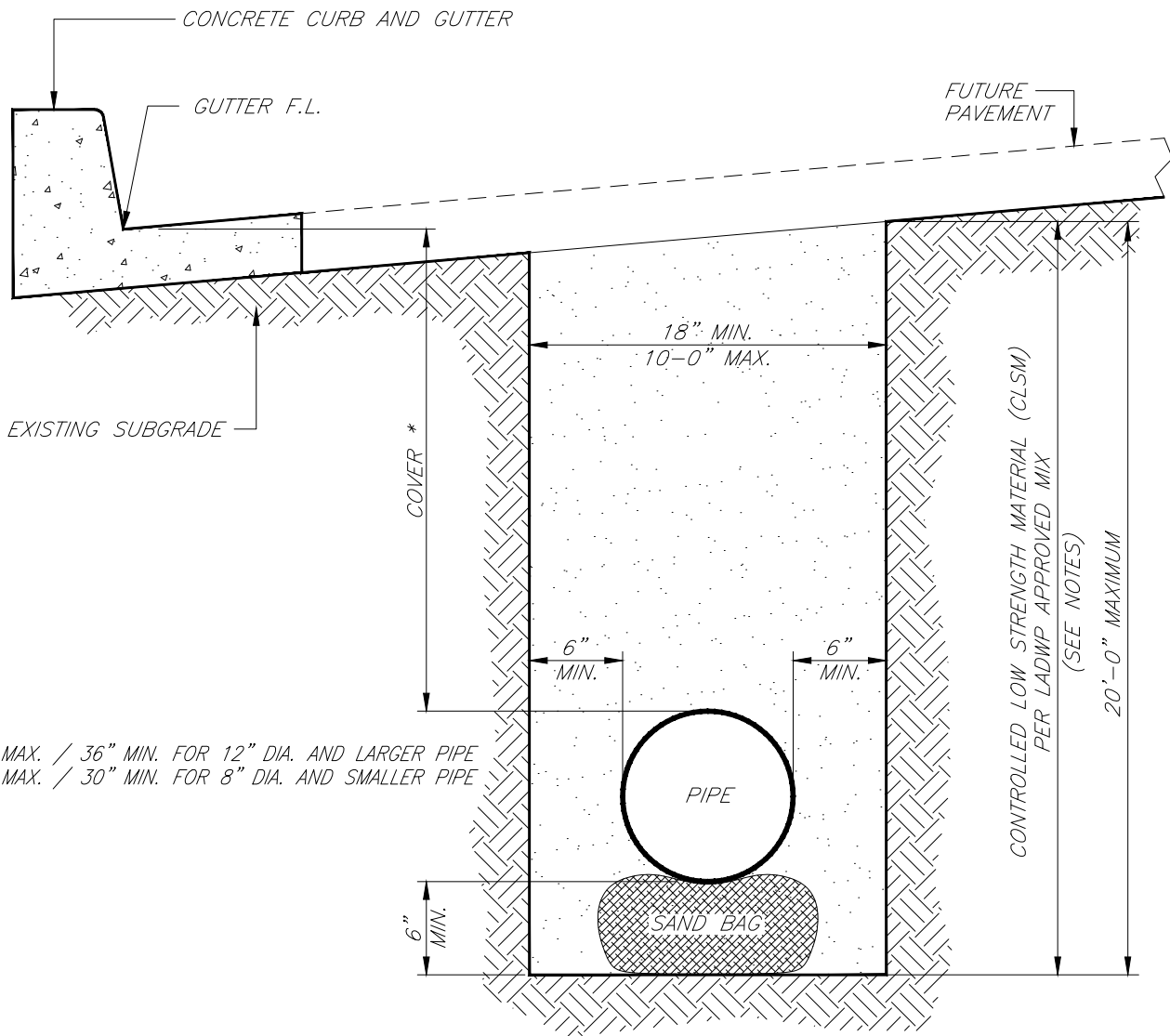
CONDITION	DUCTILE IRON PIPE UP TO 200 PSI	ERDIP UP TO 200 PSI	WELDED STEEL PIPE ABOVE 200 PSI
NO UNUSUAL CONDITIONS	●		●
CORROSIVE SOILS	●		
HILLSIDE AREAS	●	●	●
HIGH PRESSURE AREAS			● ①
FILL OR UNCONSOLIDATED ALLUVIUM	● ②	●	●
SHALLOW OR VERY DEEP PIPE COVER			●
RIGHT-OF-WAY, EASEMENT	● ③		●
OFFSETS OVER OR UNDER SUBSTRUCTURES	● ④ ⑦		●
BRIDGE CROSSINGS	⑦		● ⑤
OPEN DITCH (CLEAR SPAN) CROSSINGS			●
RAILROAD CROSSINGS			● ⑥
ADJACENT TO MAJOR MERCANTILE AREAS	●		●
MAJOR THOROUGHFARES	●		●
CUT-FILL TRANSITION AREAS	●	●	●
CHANNEL CROSSINGS	● ⑦		●
WITHIN 500FT OF EARTHQUAKE FAULT OR IN LIQUEFACTION ZONE		●	

- ① PRESSURE OVER 250 PSI REQUIRES ENGINEERING ANALYSIS OF PIPE WALL AND FLANGE THICKNESS.
- ② IF NO LATERAL MOVEMENT IS ANTICIPATED.
- ③ IF IN STREET CONFORMING TO CITY ENGINEER'S STANDARDS.
- ④ IF SUFFICIENT PIPE COVER EXISTS AND OFFSET CAN BE MADE WITH STANDARD D.I. PIPE BENDS.
- ⑤ ENCASE AND GROUT PIPE ADJACENT TO ABUTMENT.
- ⑥ ENCASE AND GROUT PIPE.
- ⑦ USE LOCKING GASKETS.

SUGGESTED USE OF PIPE MATERIAL

REVISIONS				DEPARTMENT OF WATER AND POWER WATER SYSTEM CITY OF LOS ANGELES			
NO.	DATE	INIT.	APP'D	DESIGNED	NAME	DATE	APPROVED
▲	10/16	F.C.			V. TOROMANIA	12-91	B. WEINSTEIN
							JUNE '92
▲	10/18	DRG			V. TOROMANIA	12-91	
					L. NUNO	12-91	

PC9434



* 48" MAX. / 36" MIN. FOR 12" DIA. AND LARGER PIPE
42" MAX. / 30" MIN. FOR 8" DIA. AND SMALLER PIPE

NOTES:

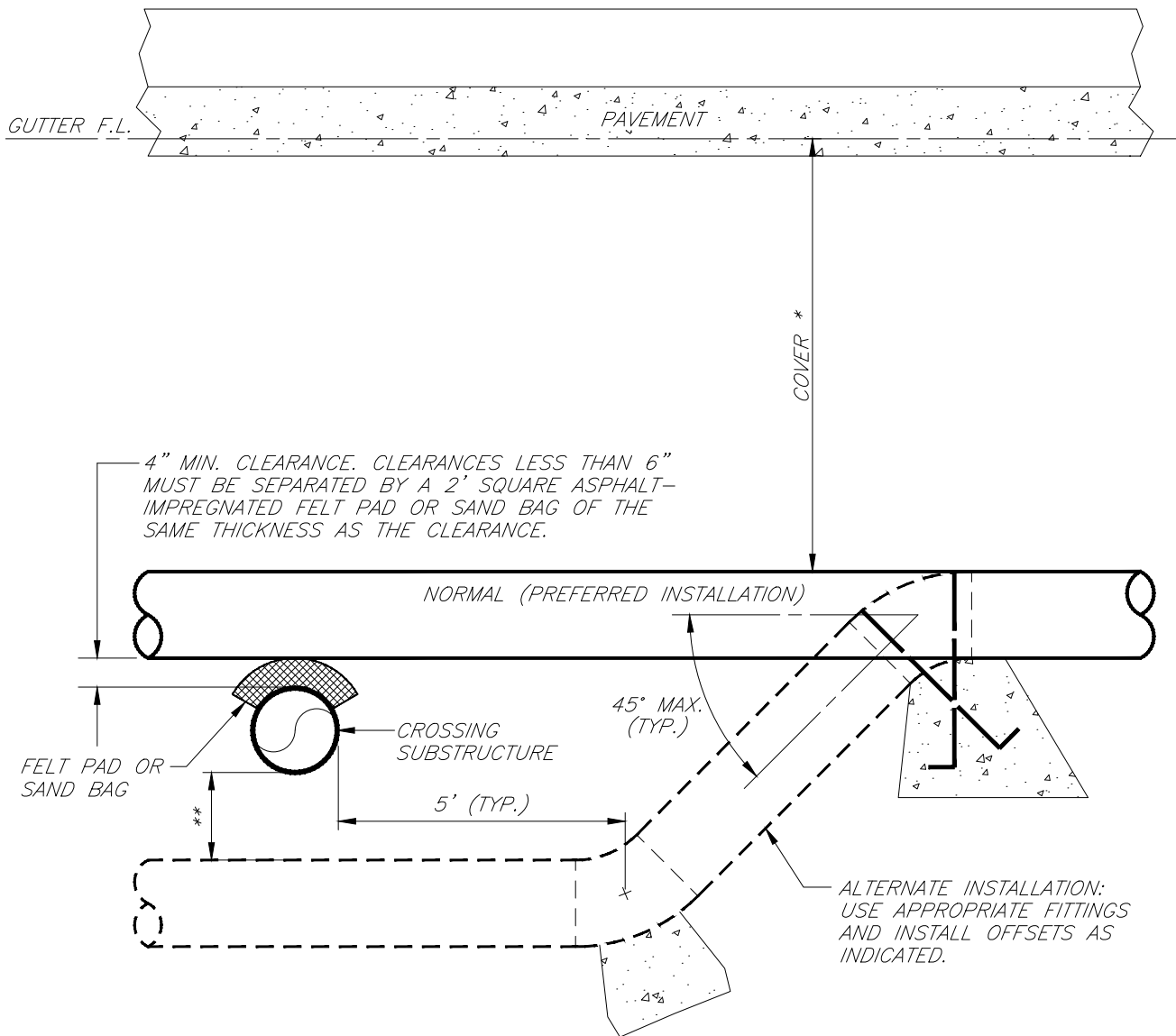
1. CLSM SHALL CONFORM TO THE LATEST CITY OF LOS ANGELES DWP MIX APPROVED BY THE BUREAU OF ENGINEERING FOR USE AS BACKFILL OVER WATER MAINS, UNLESS OTHERWISE NOTED.
2. CLSM SHALL NOT BE USED IN TRENCH WITH STANDING WATER.
3. CLSM SHALL BE USED IN PIPE TRENCH ONLY AS TRENCH BACKFILL AND PIPE BEDDING MATERIAL. THE APPROVED CLSM SHALL NOT BE USED IN OTHER EXCAVATION OR AS STRUCTURAL BACKFILL WITHOUT THE PERMISSION OF THE CITY ENGINEER.
4. CLSM SHALL BE USED AS BEDDING MATERIAL FOR STEEL AND DUCTILE IRON PIPES ONLY.
5. CLSM SHALL BE PLACED WITHIN 2½ HOURS AFTER INTRODUCTION OF THE CEMENT TO THE AGGREGATE. CLSM SHALL BE PLACED IN A MANNER TO PREVENT ANY PIPE FLOTATION OR DISPLACEMENT.
6. CLSM SHALL CONFORM TO THE APPROVED MIX DESIGN TBS-CLSM AND SHALL HAVE COMPRESSIVE STRENGTH 50-100 PSI.

TYPICAL TRENCH SECTION
CONTROLLED LOW STRENGTH MATERIAL (BACKFILL)

REVISIONS				APP'D
NO.	DATE	INIT.		

DEPARTMENT OF WATER AND POWER WATER SYSTEM CITY OF LOS ANGELES			
DESIGNED	NAME	DATE	APPROVED
			APPROVED BY MONTH 'YR
DRAWN			
CHECKED			

PC9435-2



NOTE:

1. MINIMUM CLEARANCES REQUIREMENTS PER CALIFORNIA CODE OF REGULATION (CCR) TITLE 22, DIVISION 4, CHAPTER 16, SECTION 64572:
 ** - 6" MIN. CLEARANCE FOR 12" DIA. AND SMALLER DWPWS PIPE
 12" MIN. CLEARANCE FOR LARGER THAN 12" DIA. DWPWS PIPE
2. COVER:
 * - 48" MAX. / 36" MIN. FOR 12" DIA. AND LARGER PIPE
 42" MAX. / 30" MIN. FOR 8" DIA. AND SMALLER PIPE
3. THE D.I. PIPE PUSH-ON JOINTS SHALL BE RESTRAINED WITH LOCKING JOINTS GASKET AS NEED TO MEET THE MINIMUM RESTRAINED LENGTH FOR THE PIPE.
4. BACKFILL SHALL BE 50 PSI CLSM (SLURRY)

TYPICAL ERDIP, DI & STEEL SUBSTRUCTURE CROSSING DETAIL

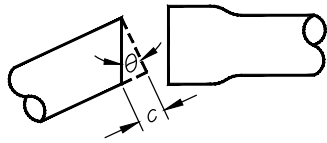
REVISIONS				APP'D
NO.	DATE	INIT.		

DEPARTMENT OF WATER AND POWER WATER SYSTEM CITY OF LOS ANGELES			
DESIGNED	NAME	DATE	APPROVED
DRAWN			APPROVED BY MONTH 'YR
CHECKED			

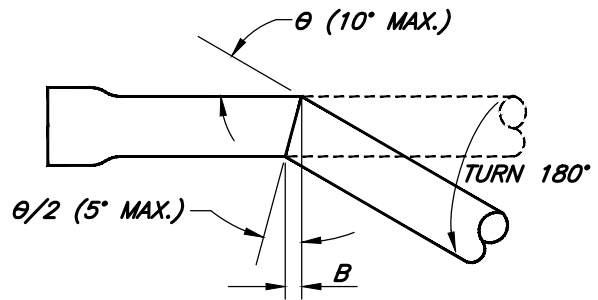
PC9436

PIPE SIZE	DEFLECTION θ AND CORRESPONDING CURVE RADIUS R*												DEFLECTION θ			
	0° (∞')	0°43' (1599')	0°54' (1273')	1° (1146')	1°07' (1026')	1°40' (688')	2° (573')	3° (382')	4° (286')	5° (229')	6° (191')	7° (164')	8°	9°	10°	>10°
4"									$\frac{5}{16}$ "	$\frac{3}{8}$ "	$\frac{1}{2}$ "	$\frac{9}{16}$ "	$\frac{5}{16}$ "	$\frac{3}{8}$ "	$\frac{3}{8}$ "	
6"								$\frac{5}{16}$ "	$\frac{7}{16}$ "	$\frac{9}{16}$ "	$\frac{11}{16}$ "	$\frac{13}{16}$ "	$\frac{7}{16}$ "	$\frac{1}{2}$ "	$\frac{9}{16}$ "	
8"							$\frac{5}{16}$ "	$\frac{7}{16}$ "	$\frac{5}{8}$ "	$\frac{3}{4}$ "	$\frac{7}{8}$ "	$1\frac{1}{16}$ "	$\frac{5}{8}$ "	$\frac{11}{16}$ "	$\frac{3}{4}$ "	
12"						$\frac{3}{8}$ "	$\frac{7}{16}$ "	$\frac{11}{16}$ "	$\frac{7}{8}$ "	$1\frac{1}{8}$ "	$1\frac{3}{8}$ "	$1\frac{9}{16}$ "	$\frac{7}{8}$ "	1"	$1\frac{1}{8}$ "	
16"				$\frac{1}{4}$ "	$\frac{5}{16}$ "	$\frac{7}{16}$ "	$\frac{9}{16}$ "	$\frac{13}{16}$ "	$1\frac{1}{8}$ "	$\frac{11}{16}$ "	$\frac{13}{16}$ "	1"	$1\frac{1}{8}$ "	$1\frac{1}{4}$ "	$1\frac{3}{8}$ "	
20"			$\frac{5}{16}$ "	$\frac{3}{8}$ "	$\frac{3}{8}$ "	$\frac{9}{16}$ "	$\frac{11}{16}$ "	$1\frac{1}{16}$ "	$\frac{11}{16}$ "	$\frac{7}{8}$ "	$1\frac{1}{16}$ "	$1\frac{1}{4}$ "	$1\frac{3}{8}$ "	$1\frac{9}{16}$ "	$1\frac{3}{4}$ "	
		PULL JOINT	AMOUNT OF CUT "C" CUT SPIGOT AS SHOWN ON DETAIL A						AMOUNT OF CUT "B" BEVEL PIPE AND FORM MITER JOINT AS SHOWN ON DETAIL B						USE ELBOW	
			USE ELBOW (OPTIONAL)													

* CURVE RADIUS R IS BASED ON 20' PIPE JOINT LENGTH



DETAIL A



DETAIL B

NOTES:

1. INSTALLED PIPE SHALL NOT DEVIATE MORE THAN ONE FOOT AT ANY POINT ALONG THE PIPE FROM THE LOCATION SHOWN ON CONSTRUCTION DRAWING.
2. BEVEL PIPE AT 5° MAXIMUM VERTICAL ANGLE. JOINT SHALL BE BUTT WELD TYPE. PIPE SHALL BE CUT SMOOTHLY WITHOUT DAMAGE TO THE CEMENT LINING.
3. AS AN ALTERNATIVE, SHORT LENGTHS OF PIPE MAY BE USED TO ACCOMPLISH THE DESIRED CURVATURE.

TABLE OF ALLOWABLE JOINT DEFLECTION IN STEEL PIPE

REVISIONS				DEPARTMENT OF WATER AND POWER			
NO.	DATE	INIT.	APP'D	WATER SYSTEM		CITY OF LOS ANGELES	
1	10/16	T.L.		DESIGNED	V. TOROMANIA	DATE	9-91
				DRAWN	V. TOROMANIA	DATE	9-91
				CHECKED	L. NUNO	DATE	2-92
REVIEWED BUT NO CHANGE				APPROVED			
				B. WEINSTEIN		JUNE '92	

PC9439



FIGURE 1

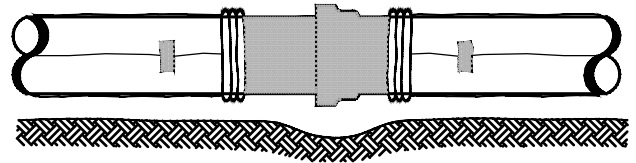


FIGURE 2

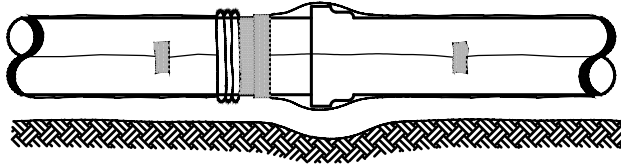


FIGURE 3

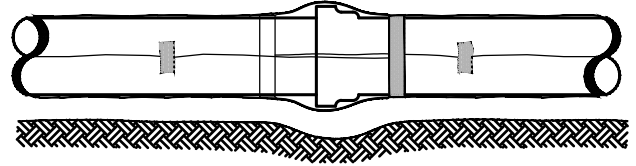


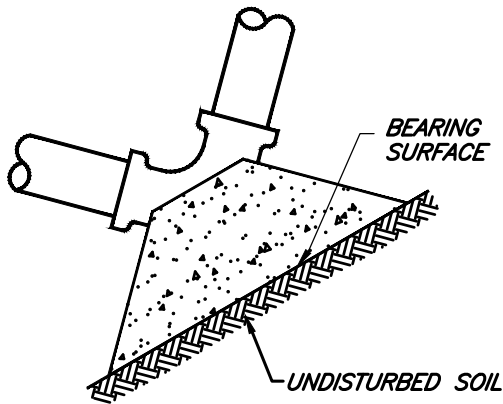
FIGURE 4

1. Cut clear-colored, 8-mil thick polyethylene tube to a length approximately 2 feet longer than that of the pipe section. The minimum flat tube width shall be 16, 20, 24, 30, and 37 inches for 4, 6, 8, 12, and 16-inch pipe respectively.
2. Ensure the pipe is clean prior to installation of the polyethylene tube. Slip the tube around the pipe, centering it to provide 1-foot overlap on each adjacent pipe section. Take up the slack width to make snug, but not tight, fit along the barrel of the pipe, securing the fold with 2-inch wide and 10-mil thick dielectric adhesive tape at quarter points (Figure 1).
3. Lower the pipe into the trench and make-up the pipe joint with the preceding section of pipe. A shallow bell hole in the bedding must be made at joints to facilitate installation of the polyethylene tube (Figure 2). Alternately, pipe may be laid on sand bags in the trench.
4. Pull the bunched polyethylene from the preceding length of pipe, slip it over the end of the new length of pipe, and secure it in place (Figure 3). Then slip the end of the polyethylene from the new pipe section over the end of the first wrap until it overlaps the joint at the end of the preceding length of pipe and secure it in place (Figure 4).
5. Repair any rips, punctures, or other damage to the polyethylene with dielectric adhesive tape or with a short length of polyethylene tube cut open, wrapped around the pipe, and secured in place. Proceed with installation of the next section of pipe in the same manner.
6. Cover bends, reducers, offsets, and other pipe shaped appurtenances with polyethylene in the same manner as the pipe.
7. When valves, tees, crosses, and other odd-shaped pieces cannot be wrapped practically in a tube, wrap with a flat sheet or split length of polyethylene tube by passing the sheet under the appurtenance and bringing it up around the body. Make seams by bringing the edges together, folding over twice, and taping down. Handle width and overlaps at joints described above. Tape polyethylene securely in place at valve stem and other penetrations.
8. Provide openings for branches, service taps, blow-offs, air valves, and similar appurtenances by making an x-shaped cut in the polyethylene and temporarily folding back the film. After the appurtenance is installed, tape the slack securely to the polyethylene, with tape. Cover all exposed clamps and other appurtenances with polyethylene to the trench wall or 3 feet beyond the pipe using the method described in step 7 above.
9. Extend the polyethylene wrap to cover adjacent DI/CI/AC pipe a minimum of 2 feet and adjacent steel pipe to the DI side of the pre-assembled insulating flange. Secure the end with circumferential turns of dielectric adhesive tape.

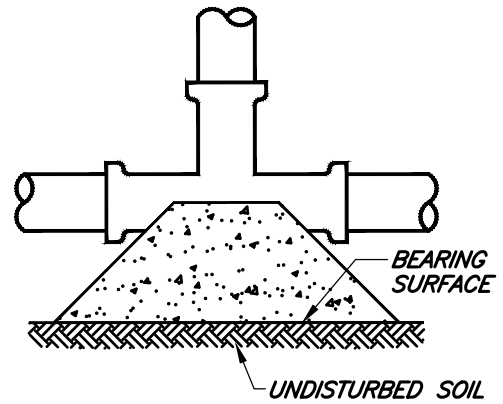
POLYETHYLENE WRAP INSTALLATION INSTRUCTIONS

REVISIONS				DEPARTMENT OF WATER AND POWER			
NO.	DATE	INIT.	APP'D	WATER SYSTEM		CITY OF LOS ANGELES	
△	10/16	K.C.	REDO CADD	DESIGNED	V. TOROMANIA	DATE	6-92
				DRAWN	V. TOROMANIA	APPROVED	B. WEINSTEIN
				CHECKED	C. HAMVAS		JUNE '92

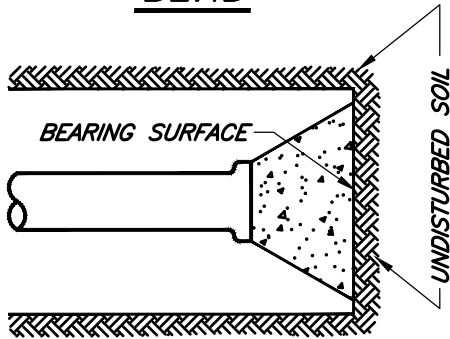
PC9440



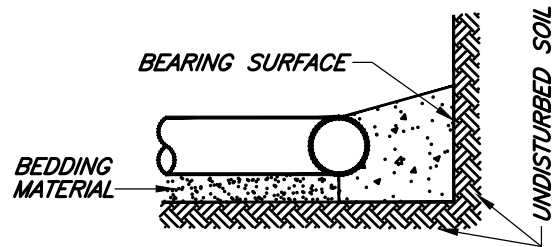
BEND



TEE OR CLAMP



PLUGGED/CAPPED END



TYPICAL CROSS SECTION

TABLE I

MINIMUM BEARING SURFACE AREA (SQ. FT)					
SIZE OF PIPE	BENDS				TEE, CLAMP OR PLUGGED/CAPPED END
	11-1/4"	22-1/2"	45°	90°	
4"	1	1	1	2	2
6"	1	2	3	4	3
8"	1	2	4	8	5
12"	3	5	9	16	12
16"	4	8	16	29	21
20"	7	13	25	45	32

TABLE II

FACTORS FOR INCREASING AREAS IN TABLE I		
SOIL TYPE *	MAX. ALLOWABLE SOIL BEARING VALUES (PSF) **	FACTOR TO INCREASE AREA BY
LOOSE SAND	500	4
SOFT SANDY SAND	1000	2
ADOBE	1000	2
COMPACTED FINE SAND	2000	1
COMPACTED COARSE SAND	2000	1
MEDIUM STIFF CLAY	2000	1

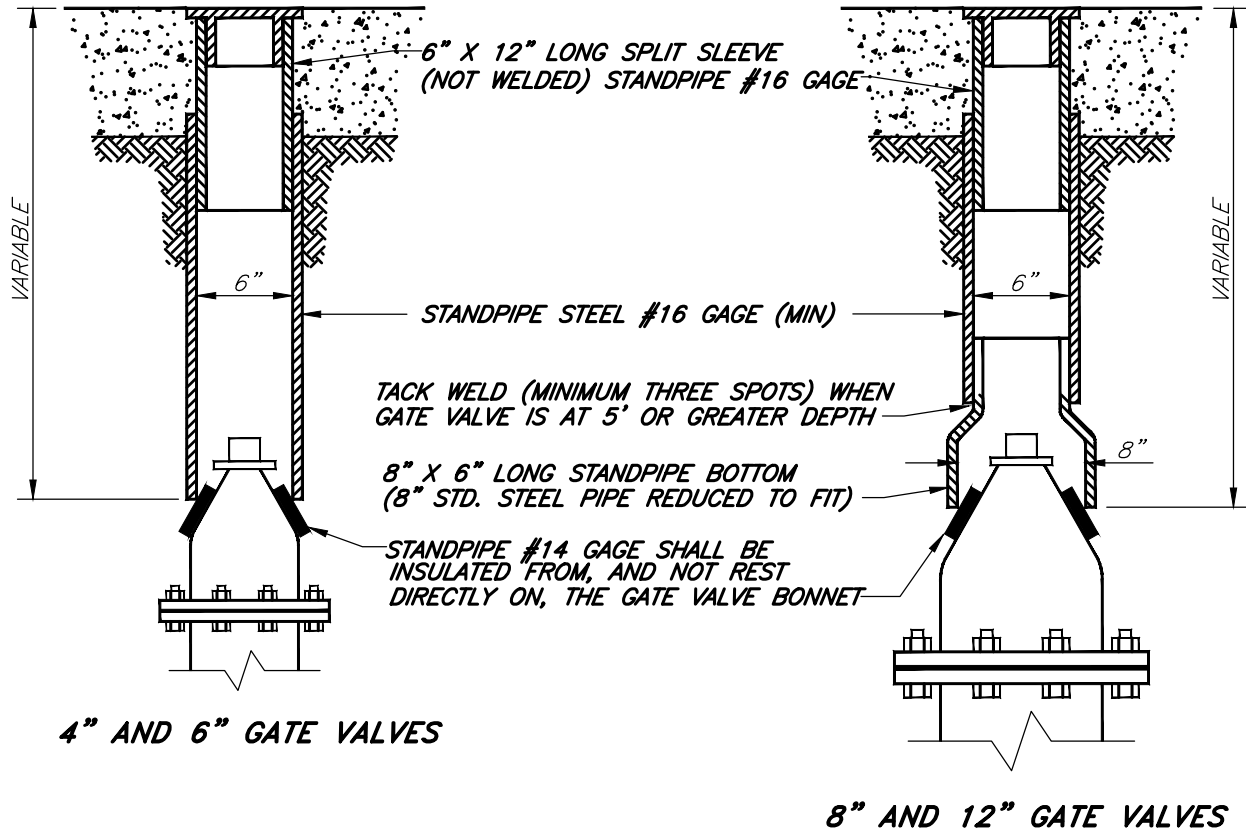
NOTES:

1. ALL FITTINGS SUBJECTED TO AN UNBALANCED HYDROSTATIC FORCE SHALL BE RESTRAINED WITH 2000 PSI CONCRETE THRUST BLOCKS BEARING AGAINST UNDISTURBED SOIL.
2. BEARING VALUES SHOWN IN TABLE I ARE BASED ON 200 PSI INTERNAL PIPE PRESSURE AND DO NOT CONSIDER THE EFFECT OF RESTRAINED OR HARNESSED JOINTS.
- * 3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE SAFE SOIL BEARING VALUES AND THE POSITION AND SIZE OF BEARING AREAS.
- ** 4. MAXIMUM ALLOWABLE SOIL BEARING VALUES IN TABLE II ARE BASED ON 2 FOOT MINIMUM DEPTH OF COVER OVER THE PIPE.
5. EXCEPT FOR THE CROSS SECTION, ALL DRAWINGS SHOWN ARE IN PLAN VIEW.

**CONCRETE THRUST BLOCK
BEARING SURFACE AND INSTALLATION**

REVISIONS				DEPARTMENT OF WATER AND POWER WATER SYSTEM CITY OF LOS ANGELES			
NO.	DATE	INIT.	APP'D	DESIGNED	NAME	DATE	APPROVED
1	10/18	KC/TM		V. TOROMANIA	V. TOROMANIA	6-94	B. WEINSTEIN
							JUNE '92

PC9441



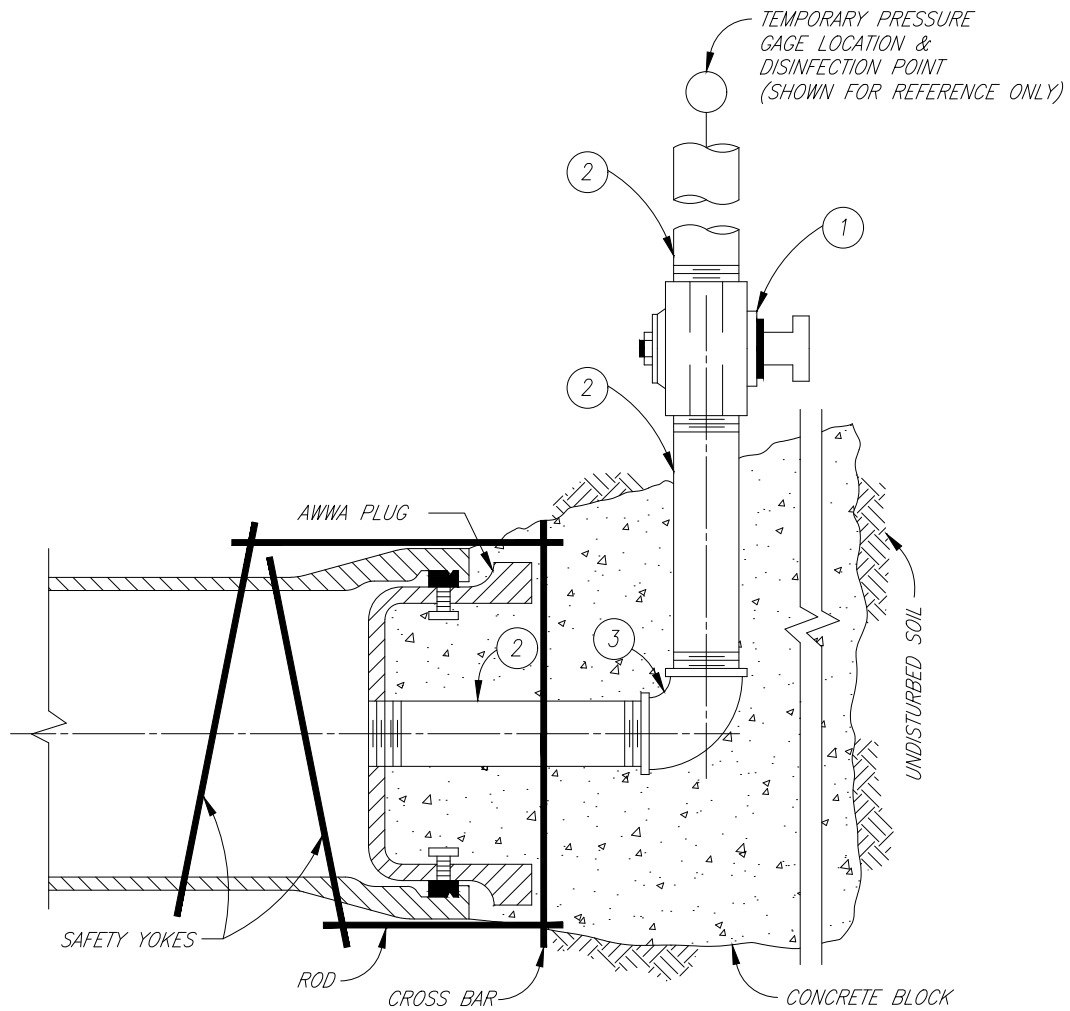
NOTES:

1. 6" WELDED STANDPIPE IS FURNISHED IN 12", 18", 24", 30" & 36" LENGTHS. WELD SHALL BE CONTINUOUS THROUGH THE LENGTH OF THE STAND PIPE.
2. 6" SPLIT SLEEVE (NOT WELDED) STANDPIPE IS FURNISHED IN 12" LENGTHS.
3. EXTERIOR & INTERIOR FINISH SHALL BE COLD DIPPED IN CARBOLINE BITUMASTIC 300 MC. IN ACCORDANCE WITH THE LATEST LADWP SPEC.

STANDPIPE FOR 4"-12" LINE VALVES

REVISIONS				DEPARTMENT OF WATER AND POWER WATER SYSTEM			
NO.	DATE	INIT.	APP'D			CITY OF LOS ANGELES	
			C.H.	DESIGNED	NAME	DATE	APPROVED
1	6-23	VT			L. N.	11-86	B. WEINSTEIN
							JUNE '94
1	2-16	KC/TN	-	DRAWN	A. SAVULIAN	11-86	
				CHECKED	G. & G.	12-86	

PC9442



NOTE:

1. PLUG AT PIPE BELL IS SHOWN, IF USING SPIGOT END OF PIPE, A CAP FITTING WITH A 2" BLOW-OFF SHALL BE UTILIZED.

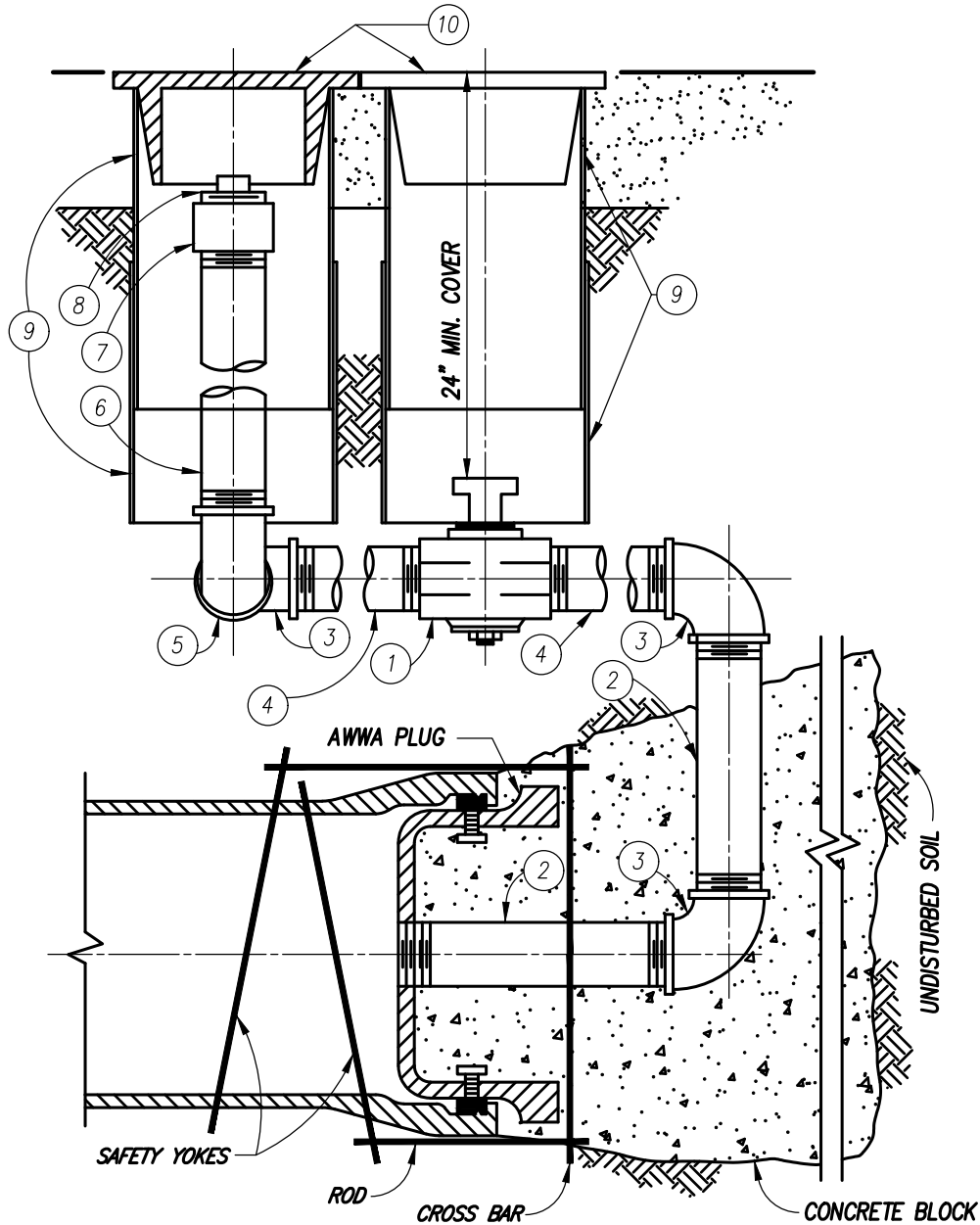
MATERIAL LIST		
ITEM	EA.	DESCRIPTION
1	1	2" FED. CURB BALL VALVE BRZ.
2	3	2" NIP. BRZ. SCR. REG.
1	3	2" - 90° ELL. BRZ.

2" TEMPORARY BLOW-OFF INSTALLATION FOR D.I. PIPE

REVISIONS				APP'D
NO.	DATE	INIT.		

DEPARTMENT OF WATER AND POWER WATER SYSTEM				CITY OF LOS ANGELES	
DESIGNED	NAME	DATE	APPROVED BY	MONTH	YR
DRAWN					
CHECKED					

PC9443-2



PROFILE

MAY BE OFFSET TO MEET FIELD CONDITIONS.

NOTES:

1. INSTALL LINE GATE VALVE UPSTREAM OF THE BLOW-OFF. LOCATION SHALL BE DETERMINED BY ENGINEER BASED ON DESIGN PARAMETERS AND FIELD CONDITION.

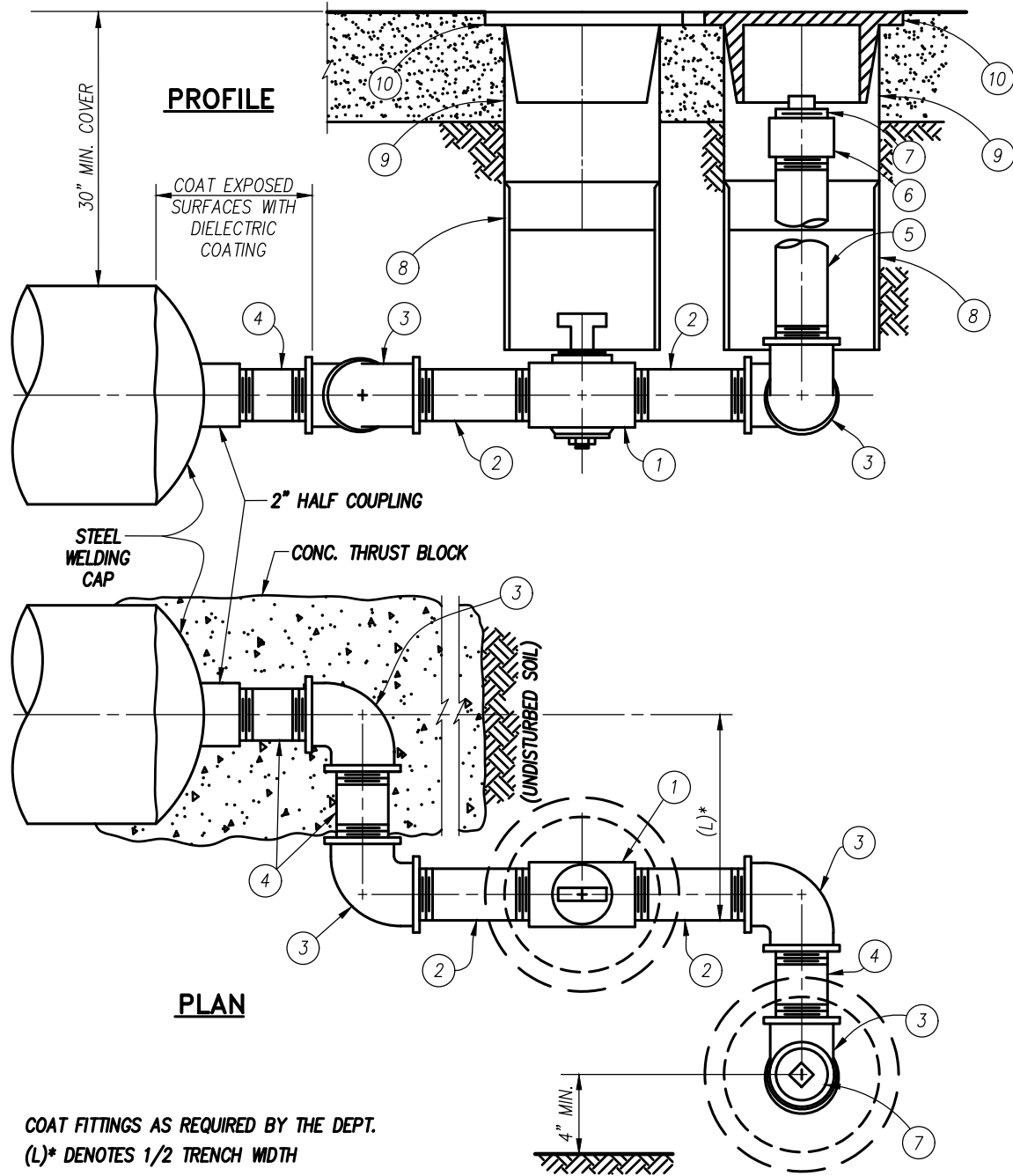
MATERIAL LIST

ITEM	EA.	DESCRIPTION	ITEM	EA.	DESCRIPTION
1	1	2" FED. CURB BALL VALVE BRZ.	6	1	2" x 20" NIP. BRZ. SCR. REG
2	2	2" x 8" NIP. BRS. SCR. REG.	7	1	2" COUPLING BRZ.
3	3	2" - 90° ELL. BRZ.	8	1	2" PLUG BRZ. SQ. HEAD
4	2	2" x 6" NIP. BRS. SCR. REG.	9	2	STAND PIPE & SPLIT SLEEVE
5	1	2" - 90° ST. ELL. BRZ.	10	2	6" GATE CAPS

2" PERMANENT STOP-COCK AND BLOW-OFF INSTALLATION FOR D.I. PIPE

REVISIONS		DEPARTMENT OF WATER AND POWER WATER SYSTEM CITY OF LOS ANGELES			
APP'D		DESIGNED	NAME	DATE	APPROVED
		DRAWN			APPROVED BY MONTH 'YR
		CHECKED			

PC9443



COAT FITTINGS AS REQUIRED BY THE DEPT.
 (L)* DENOTES 1/2 TRENCH WIDTH

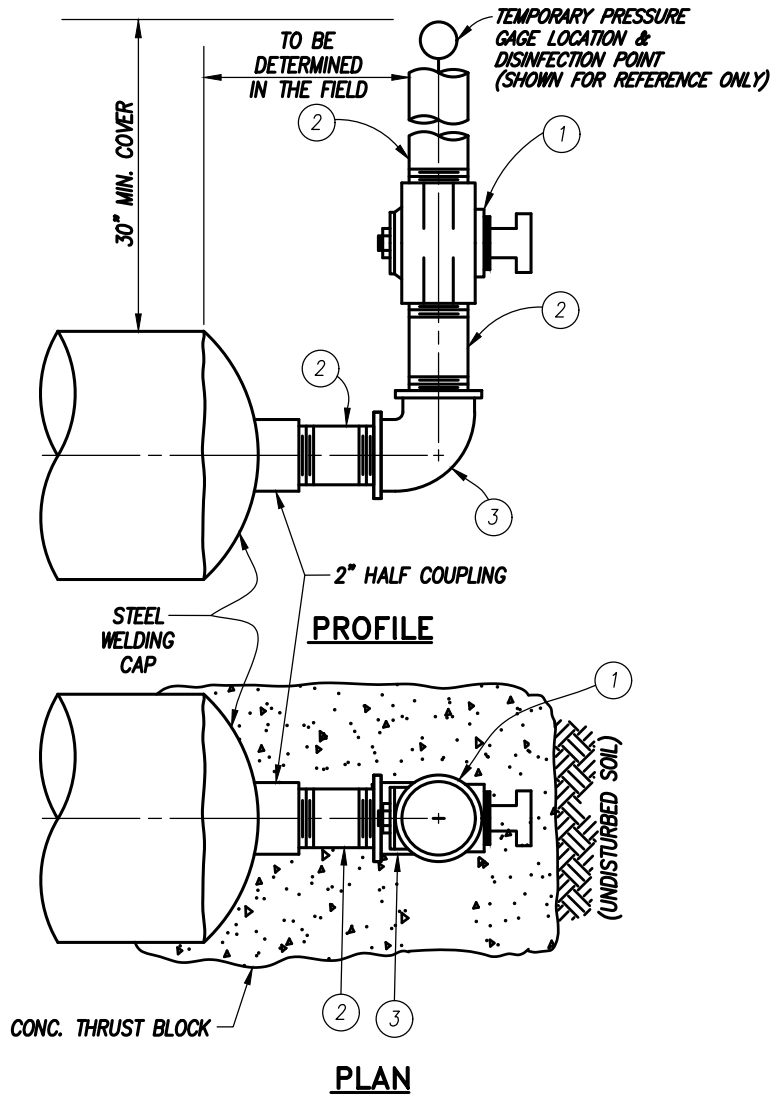
MATERIAL LIST					
ITEM	EA.	DESCRIPTION	ITEM	EA.	DESCRIPTION
1	1	2" FED. CURB BALL VALVE	6	1	2" COUPLING PIPE BRZ.
2	2	2" x 6" NIP. PIPE BRZ. REG.	7	1	2" PLUG PIPE BRZ. SQ. HEAD
3	4	2" x 90° ELL. BRZ. (A-9325)	8	2	6" STL. WLD. STAND PIPE
4	3	2" x 4" PIPE BRZ. REG.	9	2	6" x 12" STL. SPLIT SLEEVE
5	1	2" x 20" NIP. PIPE BRZ. REG.	10	2	6" C.I. VERT. GATE CAP

2" PERMANENT STOP-COCK AND BLOW-OFF INSTALLATION FOR STL. PIPE

REVISIONS				APP'D
NO.	DATE	INIT.		

DEPARTMENT OF WATER AND POWER WATER SYSTEM CITY OF LOS ANGELES			
DESIGNED	NAME	DATE	APPROVED
			APPROVED BY _____ MONTH 'YR
DRAWN			
CHECKED			

PC9444



NOTE:

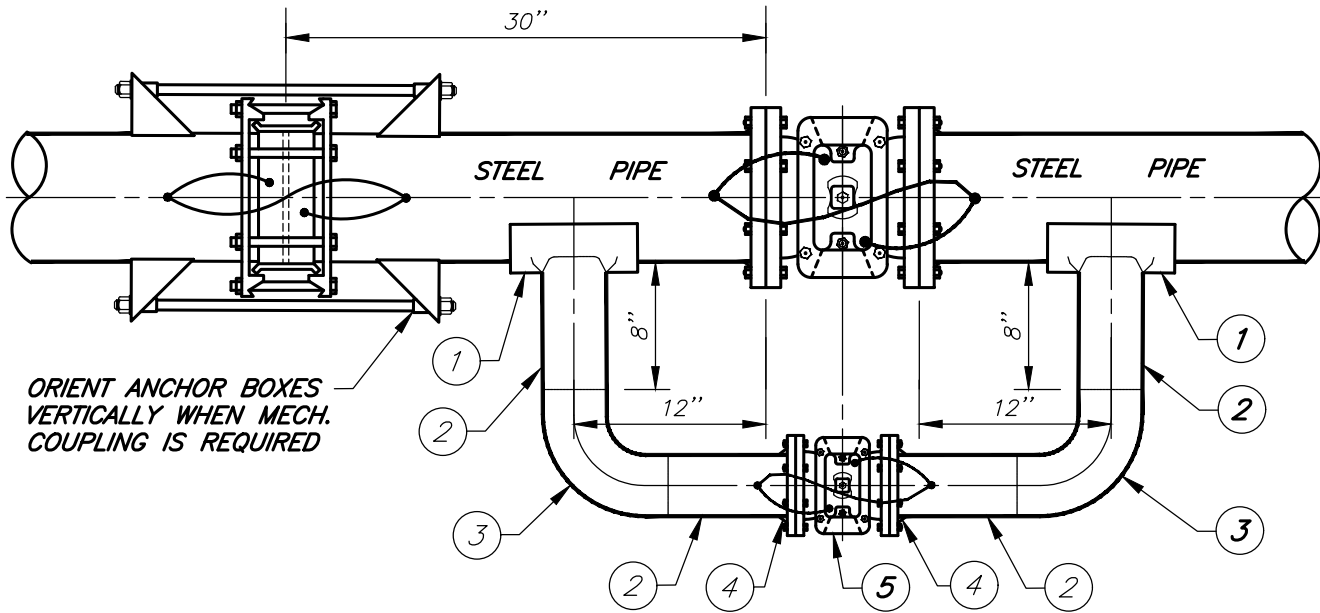
- 1. STEEL WELDING CAP IS SHOWN AT THE END OF PIPE, A BLIND FLANGE WITH BLOW-OFF MAY ALSO BE USED.

MATERIAL LIST		
ITEM	EA.	DESCRIPTION
1	1	2" FED. CURB BALL VALVE
2	3	2" PIPE BR. REG.
3	1	2" x 90° ELL. BRZ.

2" TEMPORARY BLOW-OFF INSTALLATION FOR STL. PIPE

REVISIONS				DEPARTMENT OF WATER AND POWER CITY OF LOS ANGELES			
NO.	DATE	INIT.	APP'D	DESIGNED	NAME	DATE	APPROVED
							APPROVED BY
							MONTH 'YR

PC9444-1



MATERIALS:

- ① - 8" x 8" x (PIPE THICKNESS) STEEL WELD PAD
- ② - 4" x 1/4" ENUC-CC CL WWJ STEEL PIPE
- ③ - 4" x 90° STEEL WELD ELBOW
- ④ - 4" CLASS 150 STEEL WELD NECK FLANGE
- ⑤ - 4" x 250# DI-A FLG GATE VALVE

NOTES:

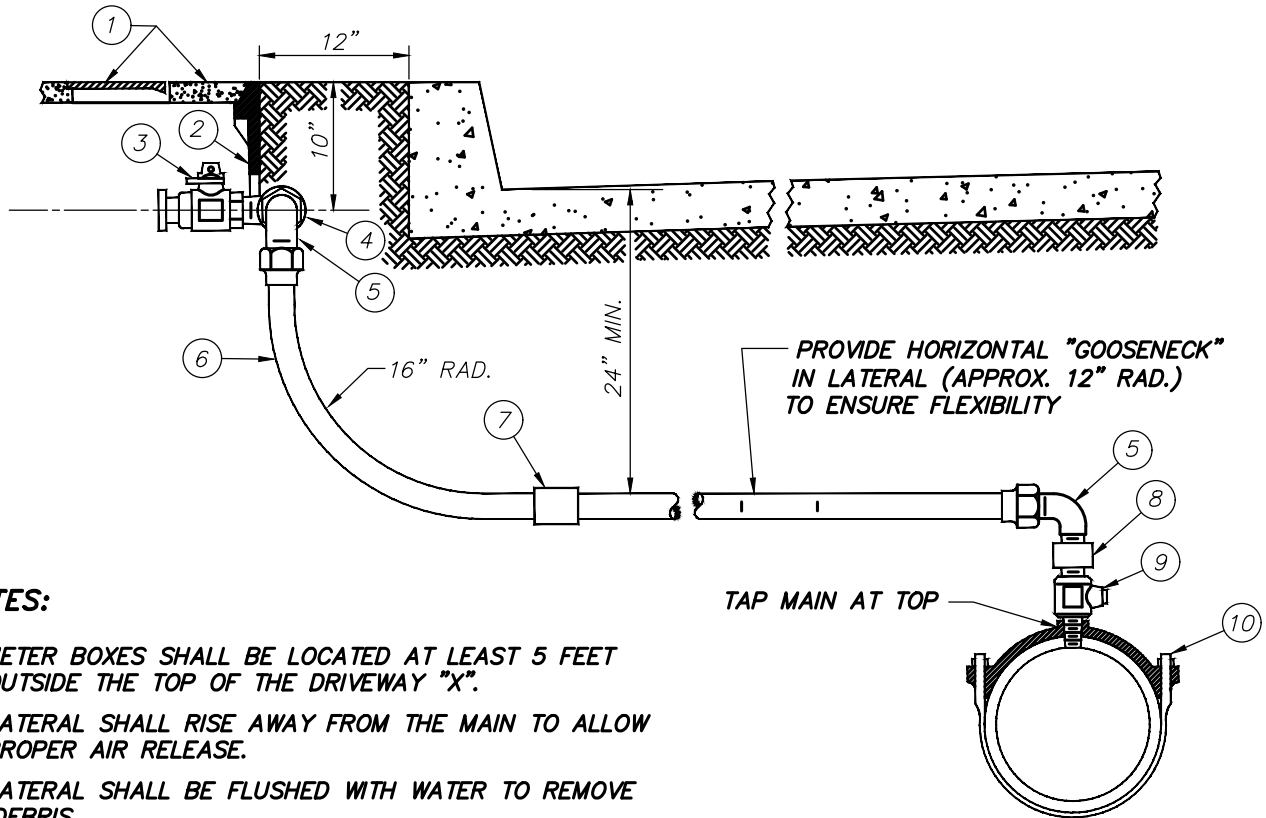
1. 4-INCH BYPASS IS REQUIRED FOR 8-INCH AND 12-INCH LINE VALVES WHEN THE MAXIMUM STATIC PRESSURE EXCEEDS 185 AND 75 PSI, RESPECTIVELY. BYPASS IS NOT REQUIRED ON FIRE HYDRANT LATERALS AND 6-INCH MAINS.
2. LINE, COAT, AND WRAP BYPASS PIPE AND FITTINGS WITH CEMENT WASH, DIELECTRIC COATING, AND "OZENBERG" CLOTH, RESPECTIVELY.
3. PROVIDE STANDPIPES FOR BOTH, MAIN VALVE AND BYPASS VALVE IN ACCORDANCE WITH DWPWS STANDARD DRAWING A9442.

**4-INCH BYPASS FOR
8-INCH AND 12-INCH LINE VALVES IN STEEL PIPE**

REVISIONS			
NO.	DATE	INIT.	APP'D
4-16	PW	OBSELETE; RE-DESIGN PENDING	

DEPARTMENT OF WATER AND POWER WATER SYSTEM CITY OF LOS ANGELES			
DESIGNED	NAME	DATE	APPROVED
V. TOROMANIA	V. TOROMANIA	4-92	APPROVED BY MONTH 'YR
V. TOROMANIA	V. TOROMANIA	5-92	
C. HAMVAS	C. HAMVAS	5-92	

PC9446



NOTES:

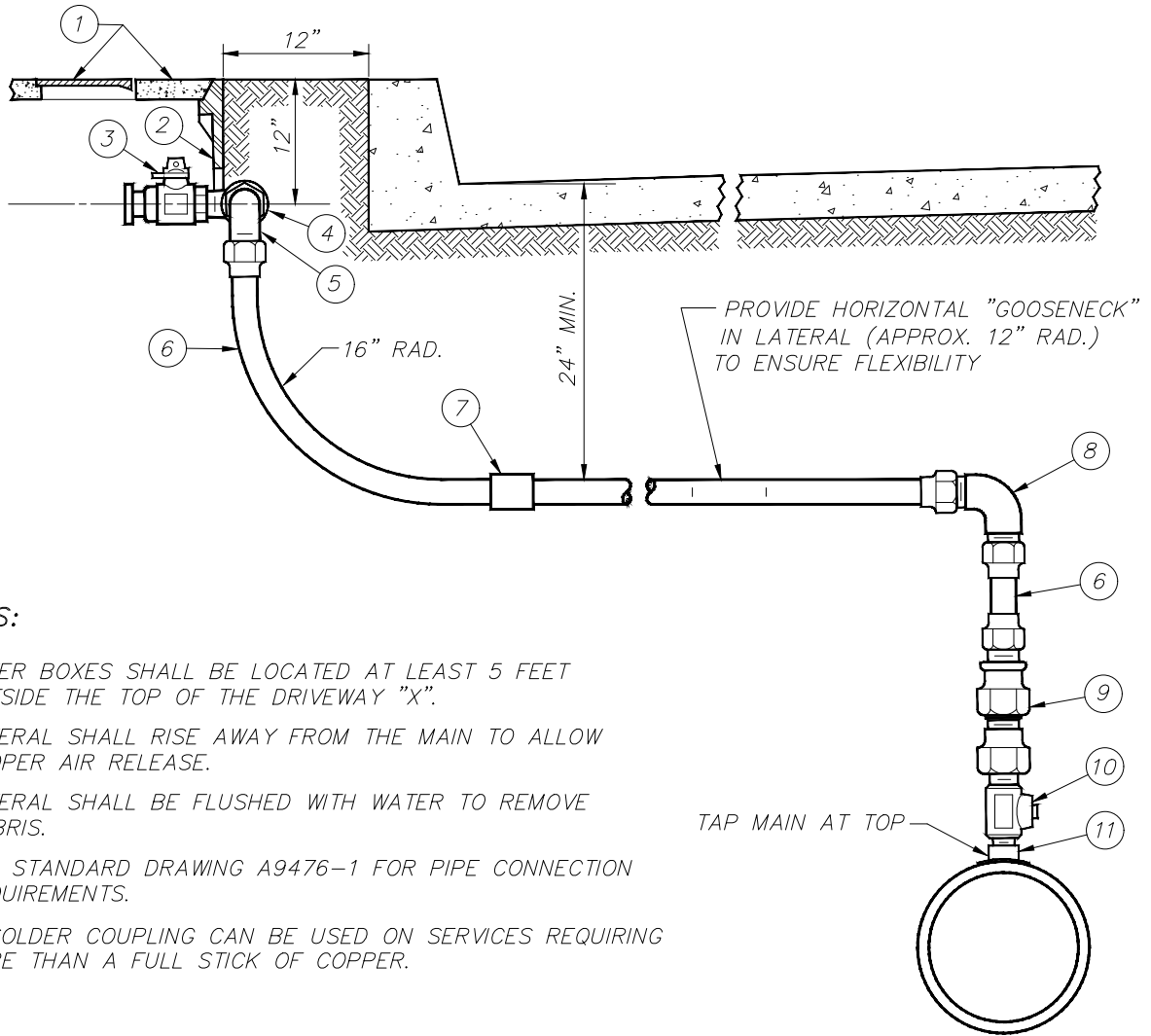
1. METER BOXES SHALL BE LOCATED AT LEAST 5 FEET OUTSIDE THE TOP OF THE DRIVEWAY "X".
2. LATERAL SHALL RISE AWAY FROM THE MAIN TO ALLOW PROPER AIR RELEASE.
3. LATERAL SHALL BE FLUSHED WITH WATER TO REMOVE DEBRIS.
4. SEE STANDARD DRAWING A9476-1 FOR PIPE CONNECTION REQUIREMENTS.
5. A SOLDER COUPLING CAN BE USED ON SERVICES REQUIRING MORE THAN A FULL STICK OF COPPER

MATERIAL LIST		
ITEM	QTY.	DESCRIPTION
1	1	#3 REINFORCED CONCRETE POLYMER COVER (CENTER HOLE)
2	1	#3 PLASTIC METER BOX
3	1	2" FEDERALLOY FLANGE CURB BALL VALVE W/LOCKWING
4	1	2" BRZ. STREET ELBOW
5	2	2" FEDERALLOY MALE COPPER TUBING TO MALE N.P.T. ELBOW
6	VAR.	2" COPPER TUBING
7	1	2" FEDERALLOY COMPRESSION COUPLING
8	1	2" BRZ. XH FEMALE N.P.T. TO FEMALE N.P.T. COUPLING
9	1	1-1/2" X 2" FEDERALLOY CORP. BALL VALVE W/ 2" COMPRESSION NUT
10	1	1-1/2" X [MAIN DIA.] BRONZE SERVICE SADDLE

2" AIR VALVE INSTALLATION FOR D.I. PIPE

REVISIONS				DEPARTMENT OF WATER AND POWER			
NO.	DATE	INIT.	APP'D	WATER SYSTEM		CITY OF LOS ANGELES	
				DESIGNED	NAME	DATE	APPROVED
							APPROVED BY
				DRAWN			MONTH 'YR
				CHECKED			

PC9447



NOTES:

1. METER BOXES SHALL BE LOCATED AT LEAST 5 FEET OUTSIDE THE TOP OF THE DRIVEWAY "X".
2. LATERAL SHALL RISE AWAY FROM THE MAIN TO ALLOW PROPER AIR RELEASE.
3. LATERAL SHALL BE FLUSHED WITH WATER TO REMOVE DEBRIS.
4. SEE STANDARD DRAWING A9476-1 FOR PIPE CONNECTION REQUIREMENTS.
5. A SOLDER COUPLING CAN BE USED ON SERVICES REQUIRING MORE THAN A FULL STICK OF COPPER.

TAP MAIN AT TOP

MATERIAL LIST

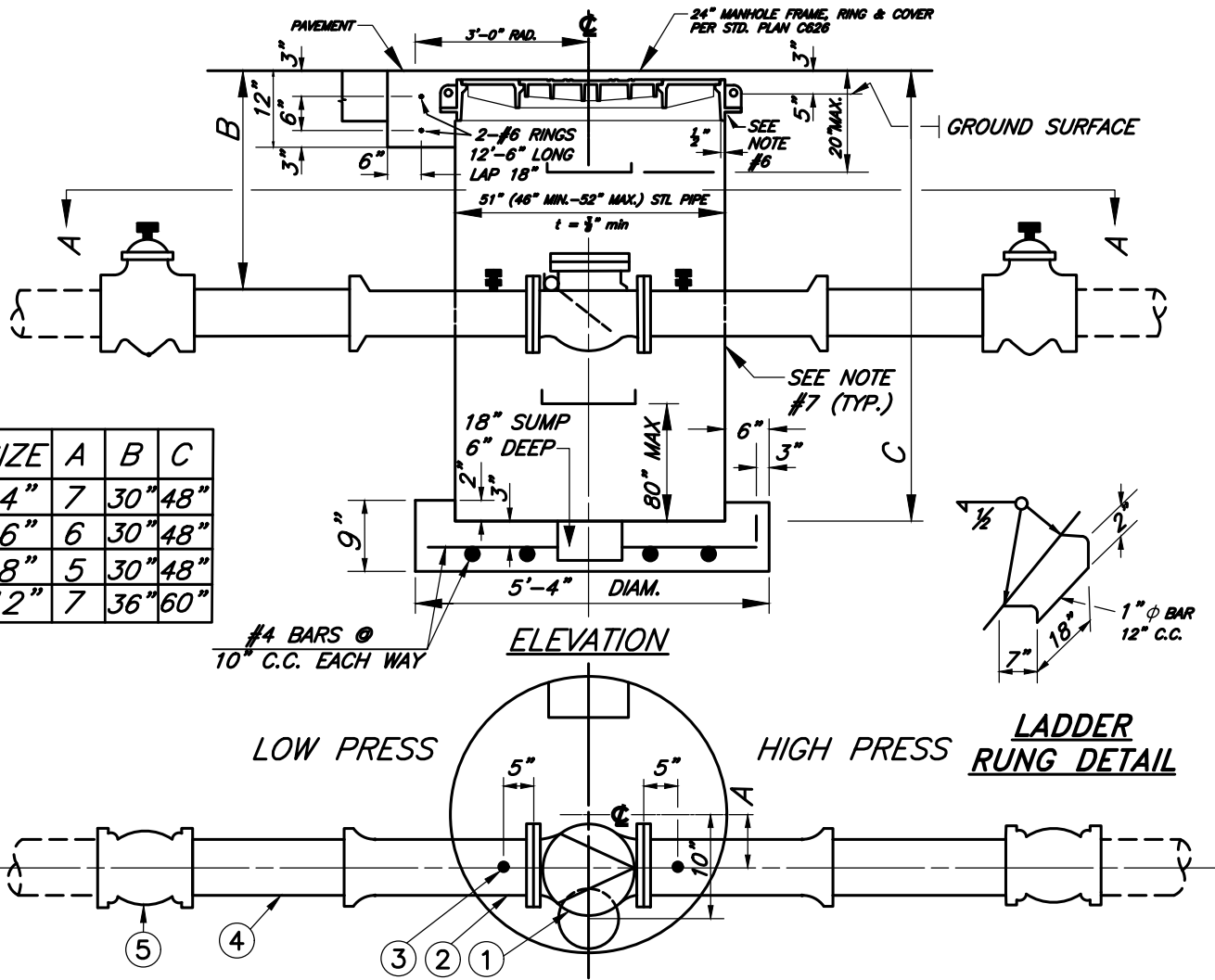
ITEM	QTY.	DESCRIPTION
1	1	#3 REINFORCED CONCRETE POLYMER COVER (CENTER HOLE)
2	1	#3 PLASTIC METER BOX
3	1	2" FEDERALLOY FLANGE CURB BALL VALVE W/LOCKWING
4	1	2" BRZ. STREET ELBOW
5	1	2" FEDERALLOY MALE COPPER TUBING TO MALE N.P.T. ELBOW
6	VAR.	2" COPPER TUBING
7	1	2" FEDERALLOY COMPRESSION COUPLING
8	1	2" FEDERALLOY-COPPER COMPRESSION ELBOW
9	1	2" FEDERALLOY INSULATING ADAPTOR
10	1	1-1/2" X 2" FEDERALLOY CORP. BALL VALVE W/ 2" COMPRESSION NUT
11	1	1-1/2" STEEL CORPORATION THREAD WELD COUPLING

2" AIR VALVE INSTALLATION FOR STEEL PIPE

REVISIONS				APP'D
NO.	DATE	INIT.		

DEPARTMENT OF WATER AND POWER			
WATER SYSTEM		CITY OF LOS ANGELES	
DESIGNED	NAME	DATE	APPROVED
			APPROVED BY _____ MONTH 'YR
DRAWN			
CHECKED			

PC9448



NOTES:

1. ALL PUSH-ON JOINTS SHALL BE FITTED WITH JOINT-LOCK GASKET
2. A BY-PASS MAY BE REQUIRED WHEN THERE IS NO ALTERNATE SUPPLY TO THE LOWER SYSTEM DURING AN OUTAGE OF ITS SOURCE
3. ENAMEL ALL EXPOSED SURFACES PER A.W.W.A. STD. SPEC. No. C 203.
4. ALL REINFORCED BARS: INTERMEDIATE GRADE, A.S.T.N. - A615 GRADE 40.
5. CONC. CLASS 560-C-3250
6. PLACE METAL WEDGES AND FELT IN SPACE TO PREVENT RING FROM SHIFTING.
7. STANDPIPE SHALL BE ELECTRICALLY ISOLATED FROM VALVE AND WATER MAIN.

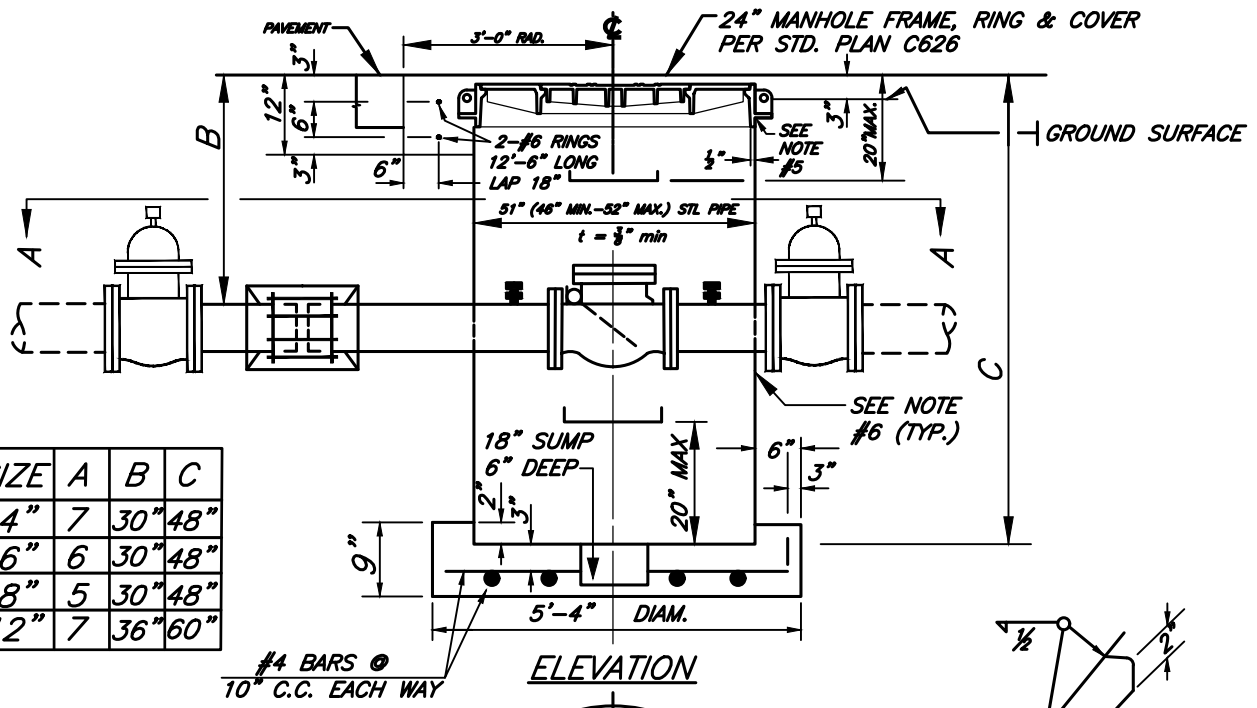
MATERIAL LIST

ITEM	QTY.	DESCRIPTION
1	1	C.I. FLANGED CHECK VALVE
2	2	27" LONG D.I. RG. FLG./BELL ADAPTOR
3	2	1" VALVE FED - I CORP. BALL COMP (46-26-464)
4	2	D.I. R.G. NIPPLE AWWA
5	2	C.I. R.G. GATE VALVE

CHECK VALVE INSTALLATION FOR D.I. PIPE

REVISIONS				DEPARTMENT OF WATER AND POWER			
NO.	DATE	INIT.	APP'D	WATER SYSTEM		CITY OF LOS ANGELES	
1	10/16	K.B.		DESIGNED	L. NUNO	DATE	11-1986
				DRAWN	A. SAVULIAN	DATE	11-1986
				CHECKED	G & S	DATE	12-1986
REVISED DRAWING/NOTES				APPROVED		APPROVED BY	
						MONTH 'YR	

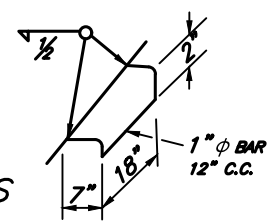
PC9449



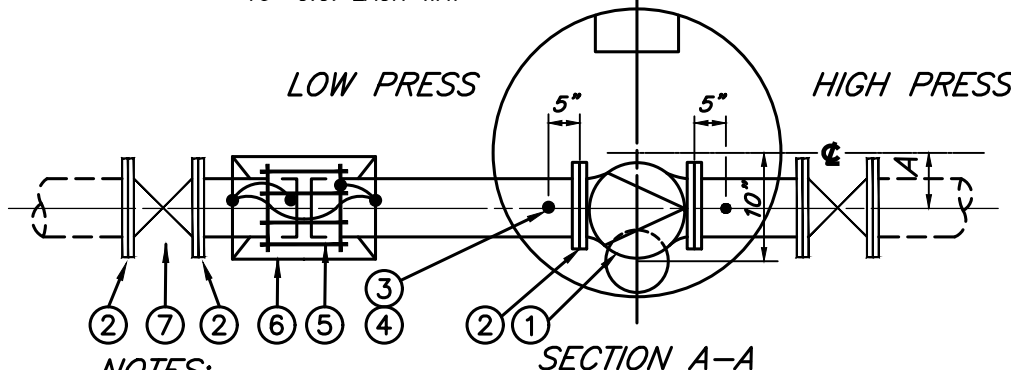
SIZE	A	B	C
4"	7	30"	48"
6"	6	30"	48"
8"	5	30"	48"
12"	7	36"	60"

#4 BARS @
10" C.C. EACH WAY

ELEVATION



LADDER RUNG DETAIL



NOTES:

1. A BY-PASS MAY BE REQUIRED WHEN THERE IS NO ALTERNATE SUPPLY TO THE LOWER SYSTEM DURING AN OUTAGE OF ITS SOURCE
2. ENAMEL ALL EXPOSED SURFACES PER A.W.W.A. STD SPEC. NO. 203
3. ALL REINF. BARS : INTERMEDIATE GRADE, A.S.T.M.-A615 GRADE 40.
4. CONC. CLASS 560-C-3250
5. PLACE METAL WEDGES AND FELT IN SPACE TO PREVENT RING FROM SHIFTING.
6. STANDPIPE SHALL BE ELECTRICALLY ISOLATED FROM VALVE AND WATER MAIN.

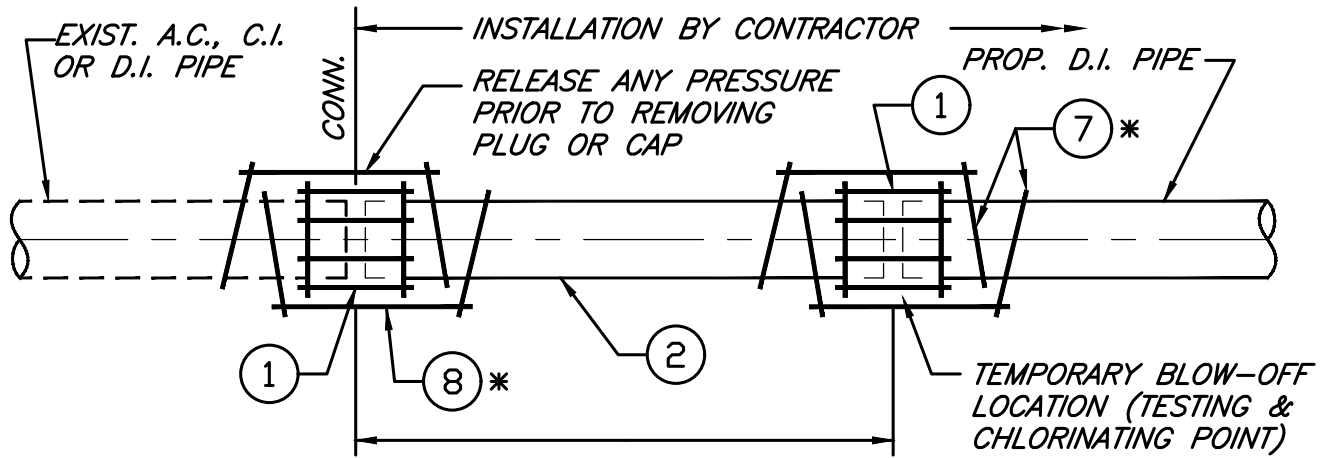
MATERIAL LIST

ITEM	QTY.	DESCRIPTION
1	1	C.I. FLANGED CHECK VALVE
2	6	WELDING NECK FLANGE
3	2	1" VALVE FED - 1 CORP. BALL COMP. (46-26-464)
4	2	1" STL. CORP. THRD. WELDING COUPLING
5	1	STL. MECH. COUPLING
6	1	ANCHOR BOX ASSEMBLY
7	2	C.I. FLANGED GATE VALVE

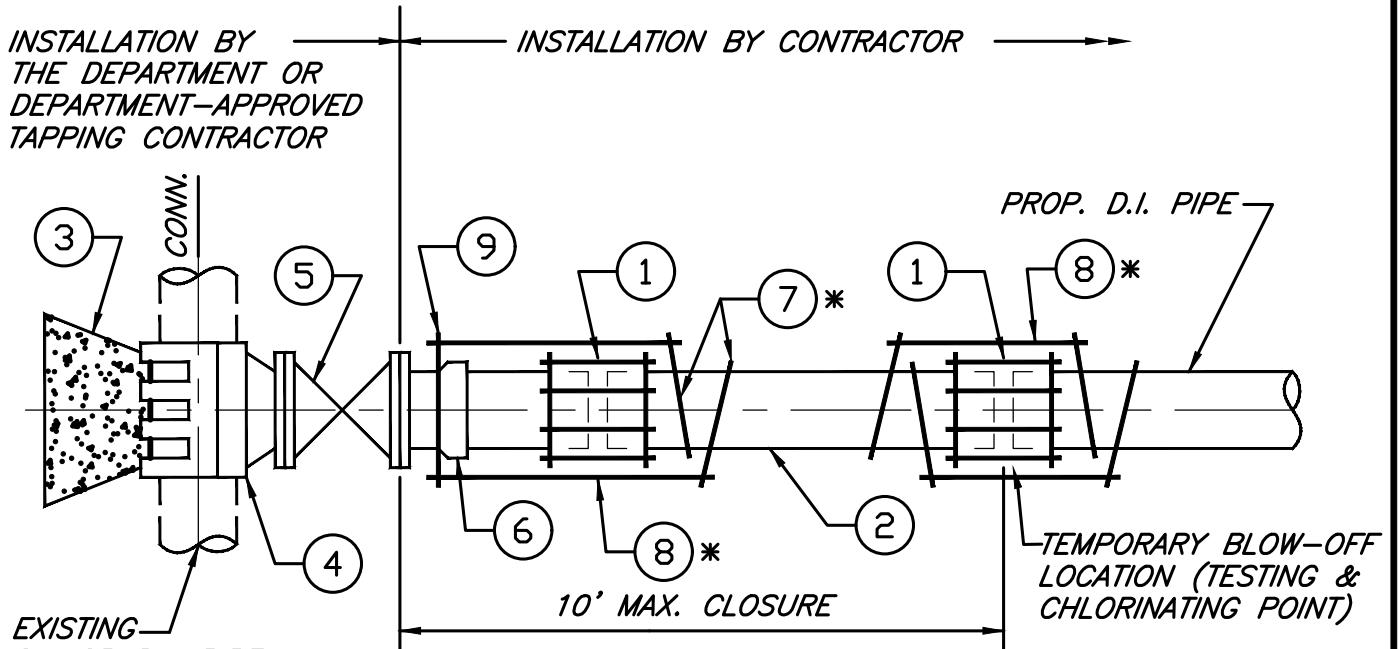
CHECK VALVE INSTALLATION FOR STEEL PIPE

REVISIONS				DEPARTMENT OF WATER AND POWER			
NO.	DATE	INIT.	APP'D	WATER SYSTEM		CITY OF LOS ANGELES	
1	10/16	K.B.		DESIGNED	L. NUNO	DATE	11-1986
				DRAWN	A. SAVULIAN	DATE	11-1986
				CHECKED	G & S	DATE	12-1986
REVISED DRAWING/NOTES				APPROVED		APPROVED BY	
						MONTH 'YR	

PC9450



DETAIL 1 - CONNECTION TO EXISTING SPIGOT END



DETAIL 2 - HOT-TAP CONNECTION TO EXISTING C.I. OR D.I. PIPE

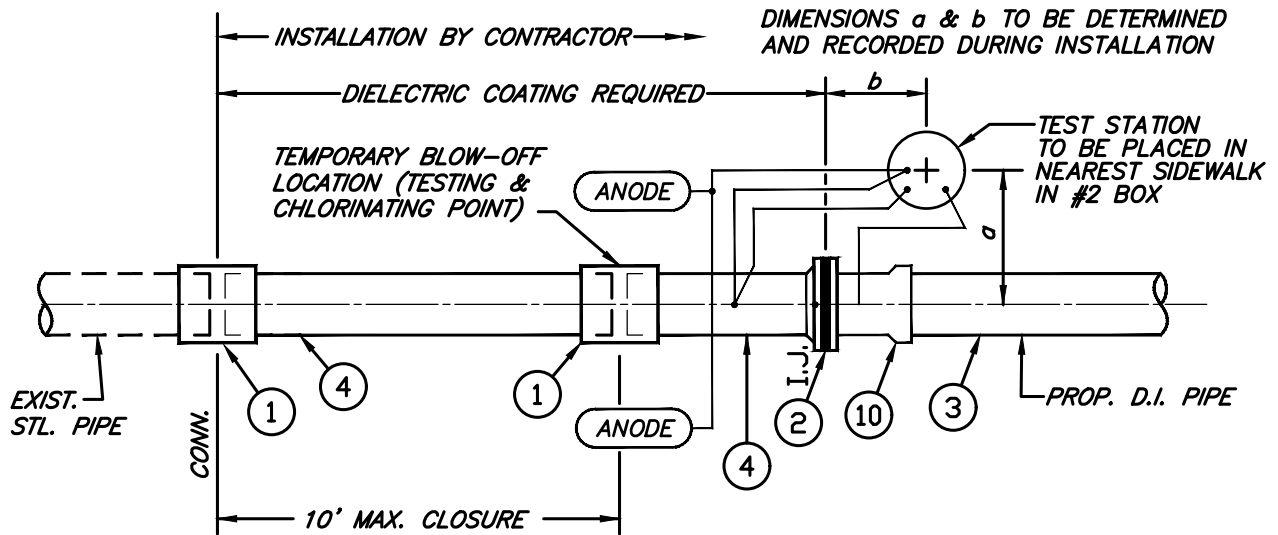
- ① CAST TRANS. MECH. COUPLING
- ② D.I. R.G. NIPPLE
- ③ CONCRETE THRUST BLOCK
- ④ TAPPING SLEEVE
- ⑤ FLANGED GATE VALVE
- ⑥ D.I. R.G. FLANGE/BELL ADAPTOR
- *⑦ SAFETY YOKE (NOT ALLOWED WITH A.C. PIPE)
- *⑧ ROD (NOT ALLOWED WITH A.C. PIPE)
- ⑨ BELL YOKE

D.I. PIPE CONNECTION TO EXISTING A.C., C.I., OR D.I. PIPE

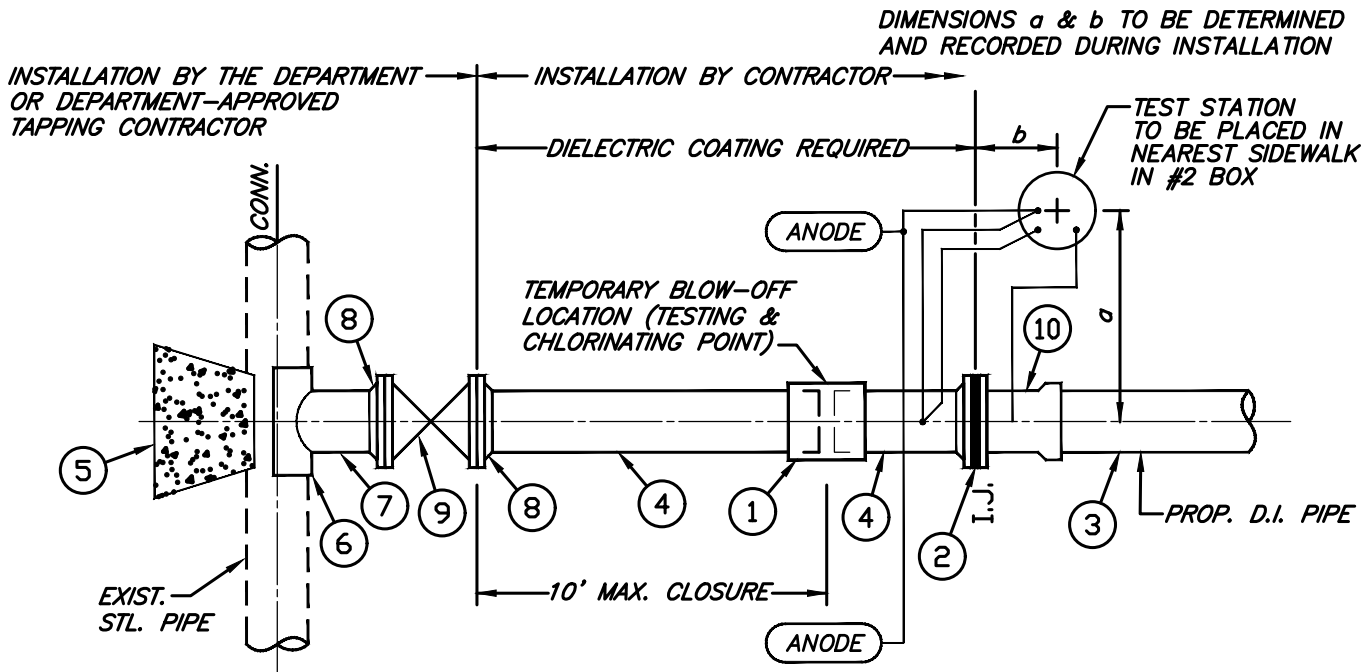
REVISIONS				APP'D
NO.	DATE	INIT.		

DEPARTMENT OF WATER AND POWER WATER SYSTEM CITY OF LOS ANGELES			
DESIGNED	NAME	DATE	APPROVED
DRAWN			APPROVED BY MONTH 'YR
CHECKED			

PC9451



DETAIL 1: CONNECTION TO EXISTING STEEL PIPE



DETAIL 2: HOT-TAP CONNECTION TO EXISTING STEEL PIPE

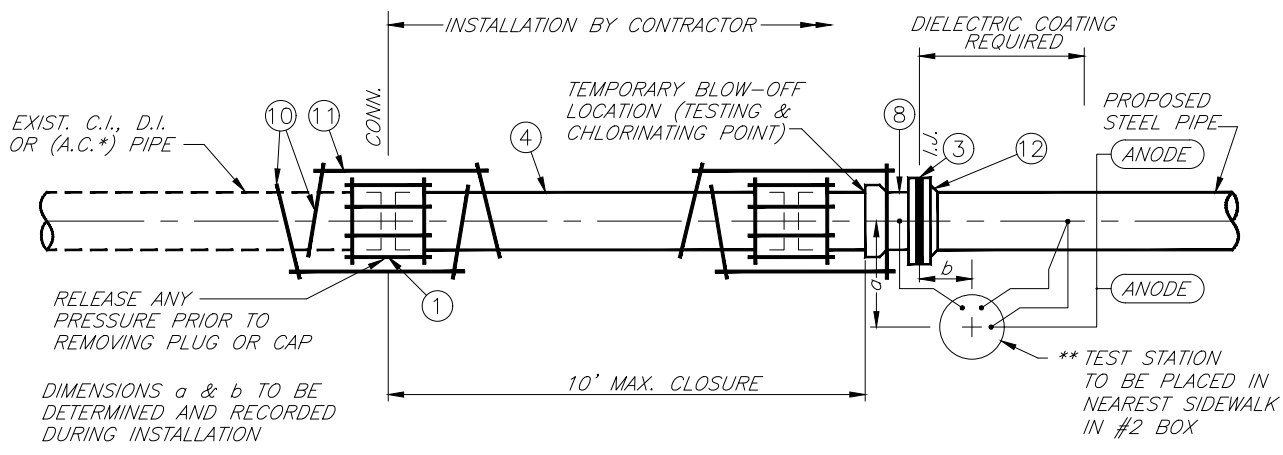
- ① STEEL BUTTSTRAP
- ② I.J. KIT
- ③ D.I. R.G. NIPPLE
- ④ STEEL PIPE
- ⑤ CONCRETE THRUST BLOCK
- ⑥ STEEL WELDING PAD
- ⑦ STEEL NIPPLE
- ⑧ WELD NECK FLANGE
- ⑨ FLANGED GATE VALVE
- ⑩ D.I. R.G. FLANGE/BELL ADAPTOR

NOTE: SEE CATHODIC PROTECTION NOTES AND DETAILS, AS LAST REVISED.

D.I. PIPE CONNECTIONS TO EXISTING STEEL PIPE

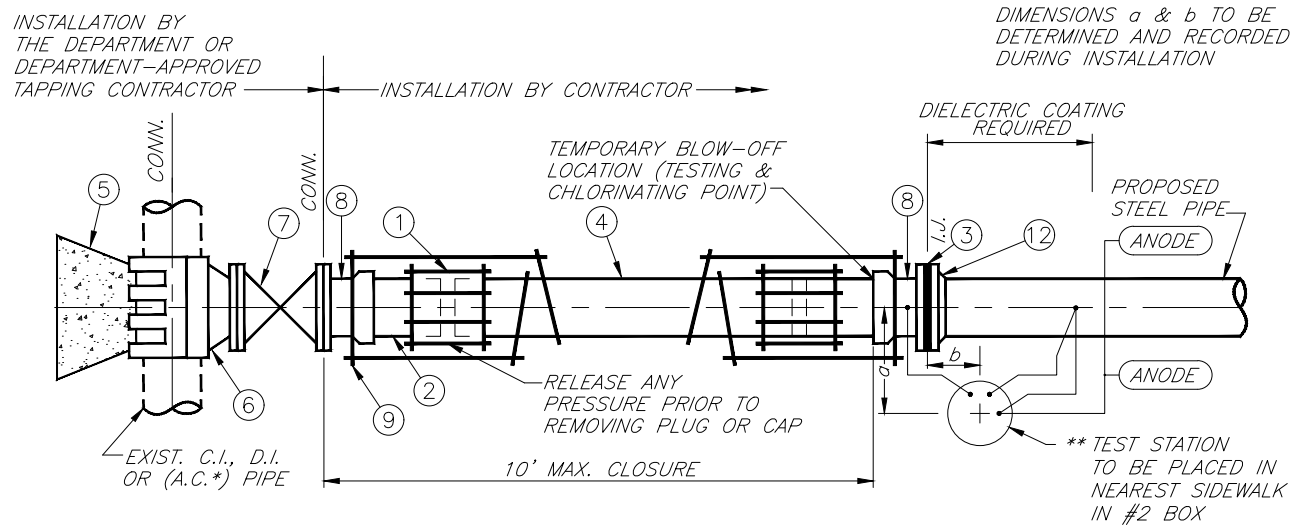
REVISIONS				DEPARTMENT OF WATER AND POWER WATER SYSTEM CITY OF LOS ANGELES			
NO.	DATE	INIT.	APP'D	DESIGNED	NAME	DATE	APPROVED
							APPROVED BY
							MONTH 'YR

PC9452



DETAIL 1: CONNECTION TO EXISTING SPIGOT END

* A.C. PIPE CONNECTION DOES NOT REQUIRE ROD & YOKE RESTRAINT.
 ** TEST STATION IS NOT REQUIRED WHEN CONNECTING TO A.C. PIPE.



DETAIL 2: HOT-TAP CONNECTION TO EXISTING C.I. OR D.I. PIPE

* HOT-TAP CONNECTION TO A.C. PIPE IS NOT ALLOWED, MUST USE D.I. PIPE TO REPLACE A.C. PIPE BEFORE TAPPING.
 ** TEST STATION IS NOT REQUIRED WHEN CONNECTING TO A.C. PIPE.

- ① CAST TRANS. MECH. COUPLING
- ② D.I. R.G. NIPPLE
- ③ I.J. KIT
- ④ DI-A PW CL RG PIPE
- ⑤ CONCRETE THRUST BLOCK
- ⑥ TAPPING SLEEVE
- ⑦ FLANGED GATE VALVE
- ⑧ D.I. R.G. FLANGE/BELL ADAPTOR
- ⑨ BELL YOKE
- ⑩ SAFETY YOKE
- ⑪ ROD
- ⑫ WELD NECK FLANGE

NOTE: SEE CATHODIC PROTECTION NOTES AND DETAILS, AS LAST REVISED.

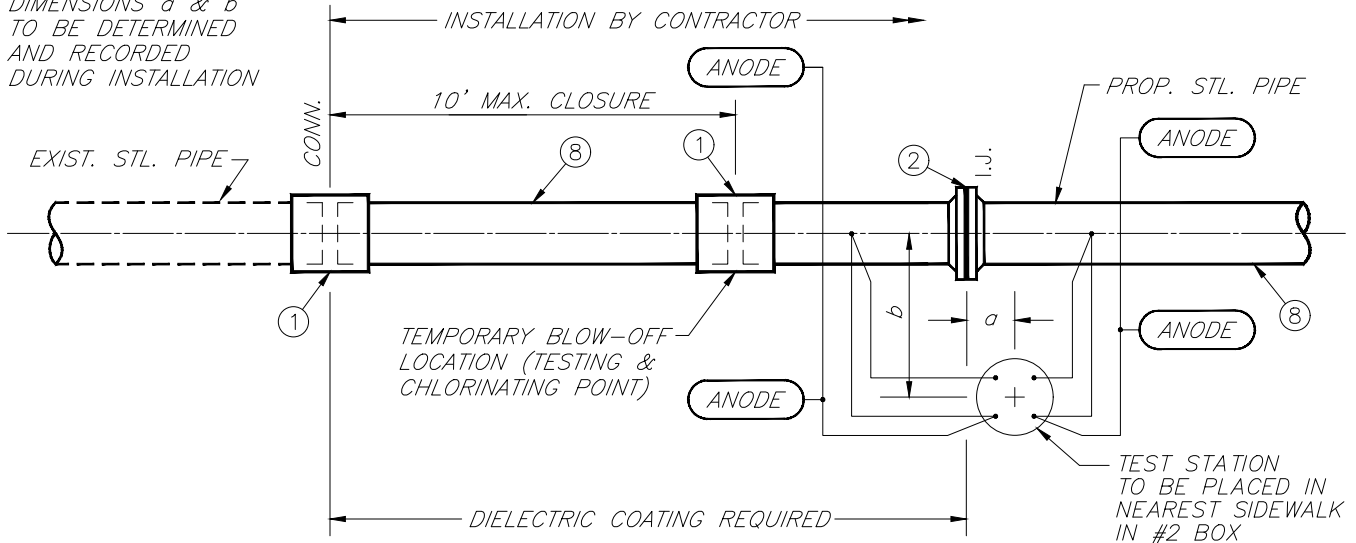
STEEL PIPE CONNECTIONS TO EXISTING C.I., OR D.I. PIPE

REVISIONS				APP'D
NO.	DATE	INIT.		

DEPARTMENT OF WATER AND POWER WATER SYSTEM				CITY OF LOS ANGELES	
DESIGNED	NAME	DATE	APPROVED BY	MONTH	YR
DRAWN					
CHECKED					

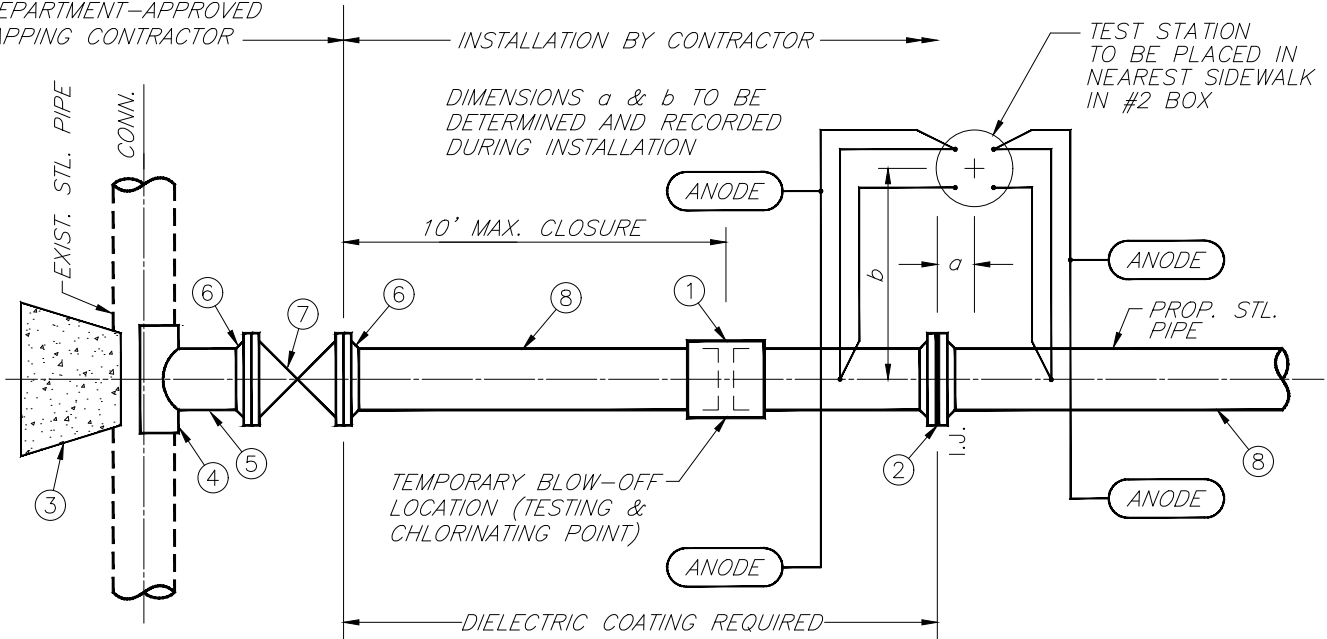
PC9453

DIMENSIONS *a* & *b*
TO BE DETERMINED
AND RECORDED
DURING INSTALLATION



DETAIL 1: CONNECTION TO EXISTING STEEL PIPE

INSTALLATION BY
THE DEPARTMENT OR
DEPARTMENT-APPROVED
TAPPING CONTRACTOR



DETAIL 2: HOT-TAP CONNECTION TO EXISTING STEEL PIPE

- ① STEEL BUTTSTRAP
- ② PPIJ INSERT (POLYPROPYLENE INSULATING JOINT)
- ③ CONCRETE THRUST BLOCK
- ④ STEEL WELDING PAD
- ⑤ STEEL NIPPLE
- ⑥ WELD NECK FLANGE
- ⑦ FLANGED GATE VALVE
- ⑧ STEEL PIPE

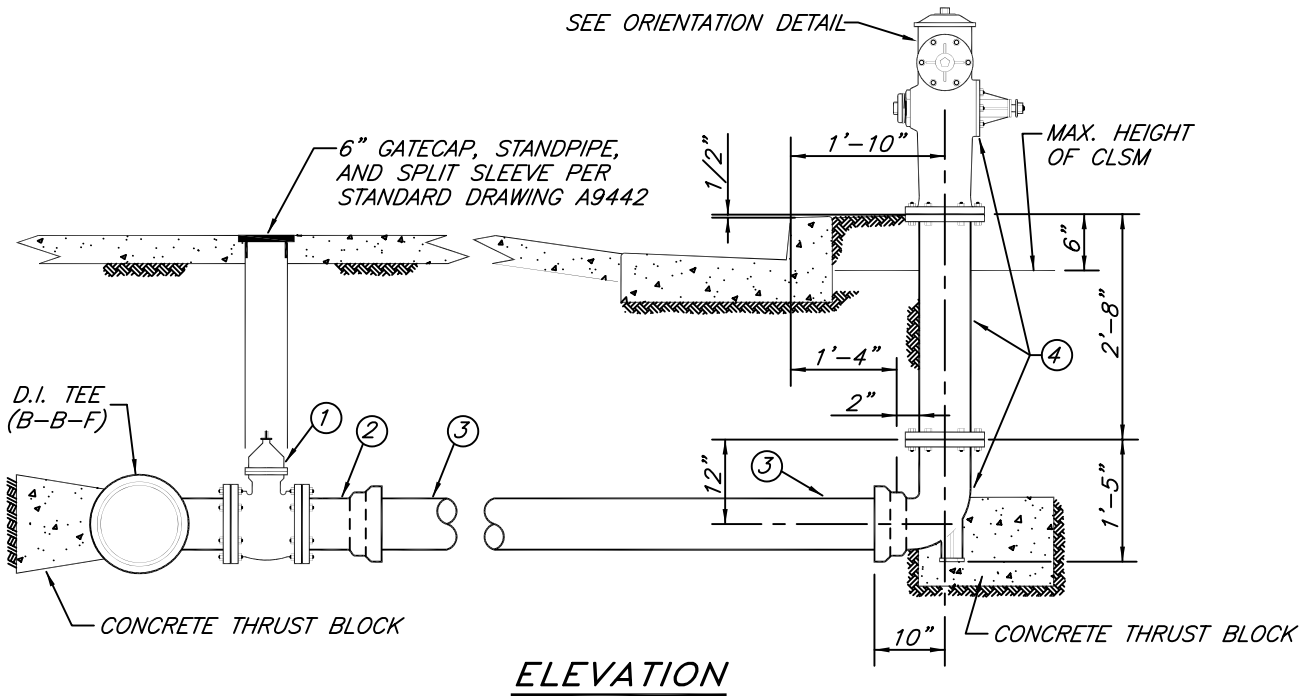
NOTE: SEE CATHODIC PROTECTION NOTES AND DETAILS, AS LAST REVISED.

STEEL PIPE CONNECTIONS TO EXISTING STEEL PIPE

REVISIONS				APP'D
NO.	DATE	INIT.		

DEPARTMENT OF WATER AND POWER WATER SYSTEM				CITY OF LOS ANGELES	
DESIGNED	NAME	DATE	APPROVED	APPROVED BY	

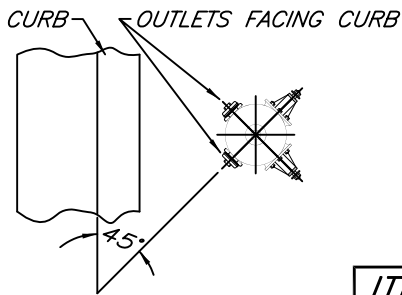
PC9454



ELEVATION

NOTES:

1. THIS FIRE HYDRANT INSTALLATION IS GENERALLY USED WHEN CONNECTING TO A PROPOSED DUCTILE IRON WATER MAIN OR CUT IN NEW TEE FOR EXISTING A.C., C.I. & D.I. WATER MAIN.
2. ALL PUSH-ON JOINTS SHALL BE RESTRAINED WITH JOINT-LOCK GASKETS.
- *3. LENGTH OF LATERAL IS DEFINED AS THE DISTANCE MEASURED ALONG THE LATERAL FROM THE MAIN TO THE CURB FACE OR TO THE FIRE HYDRANT IN THE ABSENCE OF CURB.
4. SEE STANDARD DRAWING A9461 FOR PLACEMENT OF FIRE HYDRANTS IN THE ABSENCE OF A LEVEL PAD.
5. INSTALLATION UNDER BUS PADS WILL REQUIRE USE OF A WELDED STEEL PIPE LATERAL AND CORROSION PROTECTION.
6. BACKFILL SHALL BE 50 PSI CLSM (SLURRY).



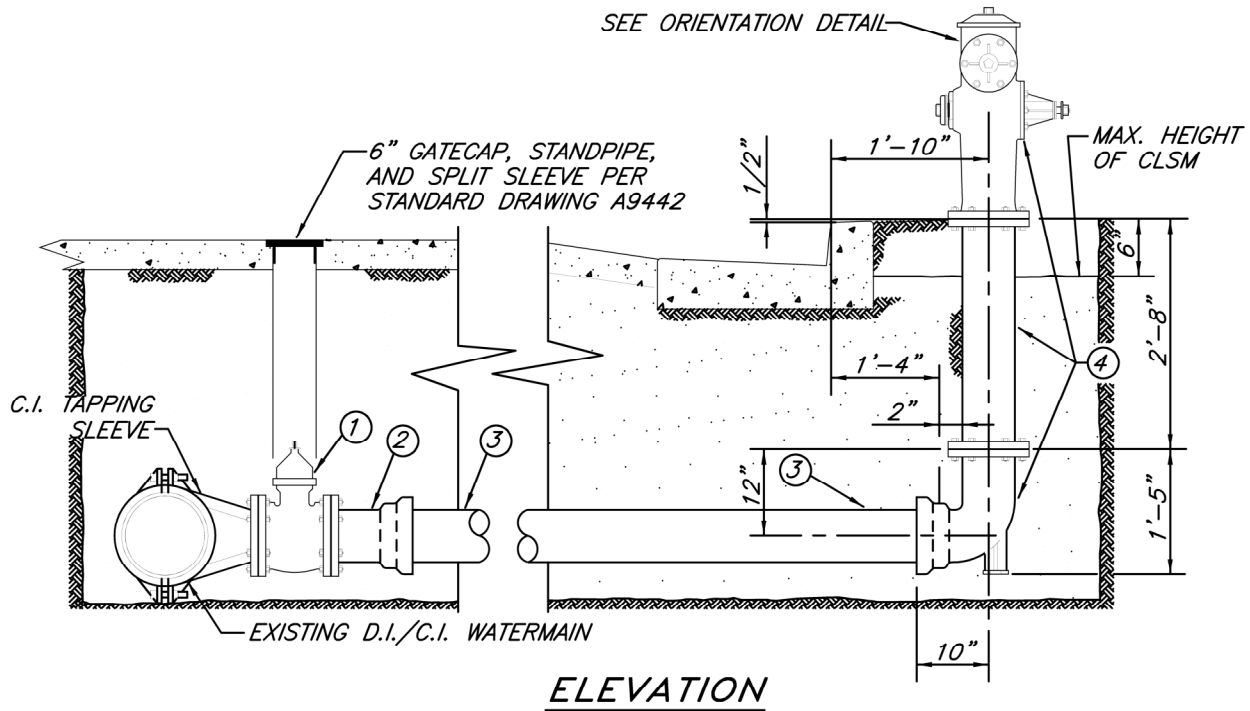
**ORIENTATION
DETAIL**

ITEM	QTY.	MATERIAL DESCRIPTION
1	1	6" X 250# D.I. FLANGED GATE VALVE
2	1	6" D.I. R.G. FLANGE/BELL ADAPTOR AWWA
3	*	6" X 0.31" D.I. R.G. PIPE AWWA
4	1	2-1/2" X 4" DOUBLE-OUTLET F.H. ASSEMBLY

DOUBLE-OUTLET FIRE HYDRANT INSTALLATION (D.I. PIPE) TEE CONN.

REVISIONS				DEPARTMENT OF WATER AND POWER WATER SYSTEM			
NO.	DATE	INIT.	APP'D	DESIGNED	NAME	DATE	APPROVED

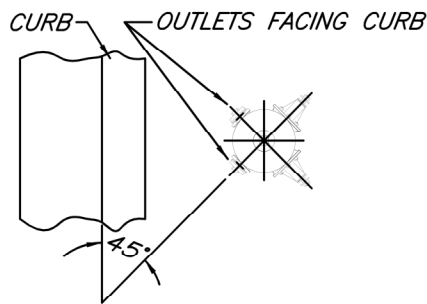
PC9456-1



ELEVATION

NOTES:

1. THIS FIRE HYDRANT INSTALLATION IS GENERALLY USED WHEN CONNECTING TO AN EXISTING D.I./C.I. WATER MAIN. LARGER THAN 6 INCHES.
2. ALL PUSH-ON JOINTS SHALL BE RESTRAINED WITH JOINT-LOCK GASKETS.
3. LENGTH OF LATERAL IS DEFINED AS THE DISTANCE MEASURED ALONG THE LATERAL FROM THE MAIN TO THE CURB FACE OR TO THE FIRE HYDRANT IN THE ABSENCE OF CURB.
4. SEE STANDARD DRAWING PC9461 FOR PLACEMENT OF FIRE HYDRANTS IN THE ABSENCE OF A LEVEL PAD.
5. BACKFILL SHALL BE 50 PSI CLSM (SLURRY).



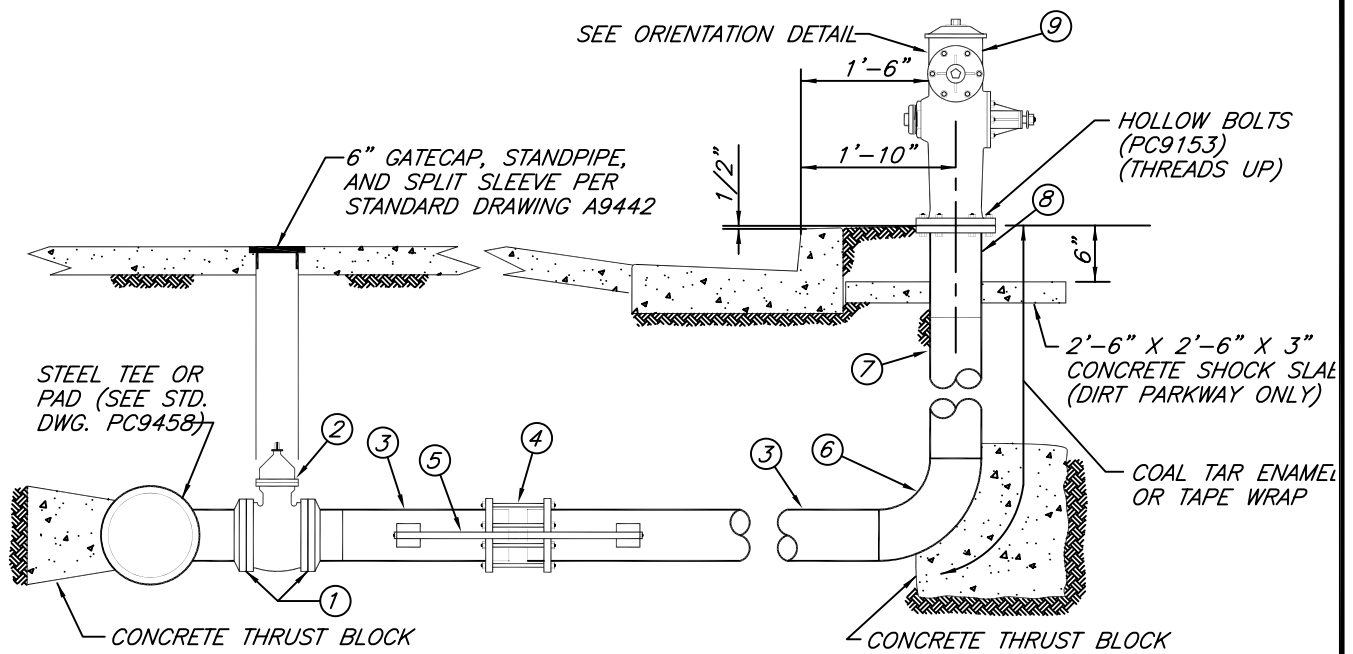
**ORIENTATION
DETAIL**

ITEM	QTY.	MATERIAL DESCRIPTION
1	1	6" X 250# D.I. FLANGED GATE VALVE
2	1	6" DI-A RG FLANGE/BELL ADAPTOR AWWA
3	VAR.	6" X 0.31" D.I. R.G. PIPE AWWA
4	1	2-1/2" X 4" DOUBLE-OUTLET F.H. ASSEMBLY

HOT-TAP DOUBLE-OUTLET FIRE HYDRANT INSTALLATION (EXISTING D.I., C.I. PIPE)

REVISIONS					DEPARTMENT OF WATER AND POWER WATER SYSTEM			
NO.	DATE	INIT.	APP'D		DESIGNED	NAME	DATE	APPROVED

PC9456-2

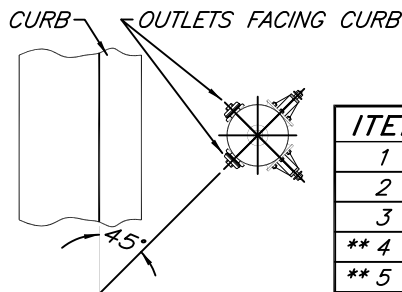


ELEVATION

NOTES:

1. THIS FIRE HYDRANT INSTALLATION IS GENERALLY USED WHEN CONNECTING TO AN EXISTING *** OR PROPOSED STEEL WATER MAIN WITH A MAXIMUM STATIC PRESSURE OF 200 PSI OR LESS.
2. PROVIDE CATHODIC PROTECTION IN ACCORDANCE WITH LATEST DWPWS STANDARDS.
- *3. LENGTH OF LATERAL IS DEFINED AS THE DISTANCE MEASURED ALONG THE LATERAL FROM THE MAIN TO THE CURB FACE OR TO THE FIRE HYDRANT IN THE ABSENCE OF CURB.
4. SEE STANDARD DRAWING A9461 FOR PLACEMENT OF FIRE HYDRANTS IN THE ABSENCE OF A LEVEL PAD.

*** SIZE ON SIZE CONNECTION SHALL NOT BE ALLOWED; A DROP-IN TEE SHALL BE REQUIRED.



**ORIENTATION
DETAIL**

ITEM	QTY.	MATERIAL DESCRIPTION
1	2	6" X 150# STEEL WELD NECK FLANGE
2	1	6" X 250# D.I. FLANGED GATE VALVE
3	*	6-5/8" O.D. X 1/4" EN. UC., C.L. & C., S.J. WLD STL. PIPE
**4	1	6" STEEL MECHANICAL COUPLING (NON-INSULATING)
**5	1	ANCHOR BOX ASSEMBLY PER STD. DWG. A9194
6	1	6" X 90' LONG RADIUS STEEL WELD ELBOW
7	3±	6-5/8" O.D. X 1/4" EN. UC., C.L. & C., S.J., WLD STL. PIPE
8	1	6" F.H. STEEL WELD NECK FLANGE (6 11/16" HOLES EQUALLY SPACED ON 9.375" B.C.)
9	1	2-1/2" X 4" (OR 4" X 4") DOUBLE-OUTLET F.H. TOP

** REQUIRED ONLY IF LENGTH OF LATERAL EXCEEDS 10'.

DOUBLE-OUTLET FIRE HYDRANT INSTALLATION (STEEL PIPE) ≤ 200#

REVISIONS				DEPARTMENT OF WATER AND POWER WATER SYSTEM			
NO.	DATE	INIT.	APP'D	NAME		DATE	APPROVED
▲	6/23	W.M	REVISED NOTES & CALLOUTS	A.P.	L. NUNO	1-90	APPROVED BY
					V. TOROMANIA	3-92	B. WEINSTEIN
					L. NUNO	3-92	MONTH 'YR
							JUNE '92

PC9456-3

6" GATECAP, STANDPIPE,
AND SPLIT SLEEVE PER
STANDARD DRAWING PC9442

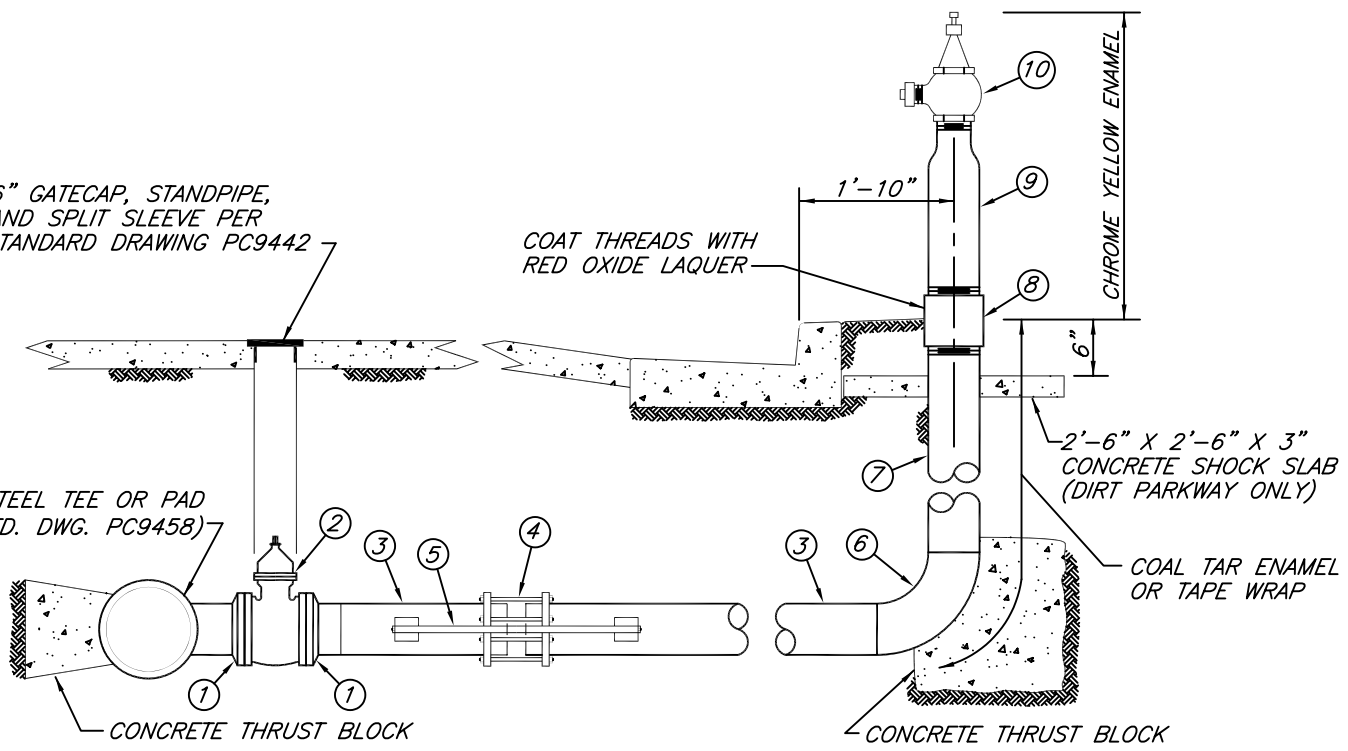
STEEL TEE OR PAD
(STD. DWG. PC9458)

COAT THREADS WITH
RED OXIDE LAQUER

CHROME YELLOW ENAMEL

2'-6" X 2'-6" X 3"
CONCRETE SHOCK SLAB
(DIRT PARKWAY ONLY)

COAL TAR ENAMEL
OR TAPE WRAP



ELEVATION

NOTES:

1. THIS FIRE HYDRANT INSTALLATION IS GENERALLY USED WHEN CONNECTING TO AN EXISTING OR PROPOSED STEEL WATER MAIN WITH A MAXIMUM STATIC PRESSURE GREATER THAN 210 PSI BUT EQUAL TO OR LESS THAN 250 PSI. SINGLE "BUILT-UP" 2-1/2 INCH OUTLET HYDRANT ARE REQUIRED IN AREAS HAVING A STATIC WATER PRESSURE OF 210 PSI OR MORE PER THE 2020 CITY OF LOS ANGELES FIRE CODE.
2. PROVIDE CATHODIC PROTECTION IN ACCORDANCE WITH LATEST DWPWS CORROSION STANDARDS.
- *3. LENGTH OF LATERAL IS DEFINED AS THE DISTANCE MEASURED ALONG THE LATERAL FROM THE MAIN TO THE CURB FACE OR TO THE FIRE HYDRANT IN THE ABSENCE OF CURB.
4. SEE STANDARD DRAWING PC9459 AND PC9460 FOR PLACEMENT OF FIRE HYDRANTS IN THE ABSENCE OF A CURB.
5. SEE STANDARD DRAWING PC9461 FOR PLACEMENT OF FIRE HYDRANT IN THE ABSENCE OF A LEVEL PAD.
6. SIZE ON SIZE CONNECTION SHALL NOT BE ALLOWED DROP-IN TEE IS REQUIRED

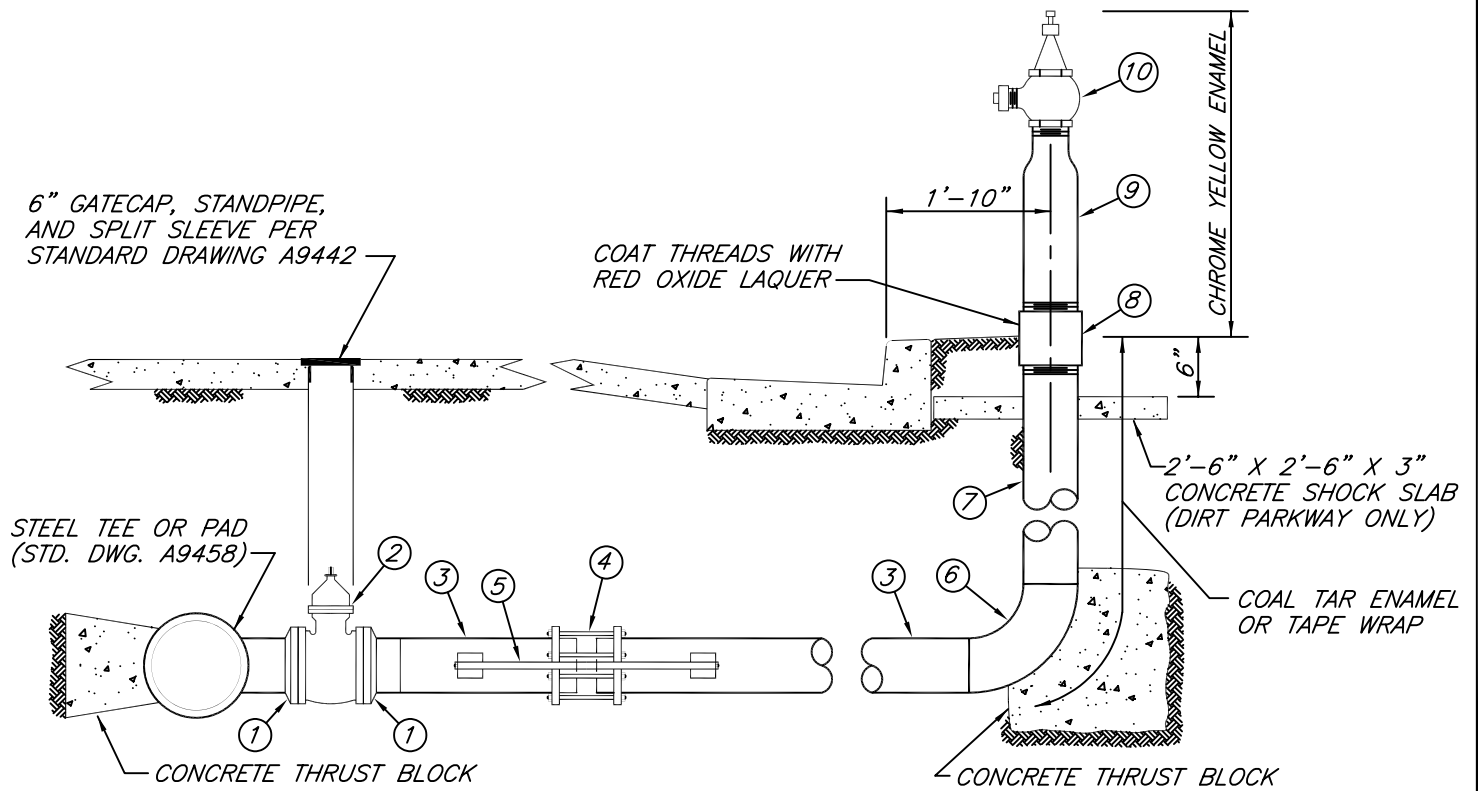
ITEM	QTY.	MATERIAL DESCRIPTION
1	2	6" X 150# STEEL WELD NECK FLANGE
2	1	6" X 300# D.I. FLANGED GATE VALVE
3	VAR.	6-5/8" O.D. X 1/4" EN. UC., C.L. & C., S.J. WELDED STEEL PIPE
** 4	1	6" STEEL MECHANICAL COUPLING (NON-INSULATING)
** 5	1	ANCHOR BOX ASSEMBLY PER STD. DWG. PC9194
6	1	6" X 90° LONG RADIUS STEEL WELD ELBOW
7	1	6-5/8" O.D. X 1/4" X 38" EN. UC., C.L. & C., STEEL WELD THREADED NIPPLE
8	1	6" STANDARD GALVANIZED STEEL COUPLING
9	1	6" X 4" X 24" STEEL SWAGED NIPPLE
10	1	4" X 2-1/2" FIRE HYDRANT ANGLE VALVE

** REQUIRED ONLY IF LENGTH OF LATERAL EXCEEDS 10'.

2-1/2" BUILT-UP FIRE HYDRANT INSTALLATION (210-250 PSI)

REVISIONS				DEPARTMENT OF WATER AND POWER WATER SYSTEM			
NO.	DATE	INIT.	APP'D	DESIGNED	NAME	DATE	APPROVED
1	10/16	F.C.			D.S. WALL	4-92	B. WEINSTEIN
					D.S. WALL	4-92	JUNE '92
					C. HAMVAS	4-92	

PC9457-1



ELEVATION

NOTES:

1. THIS FIRE HYDRANT INSTALLATION IS GENERALLY USED WHEN CONNECTING TO AN EXISTING OR PROPOSED STEEL WATER MAIN WITH A MAXIMUM STATIC PRESSURE GREATER THAN 210 PSI BUT EQUAL TO OR LESS THAN 250 PSI. SINGLE "BUILT-UP" 2-1/2 INCH OUTLET HYDRANT ARE REQUIRED IN AREAS HAVING A STATIC WATER PRESSURE OF 210 PSI OR MORE PER THE 2020 CITY OF LOS ANGELES FIRE CODE.
2. PROVIDE CATHODIC PROTECTION IN ACCORDANCE WITH LATEST DWPWS CORROSION STANDARDS.
- *3. LENGTH OF LATERAL IS DEFINED AS THE DISTANCE MEASURED ALONG THE LATERAL FROM THE MAIN TO THE CURB FACE OR TO THE FIRE HYDRANT IN THE ABSENCE OF CURB.
4. SEE STANDARD DRAWING PC9459 AND PC9460 FOR PLACEMENT OF FIRE HYDRANTS IN THE ABSENCE OF A CURB.
5. SEE STANDARD DRAWING PC9461 FOR PLACEMENT OF FIRE HYDRANT IN THE ABSENCE OF A LEVEL PAD.
6. SIZE ON SIZE CONNECTION SHALL NOT BE ALLOWED DROP-IN TEE IS REQUIRED

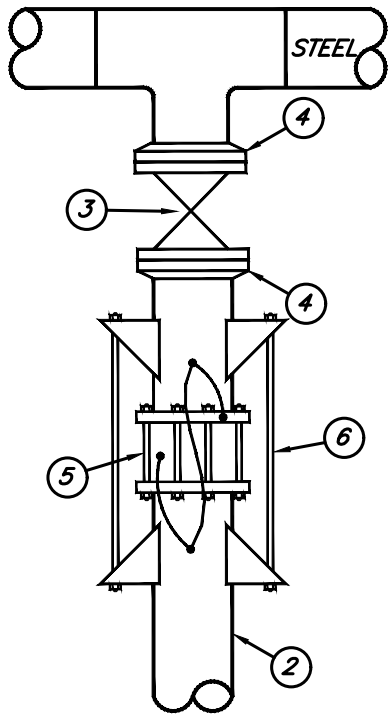
ITEM	QTY.	MATERIAL DESCRIPTION
1	2	6" X 300# STEEL WELD NECK FLANGE
2	1	6" X 300# D.I. FLANGED GATE VALVE
3	VAR.	6-5/8" O.D. X 1/4" EN. UC., C.L. & C., S.J. WELDED STEEL PIPE
** 4	1	6" STEEL MECHANICAL COUPLING (NON-INSULATING)
** 5	1	ANCHOR BOX ASSEMBLY PER STD. DWG. A9194
6	1	6" X 90° LONG RADIUS STEEL WELD ELBOW
7	1	6-5/8" O.D. X 1/4" X 38" EN. UC., C.L. & C., STEEL WELD THREADED NIPPLE
8	1	6" STANDARD GALVANIZED STEEL COUPLING
9	1	6" X 4" X 24" STEEL SWAGED NIPPLE
10	1	4" X 2-1/2" FIRE HYDRANT ANGLE VALVE

** REQUIRED ONLY IF LENGTH OF LATERAL EXCEEDS 10'.

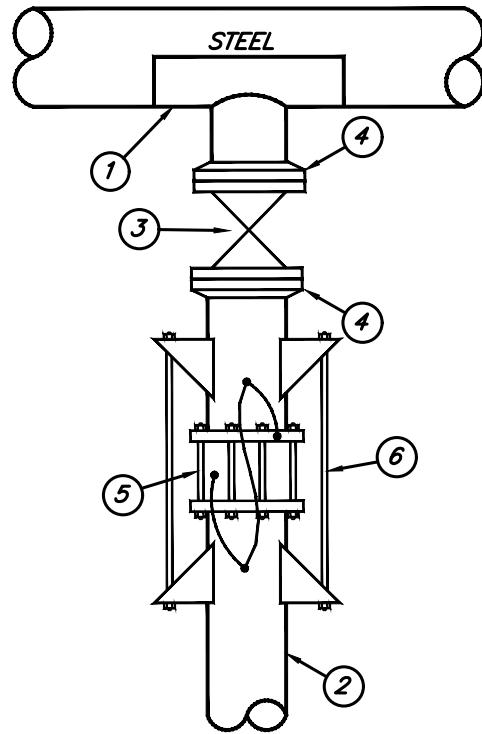
2-1/2" BUILT-UP FIRE HYDRANT INSTALLATION (>250#)

REVISIONS				DEPARTMENT OF WATER AND POWER			
NO.	DATE	INIT.	APP'D	WATER SYSTEM		CITY OF LOS ANGELES	
△	10/16	F.C.	REVIEWED - NO CHANGE	DESIGNED	D.S. WALL	DATE	4-92
				DRAWN	D.S. WALL	APPROVED	B. WEINSTEIN
				CHECKED	C. HAMVAS		JUNE '92

PC9457-2



ALL MAIN SIZES



8" MAIN OR LARGER

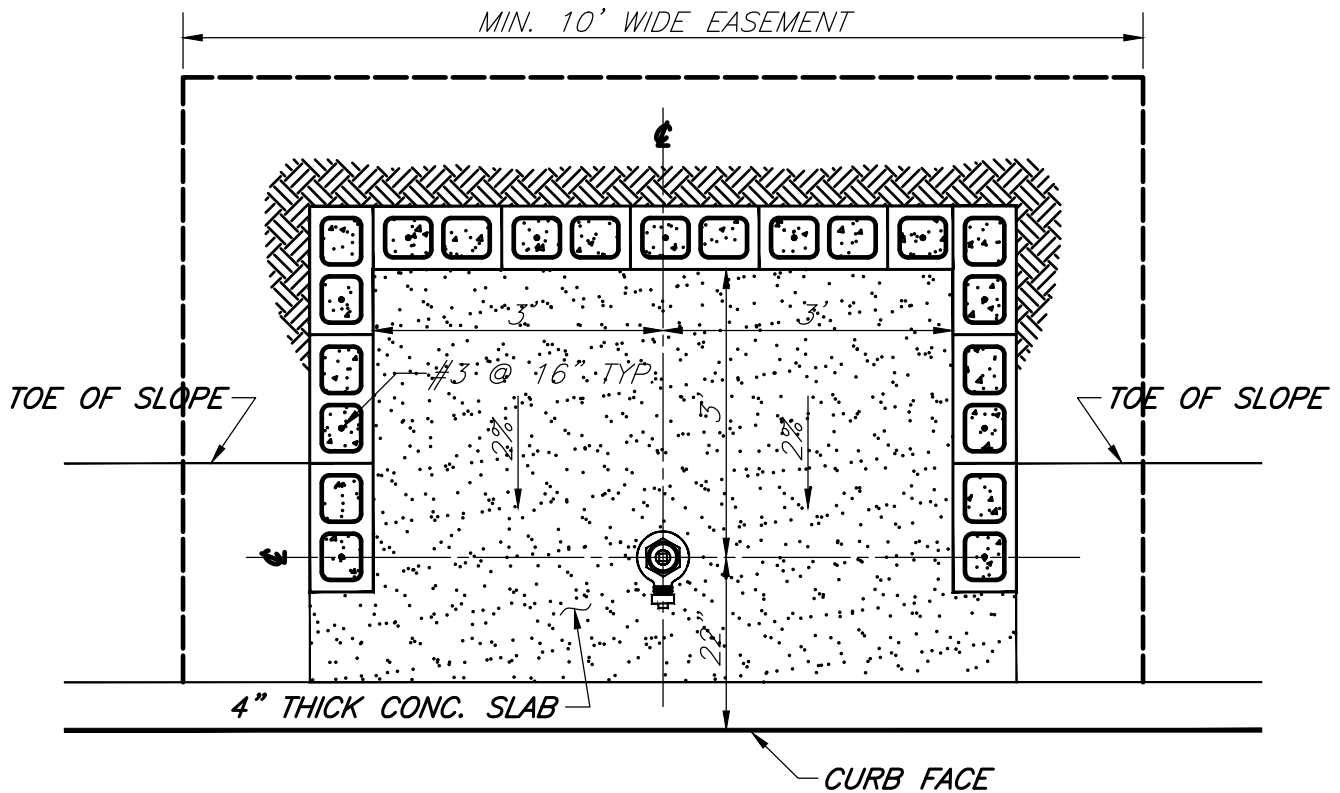
ITEM	QTY.	MATERIAL DESCRIPTION
1	1	12" X 12" x 3/8" STL. WELD PAD
2	-	6-5/8" O.D. X 1/4" EN. UC., C.L. & C., S.J., WLD STL. PIPE
3	1	6" D.I. FLANGED GATE VALVE
4	2	6" STEEL WELD NECK FLANGE
*5	1	6" STEEL MECHANICAL COUPLING (NON-INSULATING)
*6	1	ANCHOR BOX ASSEMBLY PER STD. DWG. PC9194

* REQUIRED ONLY IF LENGTH OF LATERAL EXCEEDS 10'.

FIRE HYDRANT CONNECTION TO STEEL PIPE

REVISIONS				DEPARTMENT OF WATER AND POWER WATER SYSTEM			
NO.	DATE	INIT.	APP'D	NAME		APPROVED	
10/16	F.C.			DESIGNED	D. S. WALL	4-92	B. WEINSTEIN
				DRAWN	D. S. WALL	4-92	JUNE '92
				CHECKED	C. HAMVAS	4-92	

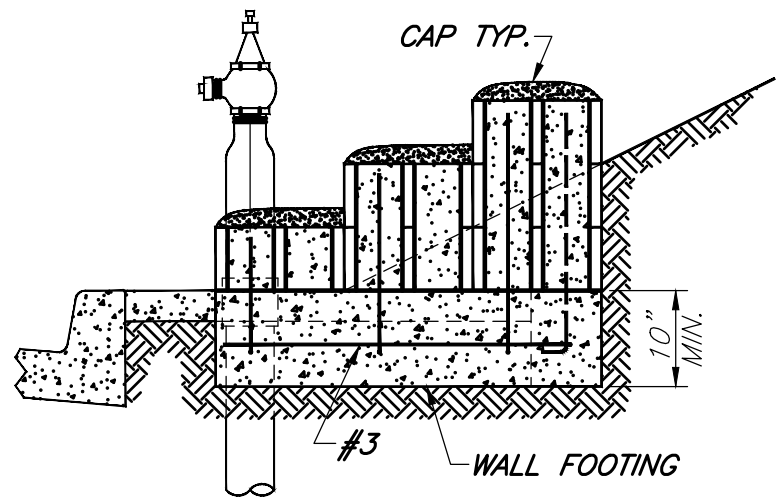
PC9458



HORIZONTAL SECTION
N.T.S.

NOTES:

1. HEIGHT OF WALL SHALL BE ONE BLOCK ABOVE GROUND
2. FILL ALL CELLS WITH GROUT.
3. CAP ALL CELLS WITH MORTAR.
4. CONCRETE SHALL BE CLASS 560-C-3250 IN ACCORDANCE WITH "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 201-1.1.2.
5. WALL OVER 5' HIGH WILL REQUIRE SPECIAL PERMIT.
- △ 6. WALL SHALL NOT BE INSTALLED IN SIDEWALK.

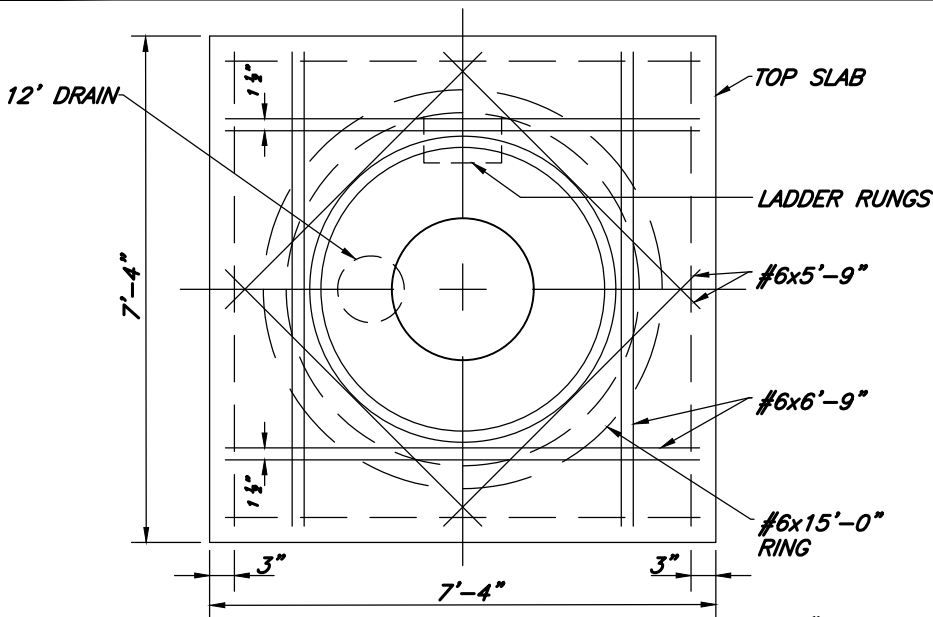


WALL SIDE SECTION
N.T.S.

FIRE HYDRANT RETAINING WALL

REVISIONS				DEPARTMENT OF WATER AND POWER			
NO.	DATE	INIT.	APP'D	WATER SYSTEM		CITY OF LOS ANGELES	
△ 10/16	T.L.	ADD NOTES		DESIGNED	V. TOROMANIAN	DATE	4-1992
				DRAWN	V. TOROMANIAN	APPROVED	B. WEINSTEIN
				CHECKED	C. HAMVAS		JUNE '92

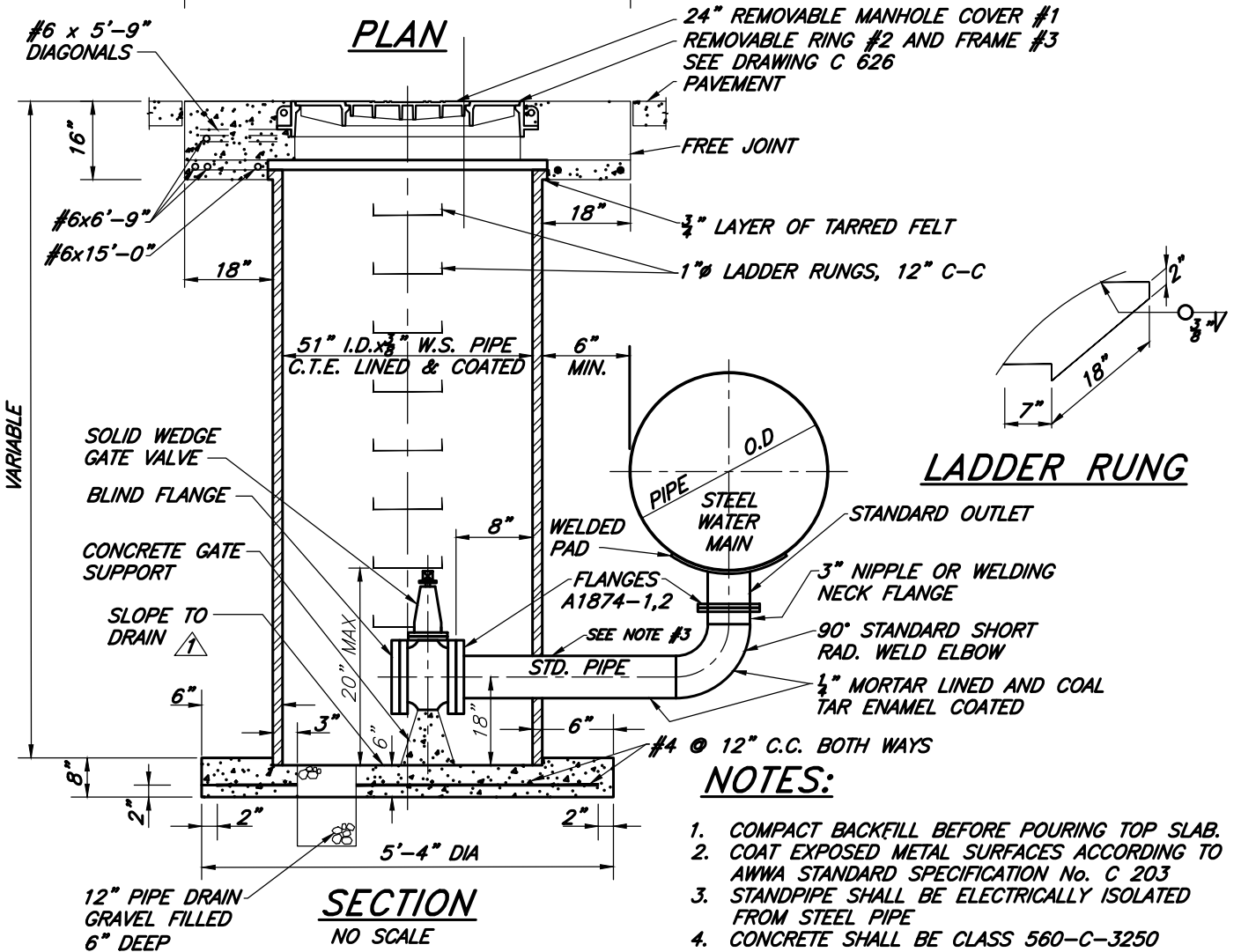
PC9461



PART LIST

- 1-24" MANHOLE COVER #1
- 1-REMOVABLE RING #2
- 1-MANHOLE FRAME #3
- 1-BLIND FLANGE
- 2-FLANGES
- 1-STD. SHORT RAD. WELD ELBOW
- 4'±STANDARD PIPE
- 1 1/2'-12"Ø STANDARD PIPE (SALVAGE)
- 2.6 CUBIC YARDS OF CONCRETE
- 253 # REINFORCE STEEL
- 206 # PER LIN. FT. OF STANDPIPE
- 6.7 # PER EACH LADDER RUNG
- BOLTS, NUTS, AND BASKETS AS REQUIRED
- 1-SOLID WEDGE GATE VALVE

PLAN



NOTES:

1. COMPACT BACKFILL BEFORE POURING TOP SLAB.
2. COAT EXPOSED METAL SURFACES ACCORDING TO AWWA STANDARD SPECIFICATION No. C 203
3. STANDPIPE SHALL BE ELECTRICALLY ISOLATED FROM STEEL PIPE
4. CONCRETE SHALL BE CLASS 560-C-3250

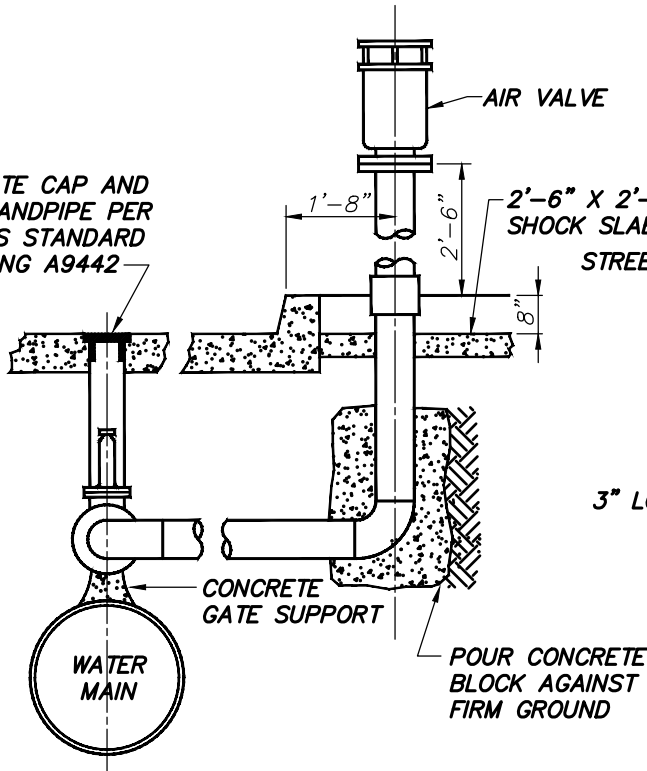
BLOW-OFF INSTALLATION FOR 16" AND LARGER STEEL PIPE

NO. DATE INIT.		REVISIONS	APP'D
1	10/16	K.C. ADDED NOTE	

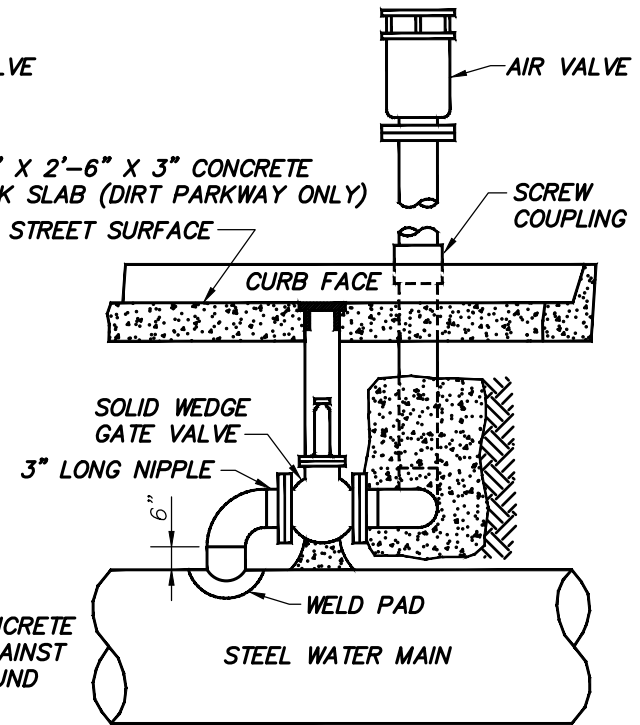
DEPARTMENT OF WATER AND POWER			
WATER SYSTEM			
NAME		DATE	APPROVED
DESIGNED	N.J.C.; E.R.W.; L.N.	11-86	
DRAWN	A. SAVULIAN	11-86	
CHECKED	G & S	12-86	

PC9462

6" GATE CAP AND
6" STANDPIPE PER
DWPWS STANDARD
DRAWING A9442



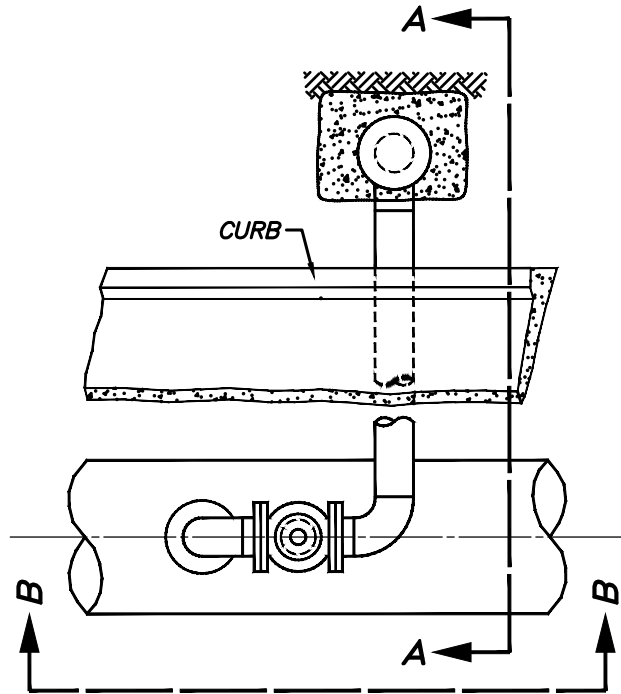
A-A
NTS



B-B
NTS

NOTES:

1. ENAMEL AND APPLY CEMENT MORTAR COATING AND LINING IN ACCORDANCE WITH AWWA STANDARD SPECIFICATION NO. C-203.
2. USE SHORT RADIUS WELDING ELBOWS (90°).
3. FLANGE DIAMETER AND DRILLING SHALL CONFORM TO ANSI B-16.1 FOR CLASS 125 AND CLASS 250 CAST IRON FLANGES.
4. APPLY A MINIMUM OF TWO COATS EACH OF RED OXIDE PRIMER AND ELLIS PAINT CO., HYLUX NO. 3548 METALLIC GREEN PAINT TO OUTSIDE SURFACES OF EXPOSED METAL.



PLAN
NTS

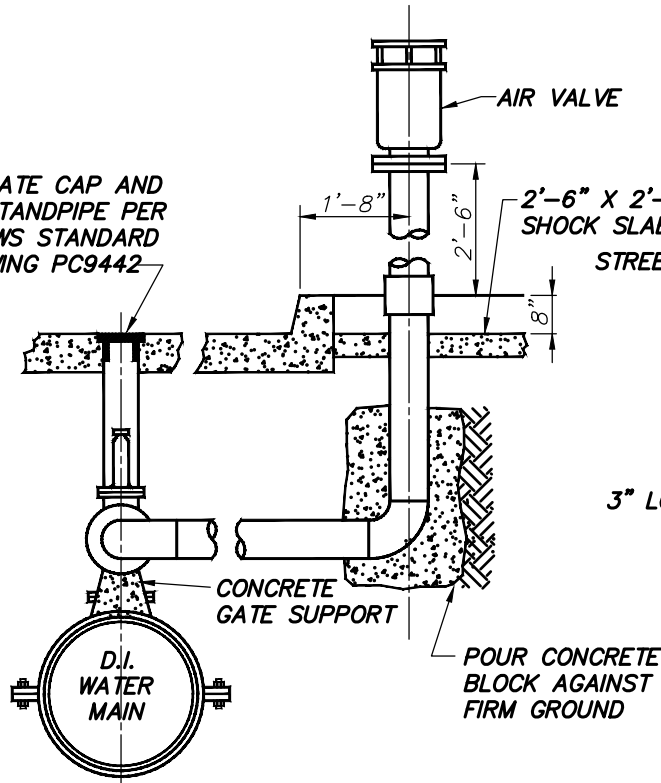
AIR VALVE ASSEMBLY
(FOR STEEL WATER MAIN) Δ

REVISIONS				APP'D
NO.	DATE	INIT.	ADD NOTES	
Δ 10/16		T.L.		

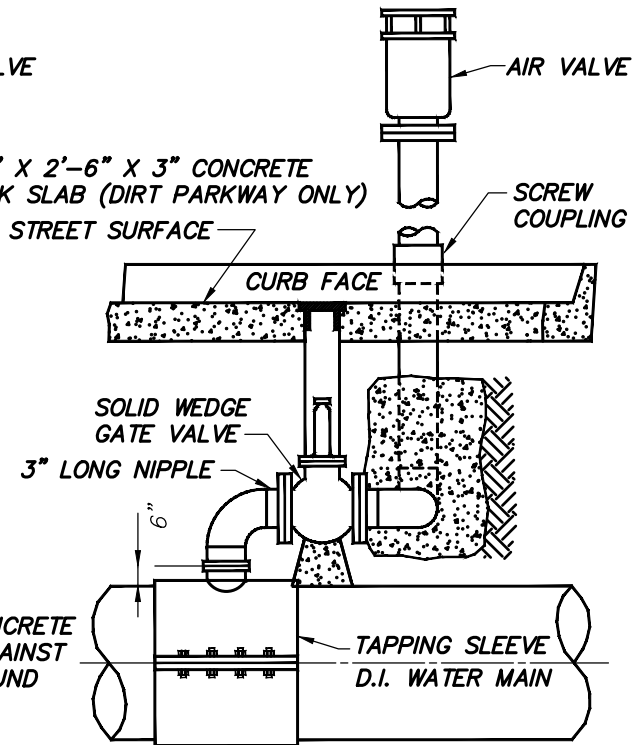
DEPARTMENT OF WATER AND POWER			
WATER SYSTEM			
CITY OF LOS ANGELES			
DESIGNED	NAME	DATE	APPROVED
	L. NUNO	11-1991	APPROVED BY _____ MONTH 'YR
	V. TOROMANIA	11-1991	
	L. NUNO	11-1991	

PC9463

6" GATE CAP AND
6" STANDPIPE PER
DWPWS STANDARD
DRAWING PC9442



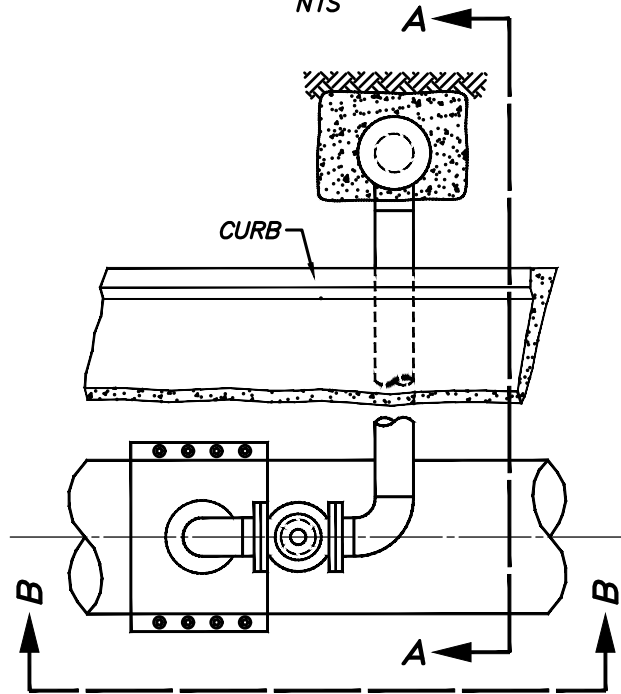
A-A
NTS



B-B
NTS

NOTES:

1. ENAMEL AND APPLY CEMENT MORTAR COATING AND LINING IN ACCORDANCE WITH AWWA STANDARD SPECIFICATION NO. C-203.
2. USE SHORT RADIUS WELDING ELBOWS (90°).
3. FLANGE DIAMETER AND DRILLING SHALL CONFORM TO ANSI B-16.1 FOR CLASS 125 AND CLASS 250 CAST IRON FLANGES.
4. APPLY A MINIMUM OF TWO COATS EACH OF RED OXIDE PRIMER AND ELLIS PAINT CO., HYLUX NO. 3548 METALLIC GREEN PAINT TO OUTSIDE SURFACES OF EXPOSED METAL.



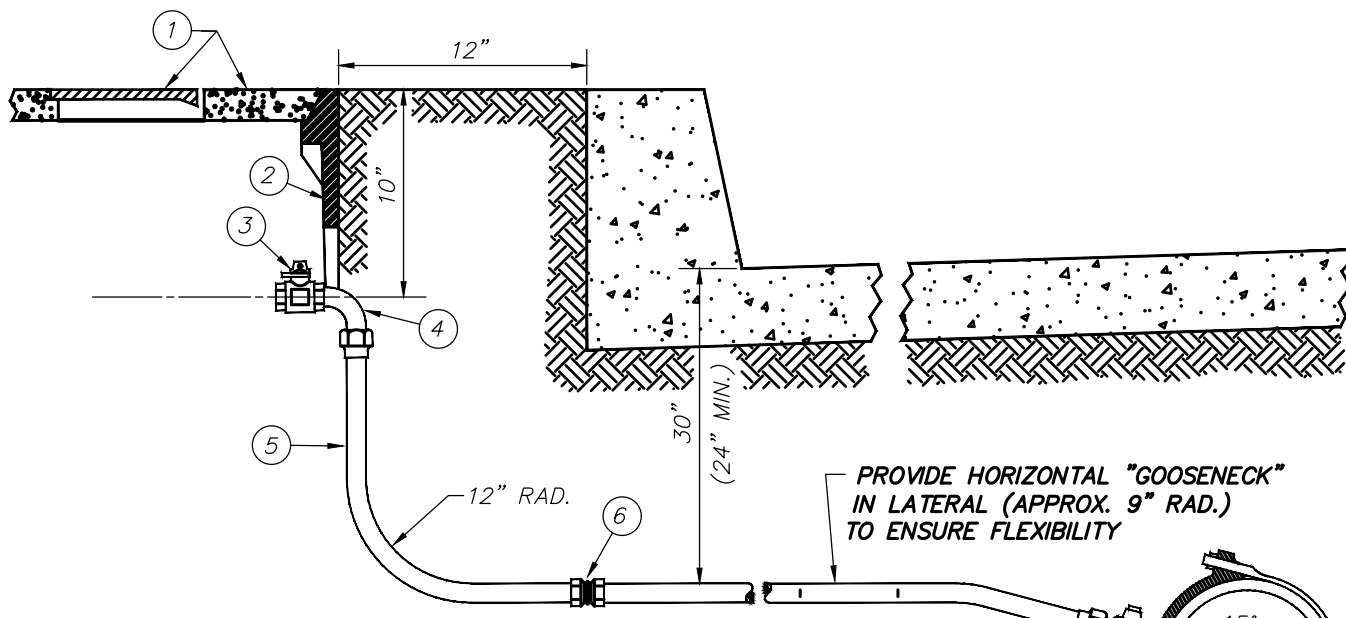
PLAN
NTS

AIR VALVE ASSEMBLY
(FOR DUCTILE IRON WATER MAIN)

REVISIONS			APP'D
NO.	DATE	INIT.	
1	10/16	T.L.	REVISED NOTES FOR D.I. APPLICATION

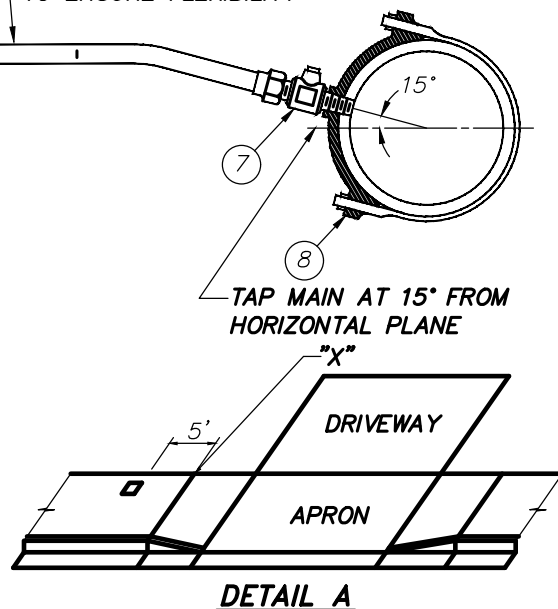
DEPARTMENT OF WATER AND POWER			
WATER SYSTEM		CITY OF LOS ANGELES	
DESIGNED	NAME	DATE	APPROVED
L. NUNO	L. NUNO	11-91	APPROVED BY
V. TOROMANIA	V. TOROMANIA	11-91	MONTH 'YR
L. NUNO	L. NUNO	11-91	

PC9463-1



NOTES:

1. METER BOXES SHALL BE LOCATED 5 FEET MIN. OUTSIDE THE TOP OF THE DRIVEWAY "X", SEE DETAIL A
2. LATERAL SHALL BE FLUSHED WITH WATER TO REMOVE DEBRIS.
3. SEE STANDARD DRAWING PC9476 FOR PIPE CONNECTION REQUIREMENTS.
4. COPPER FLARE (CF) FITTING SHALL BE INSTALLED IN AREAS WITH PRESSURE OVER 200 PSI..
5. ADD 10 MIL PVC TAPE 3 FT UP THE SERVICE LINE FROM THE MAIN.



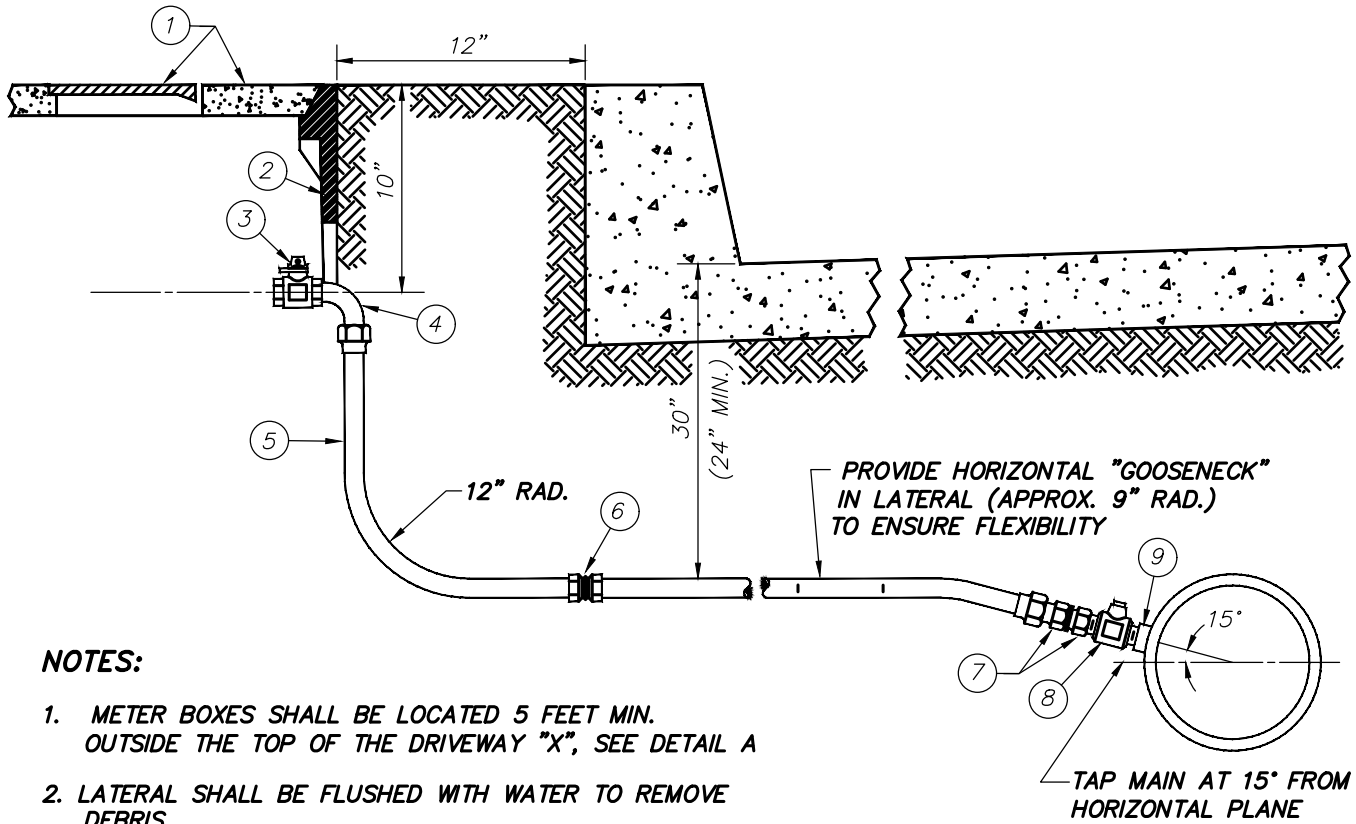
MATERIAL LIST

ITEM	QTY.	DESCRIPTION
1	1	#2 POLYMER CONCRETE HINGED COVER
2	1	#2 POLYMER CONCRETE METER BOX
3	1	1" BRONZE FEMALE N.P.T. CURB BALL VALVE W/LOCKWING
4	1	1" BRONZE FEMALE COMPRESSION COPPER TUBING TO MALE N.P.T. ELBOW
5	VAR.	1" COPPER TUBING
6	1	1" FEDERALLOY COMPRESSION COUPLING X COMPRESSION COUPLING OR COPPER FLARE COUPLING*
7	1	1" BRONZE MALE CORPORATION THREAD TO COPPER TUBING CORPORATION BALL VALVE
8	1	1" BRONZE CLAMP (SERVICE SADDLE) *IF NECESSARY

1" DOMESTIC SERVICE INSTALLATION (D.I. PIPE)

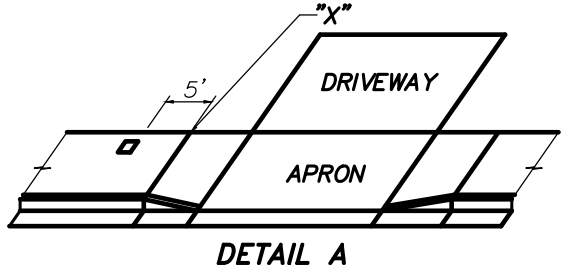
REVISIONS				DEPARTMENT OF WATER AND POWER					
NO.	DATE	INIT.	APP'D	WATER SYSTEM					
6-23	W.M.	REVISED NOTES & CALLOUTS	A.P.	CITY OF LOS ANGELES					
				DESIGNED	L. NUNO	DATE	1-90	APPROVED BY	MONTH 'YR
				DRAWN	V. TOROMANIA	DATE	3-92	B. WEINSTEIN	JUNE '92
				CHECKED	L. NUNO	DATE	3-92		

PC9465



NOTES:

1. METER BOXES SHALL BE LOCATED 5 FEET MIN. OUTSIDE THE TOP OF THE DRIVEWAY "X", SEE DETAIL A
2. LATERAL SHALL BE FLUSHED WITH WATER TO REMOVE DEBRIS.
3. SEE STANDARD DRAWING PC9477 FOR PIPE CONNECTION REQUIREMENTS.
4. COPPER FLARE (CF) FITTING SHALL BE INSTALLED IN AREAS WITH PRESSURE OVER 200 PSI..
5. ADD 10 MIL PVC TAPE 3 FT UP THE SERVICE LINE FROM THE MAIN.

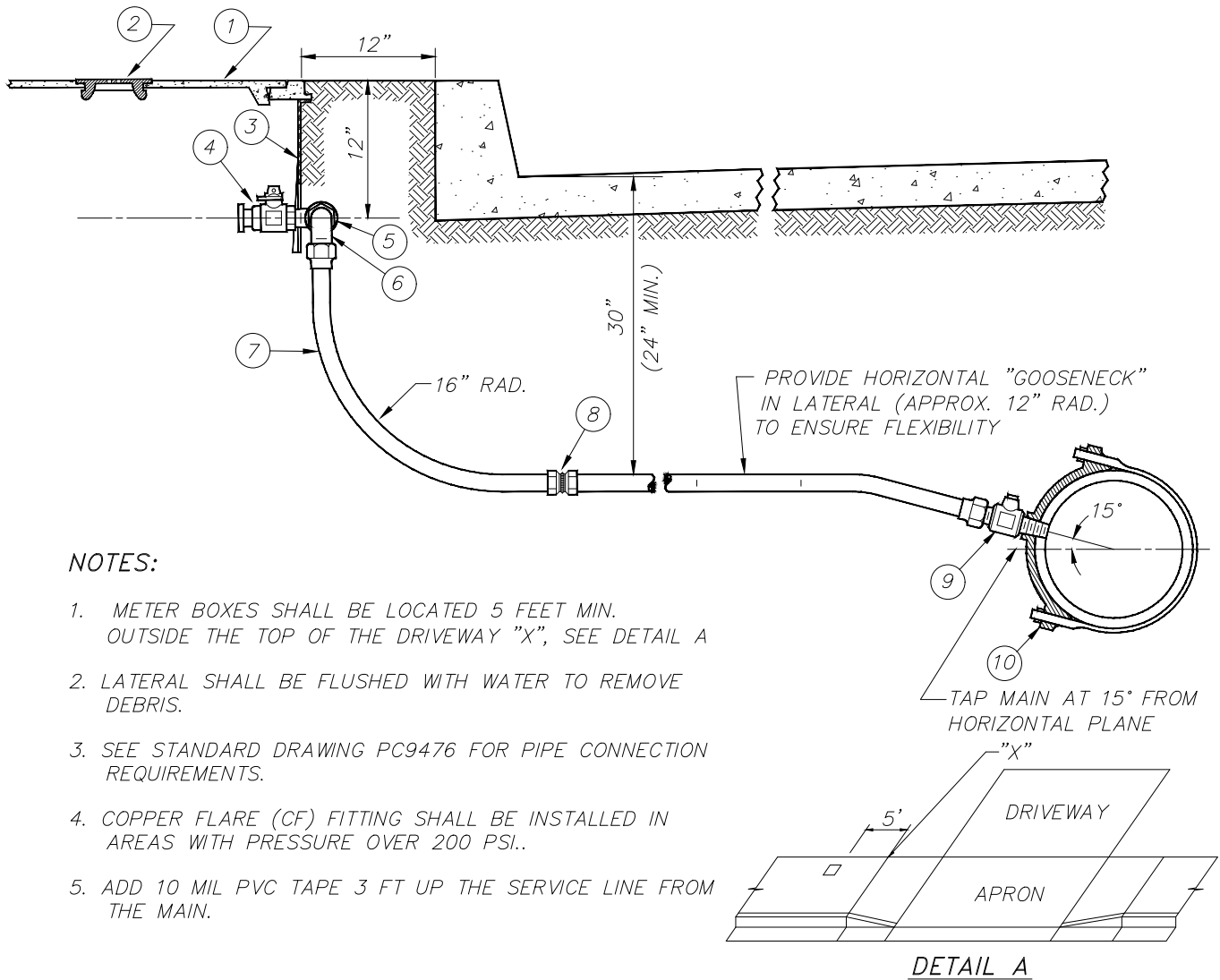


MATERIAL LIST		
ITEM	QTY.	DESCRIPTION
1	1	#2 CONCRETE HINGED COVER
2	1	#2 PLASTIC METER BOX
3	1	1" BRONZE FEMALE N.P.T. CURB BALL VALVE W/LOCKWING
4	1	1" FEDERALLOY FEMALE COMPRESSION COPPER TUBING TO MALE NPT ELBOW
5	VAR.	1" COPPER TUBING
6	1	1" FEDERALLOY COMPRESSION COUPLING X COMPRESSION COUPLING OR COPPER FLARE COUPLING*
7	1	1" FEDERALLOY INSULATING ADAPTOR
8	1	1" AWWA TAPER THREAD TO 1" COMPRESSION STYLE CORPORATION BALL VALVE (SEE NOTE #3)
9	1	1" STEEL CORPORATION THREAD WELD COUPLING *IF NECESSARY

1" DOMESTIC SERVICE INSTALLATION (STL. PIPE)

REVISIONS				DEPARTMENT OF WATER AND POWER							
NO.	DATE	INIT.	APP'D	WATER SYSTEM		CITY OF LOS ANGELES					
△	6-23	W.M.	REVISED NOTES & CALLOUTS	A.P.	DESIGNED	L. NUNO	DATE	1-90	APPROVED	APPROVED BY	MONTH 'YR
					DRAWN	V. TOROMANIA	DATE	3-92		B. WEINSTEIN	JUNE '92
					CHECKED	L. NUNO	DATE	3-92			

PC9466



NOTES:

1. METER BOXES SHALL BE LOCATED 5 FEET MIN. OUTSIDE THE TOP OF THE DRIVEWAY "X", SEE DETAIL A
2. LATERAL SHALL BE FLUSHED WITH WATER TO REMOVE DEBRIS.
3. SEE STANDARD DRAWING PC9476 FOR PIPE CONNECTION REQUIREMENTS.
4. COPPER FLARE (CF) FITTING SHALL BE INSTALLED IN AREAS WITH PRESSURE OVER 200 PSI..
5. ADD 10 MIL PVC TAPE 3 FT UP THE SERVICE LINE FROM THE MAIN.

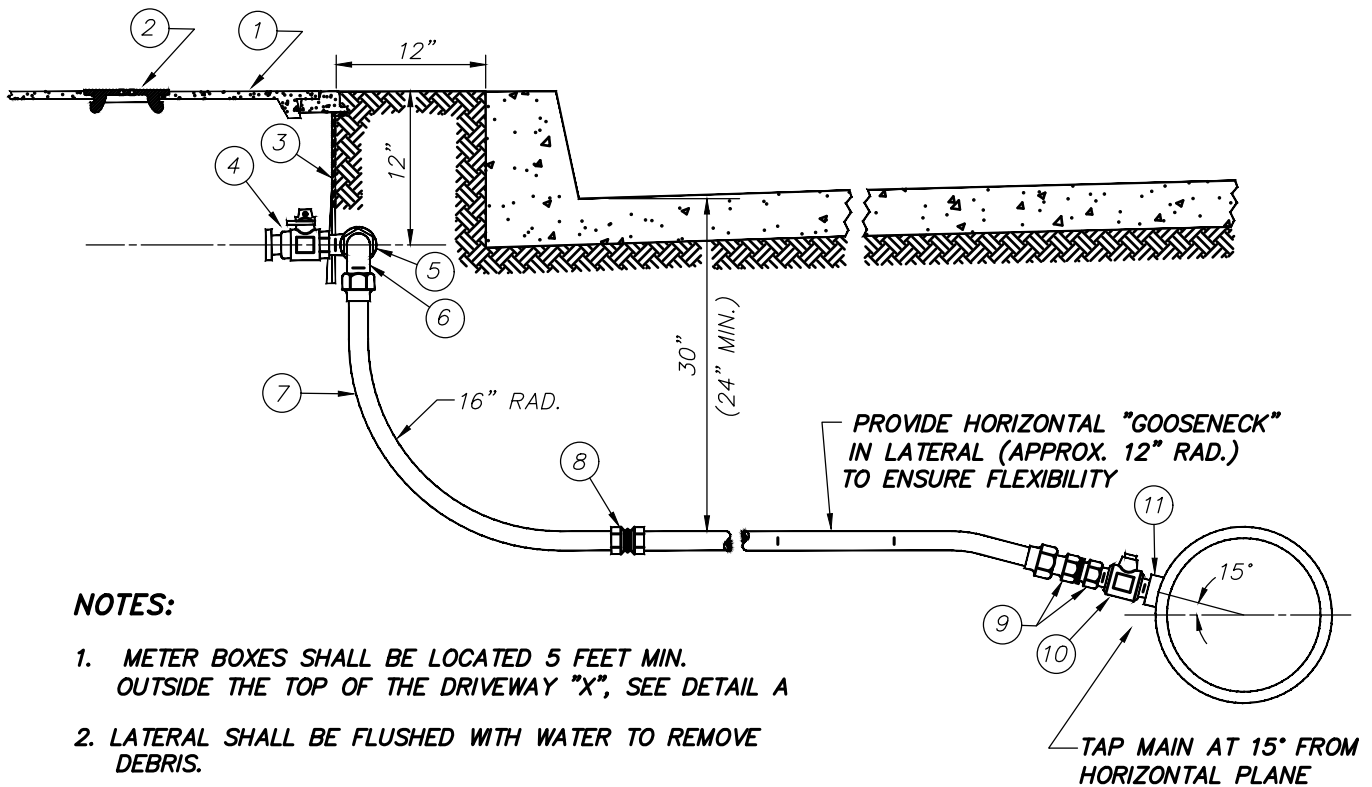
MATERIAL LIST		
ITEM	QTY.	DESCRIPTION
1	1	#3 REINFORCED POLYMER CONCRETE COVER
2	1	CAST IRON CENTERPIECE
3	1	#3 REINFORCED POLYMER CONCRETE METER BOX
4	1	1-1/2" BRZ. FLANGE CURB BALL VALVE W/LOCKWING
5	1	1-1/2" BRZ. STREET ELBOW
6	1	1-1/2" BRZ. FEMALE COMPRESSION COPPER TUBING TO MALE N.P.T. ELBOW
7	VAR.	1-1/2" COPPER TUBING
8	1	1" FEDERALLOY COMPRESSION COUPLING X COMPRESSION COUPLING OR COPPER FLARE COUPLING*
9	1	1-1/2" AWWA TAPER THREAD TO 1-1/2" COMPRESSION STYLE CORPORATION BALL VALVE (SEE NOTE #3)
10	1	1-1/2" BRONZE SERVICE SADDLE *IF NECESSARY

1-1/2" DOMESTIC SERVICE INSTALLATION (D.I. PIPE)

REVISIONS				APP'D
NO.	DATE	INIT.	REVISIONS	A.P.
1	6-23	W.M.	REVISED NOTES & CALLOUTS	

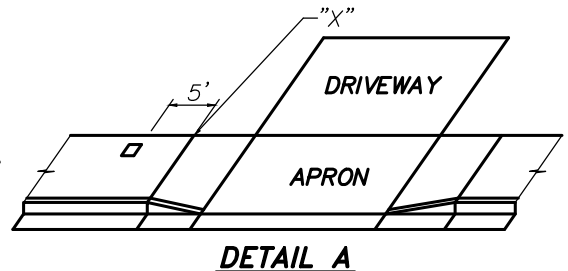
DEPARTMENT OF WATER AND POWER			
WATER SYSTEM		CITY OF LOS ANGELES	
DESIGNED	NAME	DATE	APPROVED
	L. NUNO	1-90	APPROVED BY MONTH 'YR
	V. TOROMANIA	3-92	B. WEINSTEIN JUNE '92
	L. NUNO	3-92	

PC9467



NOTES:

1. METER BOXES SHALL BE LOCATED 5 FEET MIN. OUTSIDE THE TOP OF THE DRIVEWAY "X", SEE DETAIL A
2. LATERAL SHALL BE FLUSHED WITH WATER TO REMOVE DEBRIS.
3. SEE STANDARD DRAWING PC9477 FOR PIPE CONNECTION REQUIREMENTS.
4. COPPER FLARE (CF) FITTING SHALL BE INSTALLED IN AREAS WITH PRESSURE OVER 200 PSI..
5. ADD 10 MIL PVC TAPE 3 FT UP THE SERVICE LINE FROM THE MAIN.



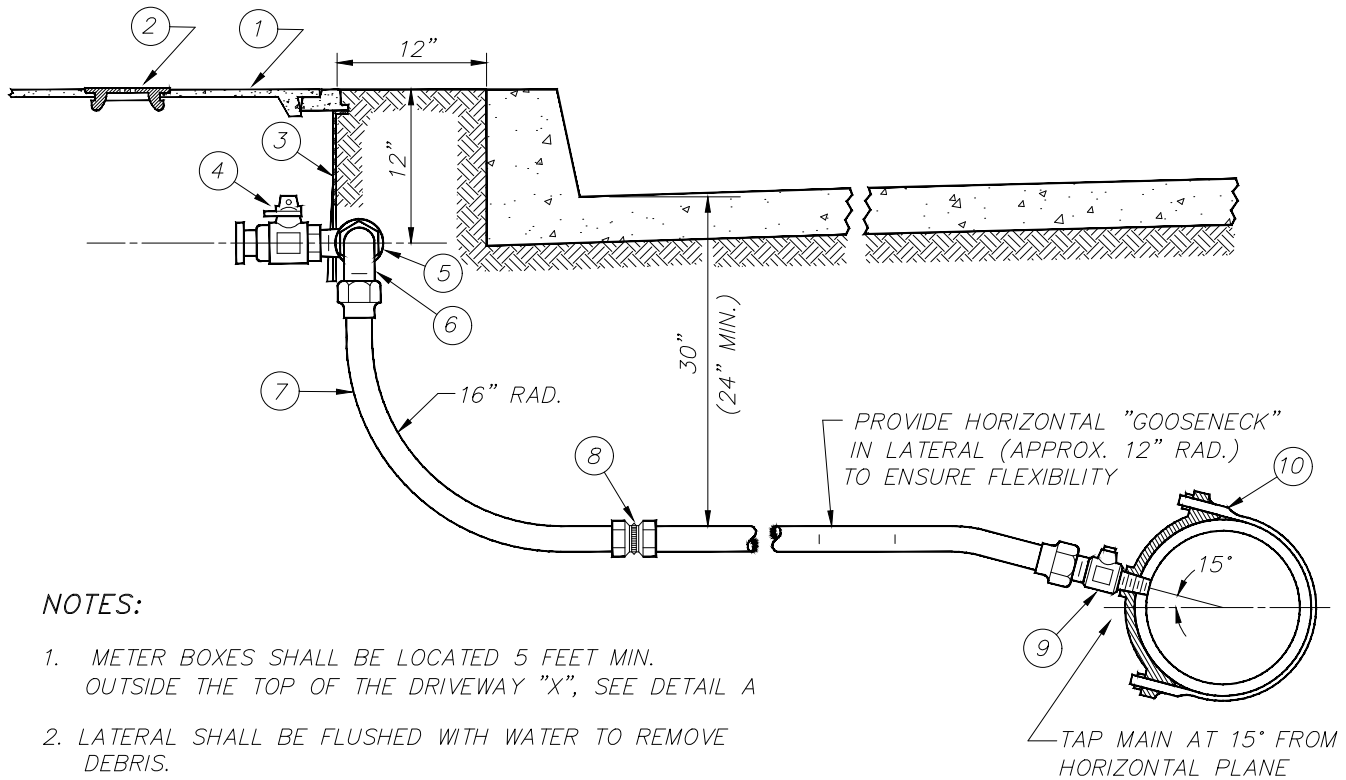
MATERIAL LIST

ITEM	QTY.	DESCRIPTION
1	1	#3 REINFORCED CONCRETE POLYMER COVER
2	1	CAST IRON CENTERPIECE
3	1	#3 PLASTIC METER BOX
4	1	1-1/2" FEDERALLOY FLANGE CURB BALL VALVE W/LOCKWING
5	1	1-1/2" BRZ. STREET ELBOW
6	1	1-1/2" FEDERALLOY FEMALE COMPRESSION COPPER TUBING TO MALE N.P.T. ELBOW
7	VAR.	1-1/2" COPPER TUBING
8	1	1-1/2" FEDERALLOY COMPRESSION COUPLING X COMPRESSION COUPLING OR COPPER FLARE COUPLING*
9	1	1-1/2" FEDERALLOY INSULATING ADAPTOR
10	1	1-1/2" AWWA TAPER THREAD TO 1-1/2" COMPRESSION STYLE CORPORATION BALL VALVE (SEE NOTE #3)
11	1	1-1/2" STEEL CORPORATION THREAD WELD COUPLING *IF NECESSARY

1-1/2" DOMESTIC SERVICE INSTALLATION (STL. PIPE)

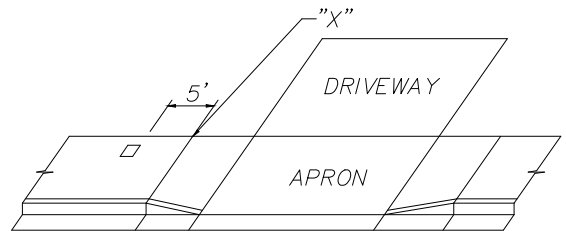
REVISIONS			DEPARTMENT OF WATER AND POWER WATER SYSTEM CITY OF LOS ANGELES			
NO.	DATE	INIT.	APP'D	NAME	DATE	APPROVED
6-23	W.M.		REVISED NOTES & CALLOUTS	L. NUNO	1-90	APPROVED BY MONTH 'YR
				V. TOROMANIA	3-92	B. WEINSTEIN JUNE '92
				L. NUNO	3-92	

PC9468



NOTES:

1. METER BOXES SHALL BE LOCATED 5 FEET MIN. OUTSIDE THE TOP OF THE DRIVEWAY "X", SEE DETAIL A
2. LATERAL SHALL BE FLUSHED WITH WATER TO REMOVE DEBRIS.
3. SEE STANDARD DRAWING PC9476 FOR PIPE CONNECTION REQUIREMENTS.
4. COPPER FLARE (CF) FITTING SHALL BE INSTALLED IN AREAS WITH PRESSURE OVER 200 PSI..
5. ADD 10 MIL PVC TAPE 3 FT UP THE SERVICE LINE FROM THE MAIN.



DETAIL A

MATERIAL LIST

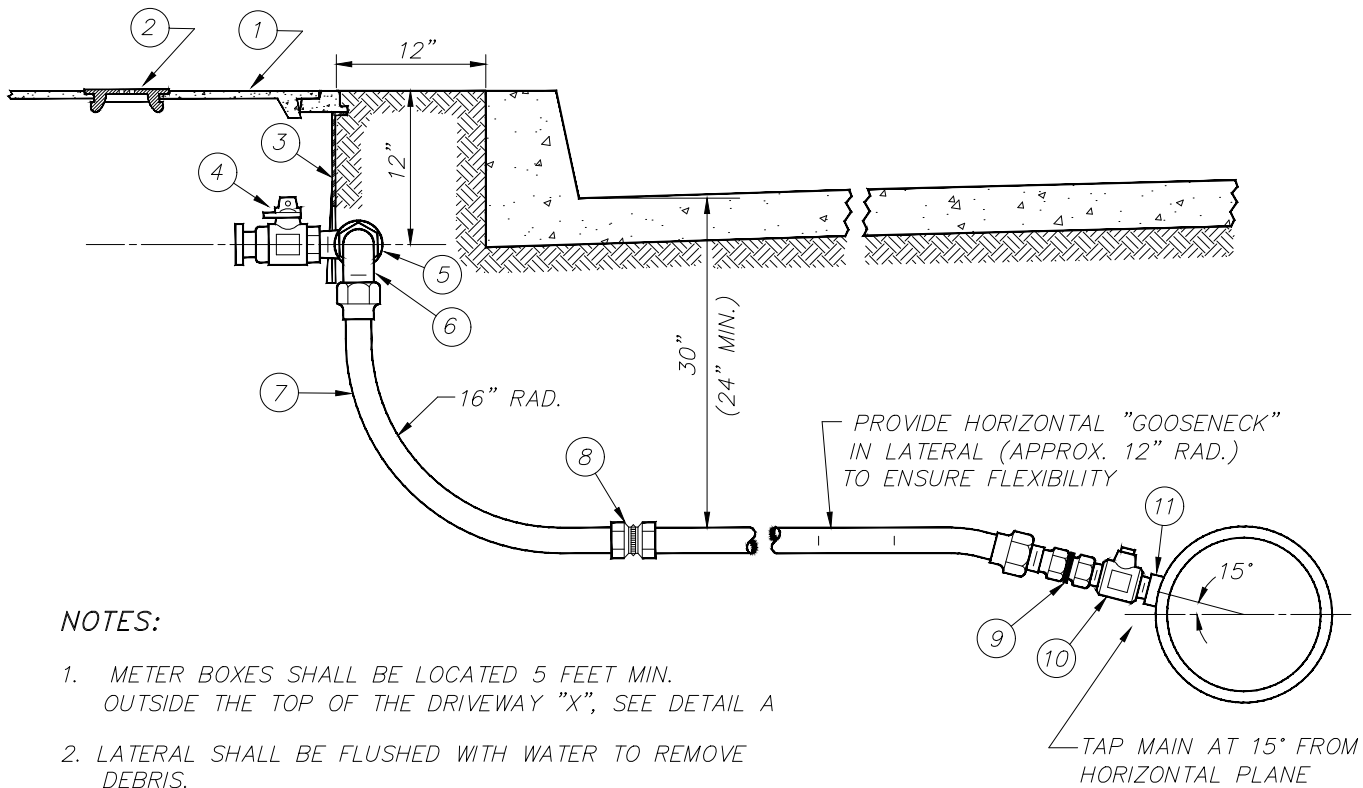
ITEM	QTY.	DESCRIPTION
1	1	#3 REINFORCED POLYMER CONCRETE COVER
2	1	CAST IRON CENTERPIECE
3	1	#3 REINFORCED POLYMER CONCRETE METER BOX
4	1	2" FEDERALLOY FLANGE CURB BALL VALVE W/LOCKWING
5	1	2" BRZ. STREET ELBOW
6	1	2" FEDERALLOY FEMALE COMPRESSION COPPER TUBING TO MALE N.P.T. ELBOW
7	VAR.	2" COPPER TUBING
8	1	2" FEDERALLOY COMPRESSION X COMPRESSION COUPLING OR COPPER FLARE COUPLING *
9	1	1-1/2" AWWA TAPER THREAD TO 2" COMPRESSION STYLE CORPORATION BALL VALVE (SEE NOTE #3)
10	1	1-1/2" X [MAIN DIA.] BRONZE SERVICE SADDLE *IF NECESSARY

2" DOMESTIC SERVICE INSTALLATION (D.I. PIPE)

REVISIONS			APP'D
NO.	DATE	INIT.	A.P.
1	6-23	W.M.	

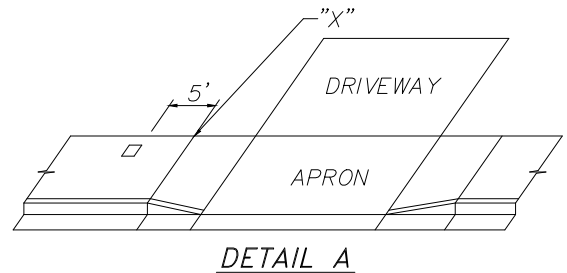
DEPARTMENT OF WATER AND POWER			
WATER SYSTEM			
CITY OF LOS ANGELES			
DESIGNED	NAME	DATE	APPROVED
	L. NUNO	1-90	APPROVED BY MONTH 'YR
DRAWN	V. TOROMANIA	3-92	B. WEINSTEIN JUNE '92
CHECKED	L. NUNO	3-92	

PC9469



NOTES:

1. METER BOXES SHALL BE LOCATED 5 FEET MIN. OUTSIDE THE TOP OF THE DRIVEWAY "X", SEE DETAIL A
2. LATERAL SHALL BE FLUSHED WITH WATER TO REMOVE DEBRIS.
3. SEE STANDARD DRAWING PC9477 FOR PIPE CONNECTION REQUIREMENTS.
4. COPPER FLARE (CF) FITTING SHALL BE INSTALLED IN AREAS WITH PRESSURE OVER 200 PSI..
5. ADD 10 MIL PVC TAPE 3 FT UP THE SERVICE LINE FROM THE MAIN.



MATERIAL LIST

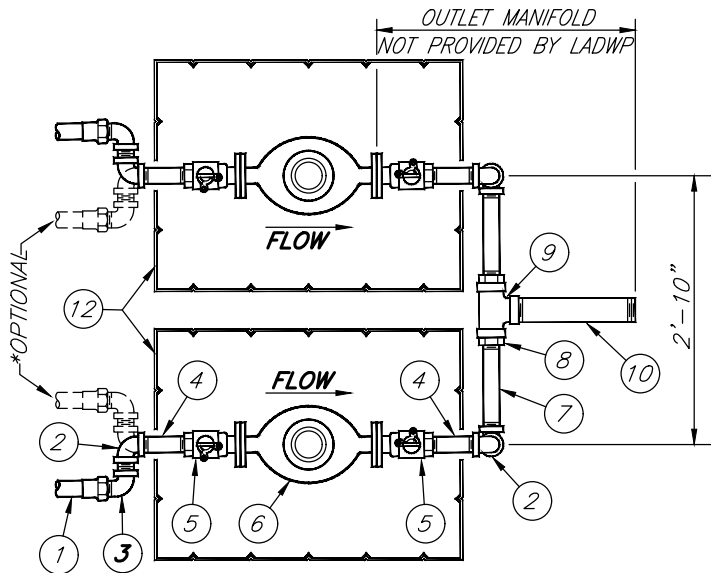
ITEM	QTY.	DESCRIPTION
1	1	#3 REINFORCED CONCRETE POLYMER COVER
2	1	CAST IRON CENTERPIECE
3	1	#3 REINFORCED POLYMER CONCRETE METER BOX
4	1	2" FEDERALLOY FLANGE CURB BALL VALVE W/LOCKWING
5	1	2" BRZ. STREET ELBOW
6	1	2" FEDERALLOY FEMALE COMPRESSION COPPER TUBING TO MALE N.P.T. ELBOW
7	VAR.	2" COPPER TUBING
8	1	2" FEDERALLOY COMPRESSION X COMPRESSION COUPLING OR COPPER FLARE COUPLING *
9	1	2" FEDERALLOY INSULATING ADAPTOR
10	1	1-1/2" AWWA TAPER THREAD TO 2" COMPRESSION STYLE CORPORATION BALL VALVE (SEE NOTE #3)
11	1	1-1/2" STEEL CORPORATION THREAD WELD COUPLING *IF NECESSARY

2" DOMESTIC SERVICE INSTALLATION (STL. PIPE)

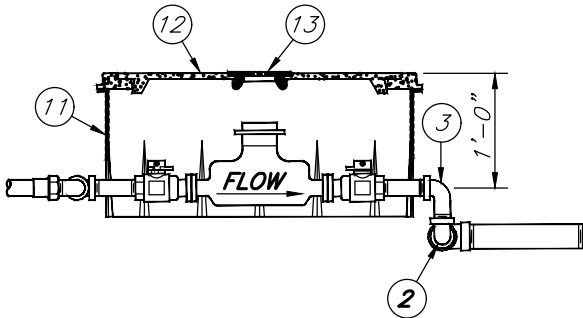
REVISIONS				APP'D
NO.	DATE	INIT.		A.P.
1	6-23	W.M.	REVISED NOTES & CALLOUTS	

DEPARTMENT OF WATER AND POWER			
WATER SYSTEM		CITY OF LOS ANGELES	
DESIGNED	NAME	DATE	APPROVED
L. NUNO		1-90	APPROVED BY MONTH 'YR
V. TOROMANIA		3-92	B. WEINSTEIN JUNE '92
L. NUNO		3-92	

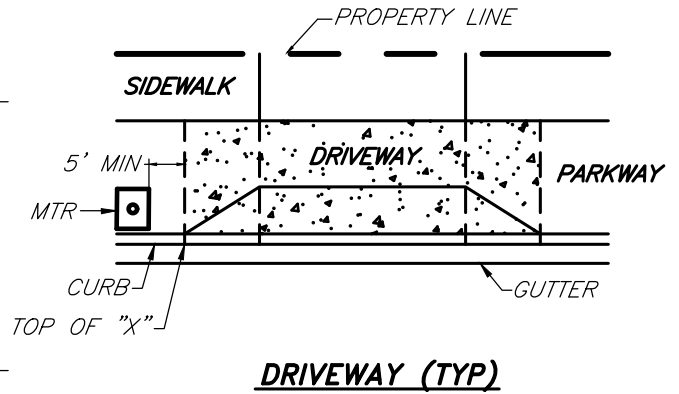
PC9470



HORIZONTAL SECTION
NTS



PROFILE
NTS



NOTES:

1. CONNECTIONS TO WATER MAIN SHALL BE IDENTICAL TO 2" SERVICE CONNECTIONS.
2. LATERAL SHALL BE FLUSHED WITH WATER TO REMOVE DEBRIS.
3. METER BOXES SHALL BE LOCATED AT LEAST 5 FEET OUTSIDE THE TOP OF THE DRIVEWAY "X".
- *4. SWING CAN BE INSTALLED IN EITHER CONFIGURATION

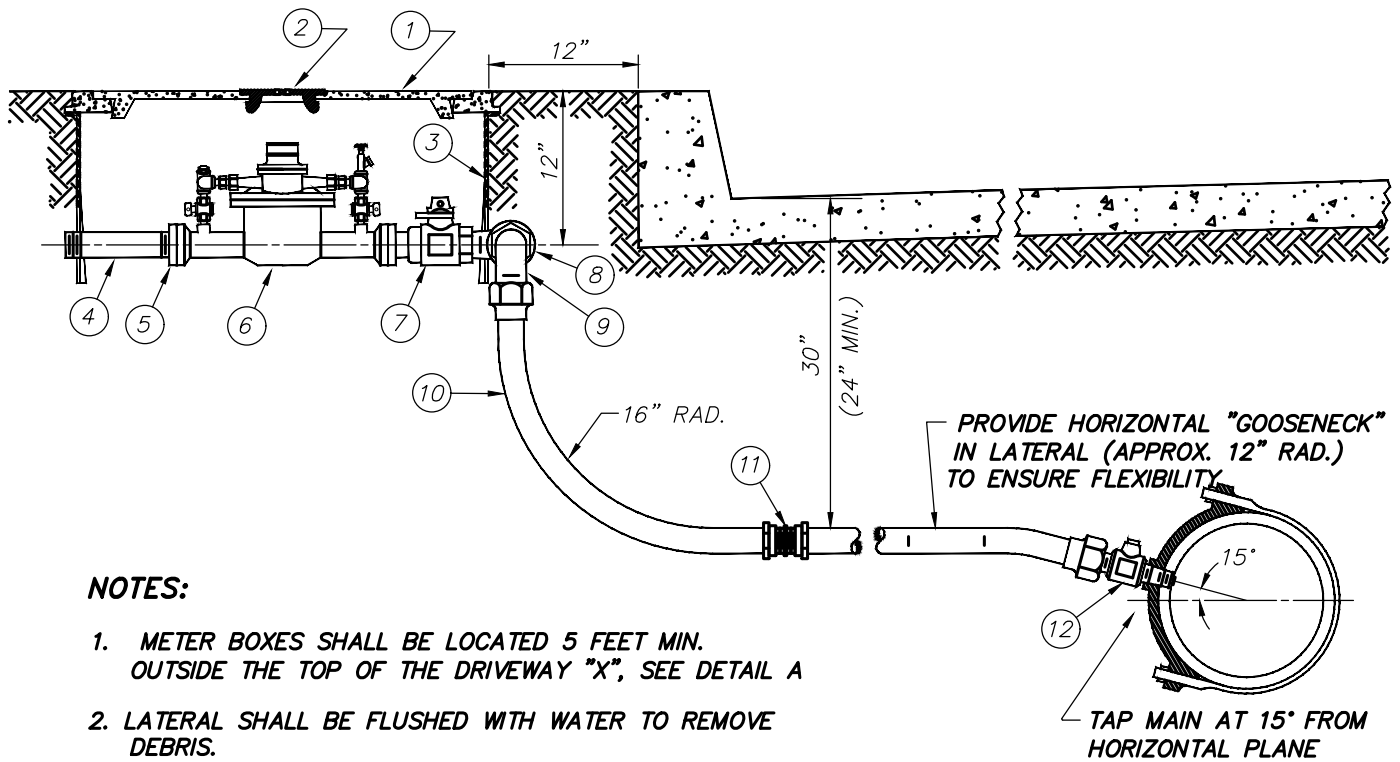
MATERIAL LIST

ITEM	QTY.	DESCRIPTION
1	VAR.	2" COPPER TUBING
2	4	2" FEDERALLOY FEMALE COPPER TUBING TO FEMALE ELBOW
3	4	2" X 90° BRZ. STREET ELBOW
4	4	2" X 6" BRZ. STD. NIPPLE PIPE
5	4	2" FEDERALLOY FLG. CURB BALL VALVE W/ LOCKWING
6	2	2" METER
7	2	2" X 12" BRZ. STD. NIPPLE PIPE
8	2	3" X 2" BRZ. HEX. BUSHING
9	1	3" BRZ. STD. TEE PIPE
10	1	3" X 18" BRZ. STD. NIPPLE PIPE
11	2	#3 REINFORCED CONCRETE POLYMER BOX
12	2	#3 REINFORCED CONCRETE POLYMER COVER (CENTER HOLE)
13	2	CAST IRON CENTERPIECE

**3" EQUIVALENT SERVICE IN #3 REINFORCED CONCRETE POLYMER METER BOXES
(SIDEWALK LOADING ONLY)**

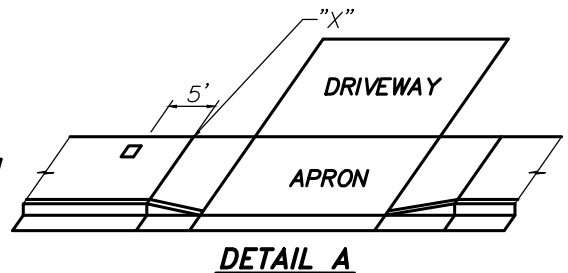
REVISIONS				DEPARTMENT OF WATER AND POWER WATER SYSTEM CITY OF LOS ANGELES					
NO.	DATE	INIT.	APP'D	NAME		DATE	APPROVED		
▲	6-23	W.M.	REVISED NOTES & CALLOUTS	A.P.	DESIGNED	L. NUNO	1-90	APPROVED BY	MONTH 'YR
					DRAWN	V. TOROMANIA	3-92	B. WEINSTEIN	JUNE '92
					CHECKED	L. NUNO	3-92		

PC9472



NOTES:

1. METER BOXES SHALL BE LOCATED 5 FEET MIN. OUTSIDE THE TOP OF THE DRIVEWAY "X", SEE DETAIL A
2. LATERAL SHALL BE FLUSHED WITH WATER TO REMOVE DEBRIS.
3. SEE STANDARD DRAWING PC9476 FOR PIPE CONNECTION REQUIREMENTS.
4. COPPER FLARE (CF) FITTING SHALL BE INSTALLED IN AREAS WITH PRESSURE OVER 200 PSI..
5. ADD 10 MIL PVC TAPE 3 FT UP THE SERVICE LINE FROM THE MAIN.

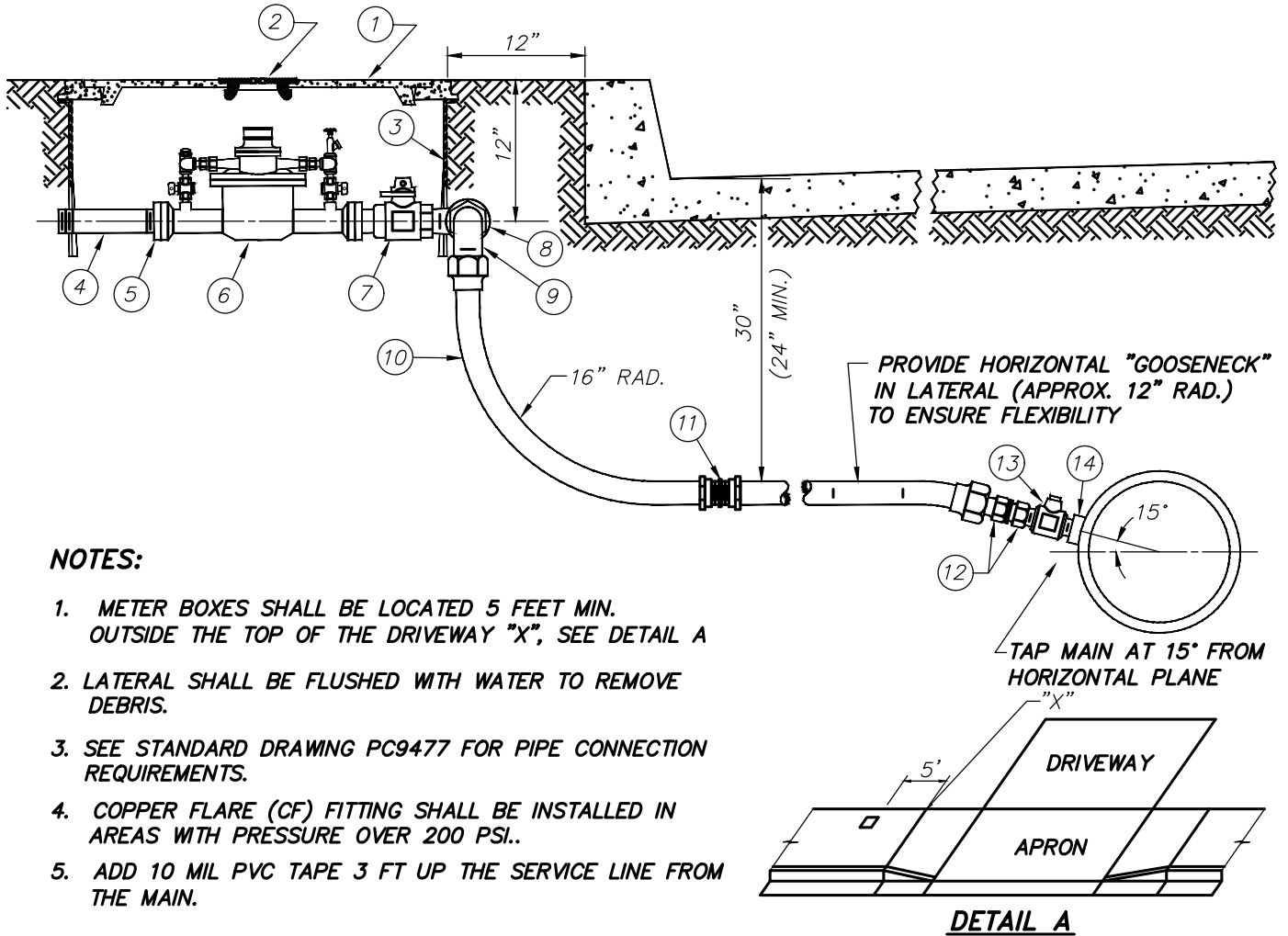


MATERIAL LIST		
ITEM	QTY.	DESCRIPTION
1	1	#3 REINFORCED POLYMER CONCRETE COVER (CENTER HOLE)
2	1	CAST IRON CENTERPIECE
3	1	#3 REINFORCED POLYMER CONCRETE METER BOX
4	1	2" X 8" BRASS FLANGE
5	1	2" BRASS METER COMPANION FLANGE
6	1	2" DETECTOR CHECK W/ BYPASS METER
7	1	2" BRZ. FLANGE CURB BALL VALVE W/LOCKWING
8	1	2" BRZ. STREET ELBOW 90°
9	1	2" ELBOW, COPPER ALLOY, 90° MALE IRON PIPE THREAD
10	VAR.	2" COPPER TUBING
11	1	2" COMPRESSION X MALE NPT THREAD, COMPRESSION X COMPRESSION COUPLING OR COPPER FLARE COUPLING*
12	1	1-1/2" AWWA TAPER THREAD TO 2" COMPRESSION STYLE CORPORATION BALL VALVE (SEE NOTE #3)

2" FIRE SERVICE INSTALLATION (D.I. PIPE)

REVISIONS				DEPARTMENT OF WATER AND POWER								
NO.	DATE	INIT.	APP'D	WATER SYSTEM		CITY OF LOS ANGELES						
1	6-23	W.M.	REVISED NOTES & CALLOUTS	A.P.	DESIGNED	L. NUNO	DATE	1-90	APPROVED BY	B. WEINSTEIN	MONTH 'YR	JUNE '92
					DRAWN	V. TOROMANIA	DATE	3-92				
					CHECKED	L. NUNO	DATE	3-92				

PC9474



NOTES:

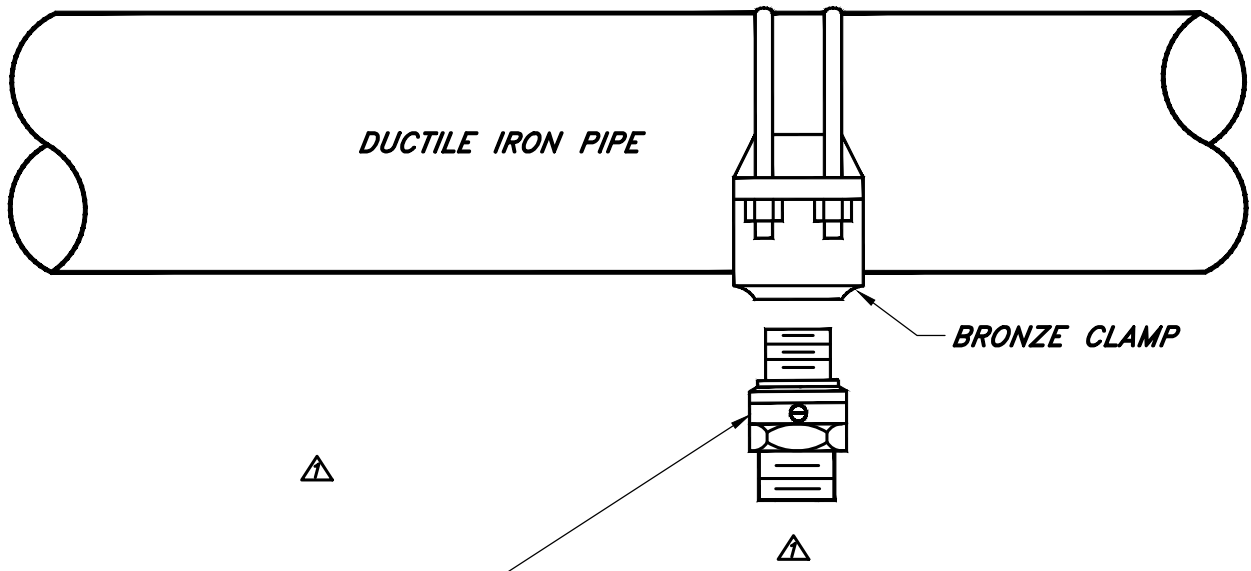
1. METER BOXES SHALL BE LOCATED 5 FEET MIN. OUTSIDE THE TOP OF THE DRIVEWAY "X", SEE DETAIL A
2. LATERAL SHALL BE FLUSHED WITH WATER TO REMOVE DEBRIS.
3. SEE STANDARD DRAWING PC9477 FOR PIPE CONNECTION REQUIREMENTS.
4. COPPER FLARE (CF) FITTING SHALL BE INSTALLED IN AREAS WITH PRESSURE OVER 200 PSI..
5. ADD 10 MIL PVC TAPE 3 FT UP THE SERVICE LINE FROM THE MAIN.

MATERIAL LIST		
ITEM	QTY.	DESCRIPTION
1	1	#3 REINFORCED CONCRETE POLYMER COVER (CENTER HOLE)
2	1	CAST IRON CENTERPIECE
3	1	#3 REINFORCED POLYMER CONCRETE METER BOX
4	1	2" X 8" BRASS FLANGE
5	1	2" BRASS METER COMPANION FLANGE
6	1	2" DETECTOR CHECK W/ BYPASS METER
7	1	2" BRZ. FLANGE CURB BALL VALVE W/LOCKWING
8	1	2" BRZ. STREET ELBOW 90°
9	1	2" ELBOW, COPPER ALLOY, 90° MALE IRON PIPE THREAD
10	VAR.	2" COPPER TUBING
11	1	2" COMPRESSION X MALE NPT THREAD, COMPRESSION X COMPRESSION COUPLING OR COPPER FLARE COUPLING*
12	1	2" ADAPTER, INSULATING, FEDERALLOY, FEMALE, 111NL-H407
13	1	1-1/2" AWWA TAPER THREAD TO 2" COMPRESSION STYLE CORPORATION BALL VALVE (SEE NOTE #3)
14	1	1-1/2" STEEL CORPORATION THREAD WELD COUPLING *IF NECESSARY

2" FIRE SERVICE INSTALLATION (STL. PIPE)

REVISIONS				DEPARTMENT OF WATER AND POWER			
NO.	DATE	INIT.	APP'D	WATER SYSTEM		CITY OF LOS ANGELES	
1	6-23	W.M.	A.P.	DESIGNED	L. NUNO	DATE	1-90
REVISED NOTES & CALLOUTS				DRAWN	V. TOROMANIA	DATE	3-92
				CHECKED	L. NUNO	DATE	3-92
				APPROVED		APPROVED BY	MONTH 'YR
						B. WEINSTEIN	JUNE '92

PC9475



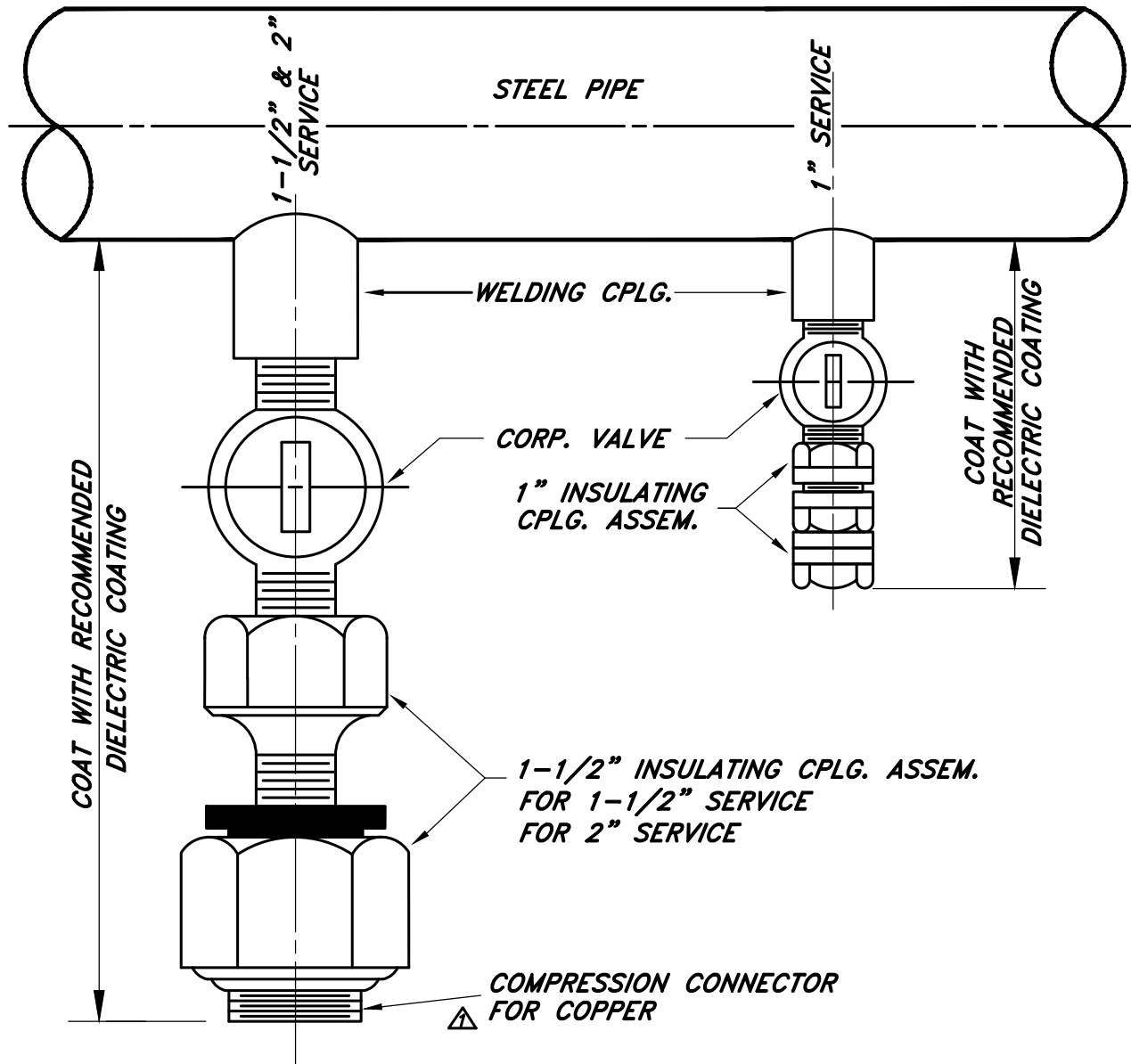
1" MUELLER/AWWA THREAD x 1" COMP
 1-1/2" MUELLER/AWWA THREAD x 1-1/2" COMP
 1-1/2" MUELLER/AWWA THREAD x 2" COMP

CONNECTION REQUIREMENTS - NEW MAIN		
CORP. VALVE SIZE	D.I. PIPE SIZE	CONNECTION TYPE
1" OR 1-1/2" OR 2"	ALL SIZES	BRONZE SERVICE SADDLE, DOUBLE STRAP

CORPORATION VALVE INSTALLATION (D.I. PIPE)

REVISIONS				DEPARTMENT OF WATER AND POWER WATER SYSTEM			
NO.	DATE	INIT.	APP'D	NAME		DATE	APPROVED
1	10/16	KB		DESIGNED	V. TOROMANIA	4-1992	
				DRAWN	V. TOROMANIA	4-1992	
				CHECKED	C. HAMMAS	4-1992	

PC9476-1

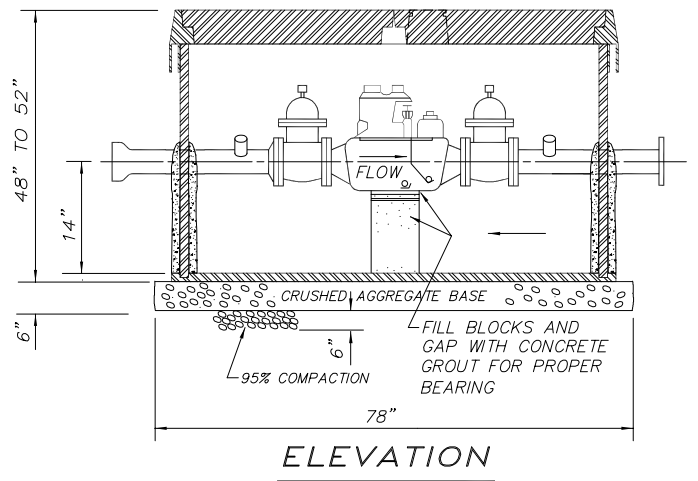
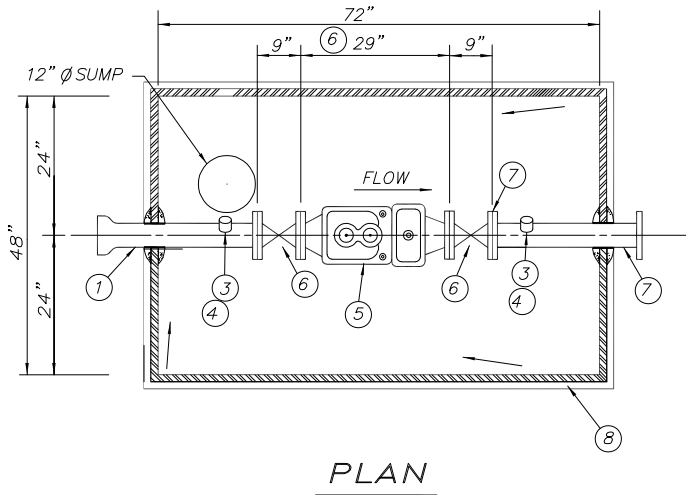
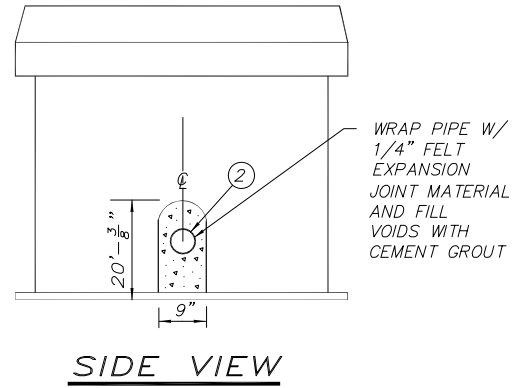
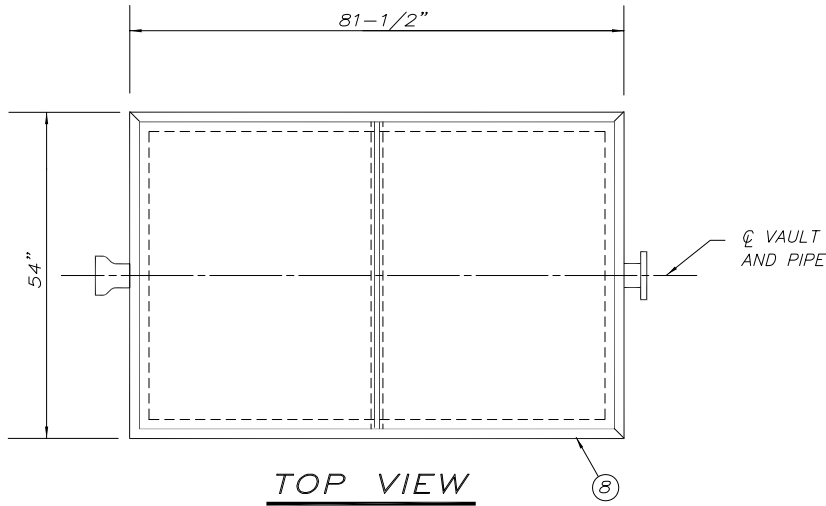


CONNECTION REQUIREMENTS		
CORP. VALVE SIZE	STEEL PIPE SIZE	CONNECTION TYPE
1" AND 1-1/2" AND 2"	4" OR GREATER	WELDING COUPLING

CORPORATION VALVE INSTALLATION (STEEL PIPE)

REVISIONS				DEPARTMENT OF WATER AND POWER		
NO.	DATE	INIT.	APP'D	WATER SYSTEM		CITY OF LOS ANGELES
1	10/16	KB		DESIGNED	V. TOROMANIA	4-92
				DRAWN	A. MILANES	8-07
				CHECKED	D. RICE	8-07

PC9477



NOTES:

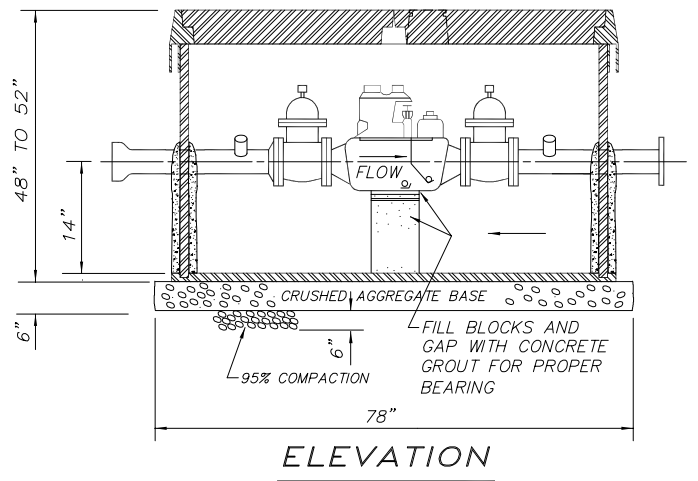
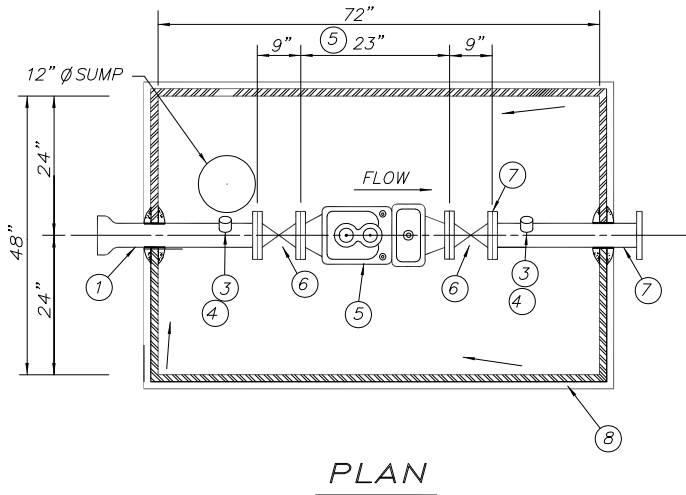
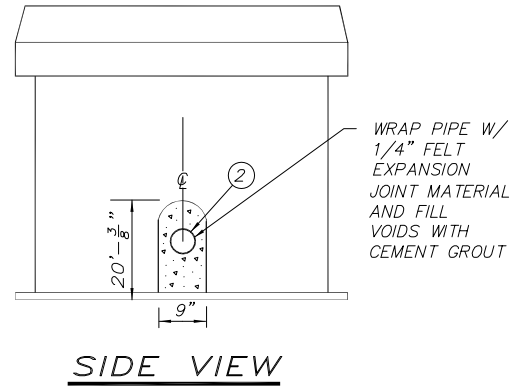
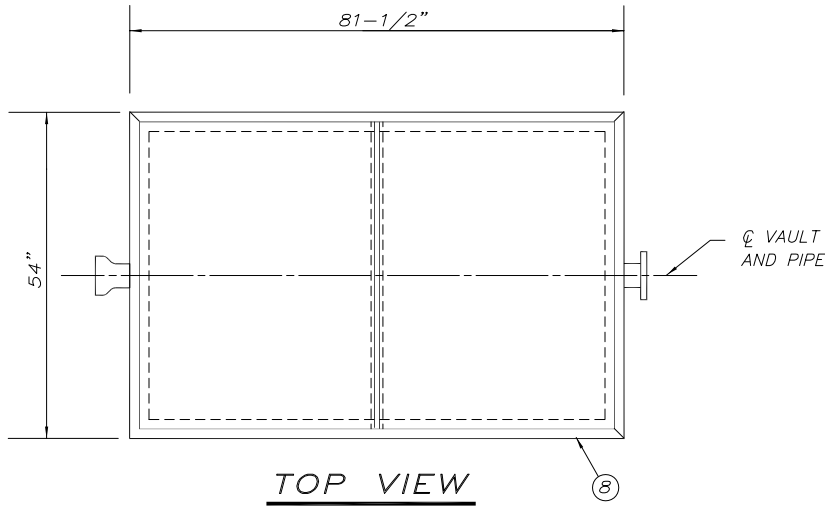
1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.
- *2. USE LOCKING GASKET WITH THE FLANGE/BELL ADAPTOR
3. THIS DRAWING IS NOT TO SCALE
- ** 4. ARMORCAST PRODUCT
MODEL: A6004872AX48MTB

MATERIAL LIST		
ITEM	QTY	DESCRIPTION
1	1	4" D.I. R.G. FLG./BELL ADAPTOR AWWA
2	-	1/4" FELT EXPANSION JOINT MATERIAL
3	2	4" X 1-1/2" BRZ. CLAMP
4	2	1-1/2" CORP. BALL VALVE
5	1	4" COMP. METER
6	2	4" X 250# D.I. FLG. GATE VALVE
7	1	4" X 18" D.I. SPOOL (OR OTHER OUTLET FITTING)
8	1	4'-0" X 6'-0" X 4'-0" REINFORCED POLYMER CONCRETE VAULT W/ TORSION ASSIST COVER **

**4" DOMESTIC SERVICE IN REINFORCED POLYMER CONCRETE VAULT (D.I. PIPE)
(SIDEWALK LOADING ONLY)**

REVISIONS				DEPARTMENT OF WATER AND POWER			
NO.	DATE	INIT.	APP'D	WATER SYSTEM		CITY OF LOS ANGELES	
				DESIGNED	NAME	DATE	APPROVED

PC9478



NOTES:

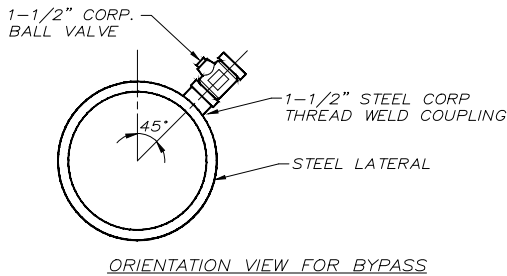
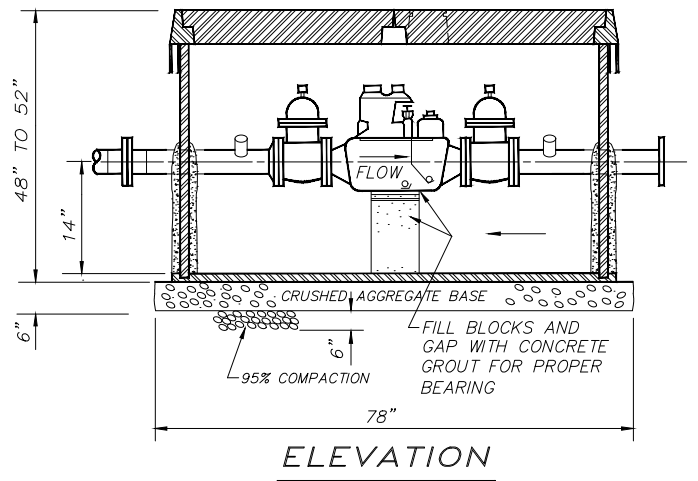
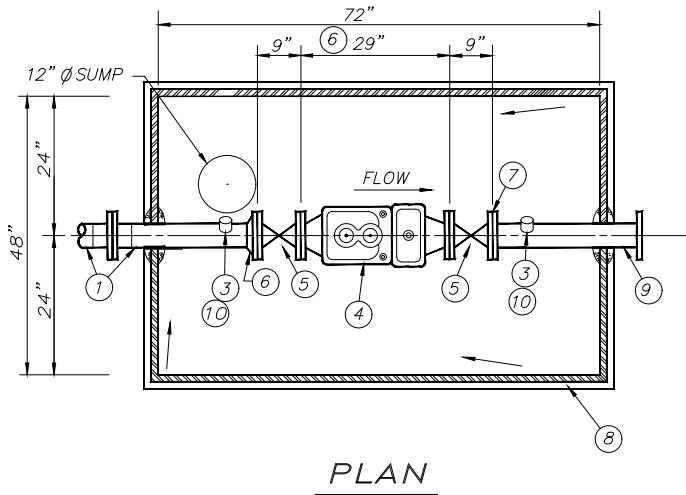
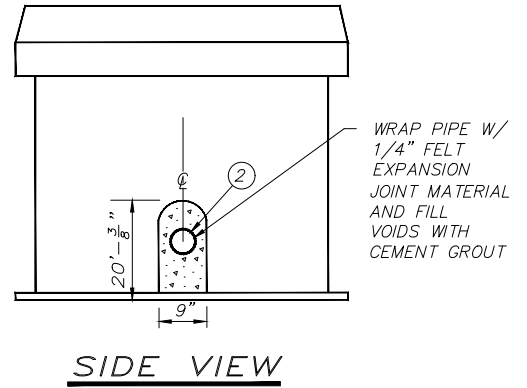
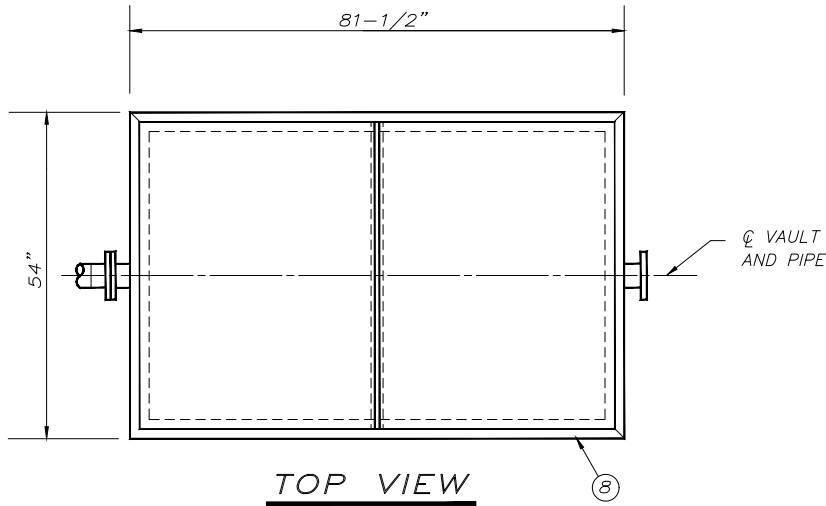
1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.
- *2. USE LOCKING GASKET WITH THE FLANGE/BELL ADAPTOR
3. THIS DRAWING IS NOT TO SCALE
- ** 4. ARMORCAST PRODUCT MODEL: A600-4872AX48MTB

MATERIAL LIST		
ITEM	QTY	DESCRIPTION
1	1	4" D.I. R.G. FLG./BELL ADAPTOR AWWA
2	-	1/4" FELT EXPANSION JOINT MATERIAL
3	2	4" X 1-1/2" BRZ. CLAMP
4	2	1-1/2" CORP. BALL VALVE
5	1	4" TURBINE METER (REQUIRES 4" STRAINER (INCLUDED IN 23" DIMENSION))
6	2	4" X 250# D.I. FLG. GATE VALVE
7	1	4" X 18" D.I. SPOOL (OR OTHER OUTLET FITTING)
8	1	4'-0" X 6'-0" X 4'-0" REINFORCED POLYMER CONCRETE VAULT W/ TORSION ASSIST COVER **

**4" IRRIGATION SERVICE IN REINFORCED POLYMER CONCRETE VAULT (D.I. PIPE)
(SIDEWALK LOADING ONLY)**

REVISIONS				DEPARTMENT OF WATER AND POWER			
NO.	DATE	INIT.	APP'D	WATER SYSTEM		CITY OF LOS ANGELES	
				DESIGNED	NAME	DATE	APPROVED

PC9478-1



NOTES:

1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.

* 2. ARMORCAST PRODUCTS
MODEL: A600-4872AX48MTB
APPROVED BY CITY OF LOS ANGELES
BUREAU OF ENGINEERING

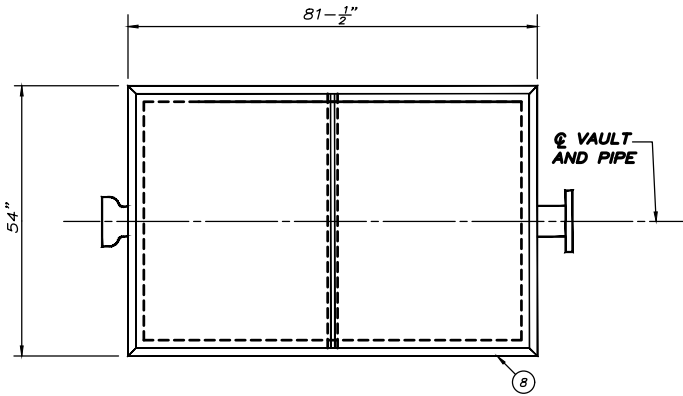
MATERIAL LIST		
ITEM	QTY	DESCRIPTION
1	-	4-1/2" O.D. X 1/4" CEMENT LINED CEMPP/CT SLIP JOINT STEEL PIPE
2	-	1/4" FELT EXPANSION JOINT MATERIAL
3	2	1-1/2" B&S CORP. BALL VALVE
4	1	4" COMP. METER
5	2	4" X 250# D.I. FLG. GATE VALVE
6	1	4" X 150# STL. WELD NECK FLANGE
7	1	4" INSULATING JOINT KIT CLASS 150
8	1	4'-0" X 6'-0" X 4'-0" REINFORCED POLYMER CONCRETE VAULT W/ TORSION ASSIST COVER *
9	1	4" X 18" D.I. SPOOL (OR OTHER OUTLET FITTING)
10	1	1-1/2" STEEL CORP. THREAD WELD COUPLING

**4" DOMESTIC SERVICE IN REINFORCED POLYMER CONCRETE VAULT (STL. PIPE)
(SIDEWALK LOADING ONLY)**

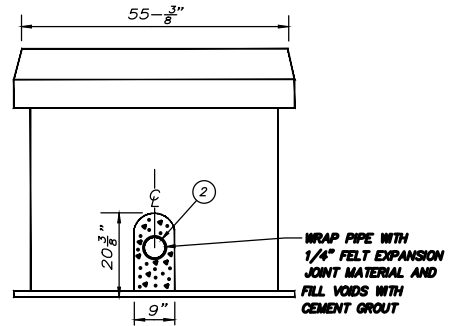
REVISIONS				APP'D
NO.	DATE	INIT.	REVISIONS	A.P.
1	6-23	W.M.	REVISED NOTES & CALLOUTS	

DEPARTMENT OF WATER AND POWER				
WATER SYSTEM			CITY OF LOS ANGELES	
DESIGNED	NAME	DATE	APPROVED	
	L. NUNO	1-90	APPROVED BY	MONTH 'YR
DRAWN	V. TOROMANIA	3-92	B. WEINSTEIN	JUNE '92
CHECKED	L. NUNO	3-92		

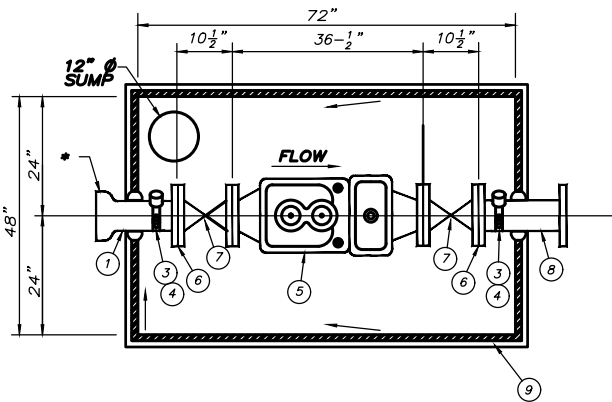
PC9479



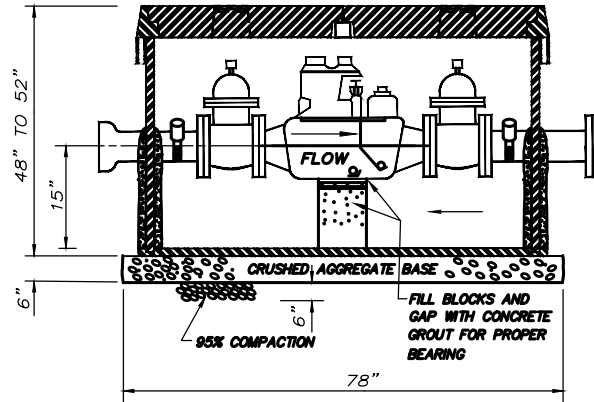
TOP VIEW



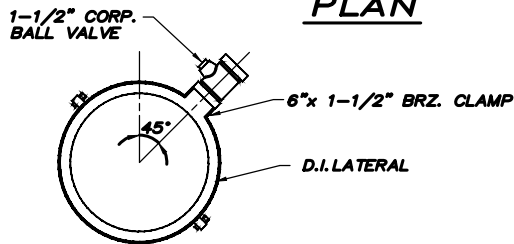
SIDE VIEW



PLAN



ELEVATION



ORIENTATION VIEW FOR BYPASS

NOTES:

- 1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.
- * 2. USE LOCKING GASKET WITH THE FLANGE/BELL ADAPTOR.
- ** 3. ARMORCAST PRODUCTS MODEL: A6004872AX48MTB OR EQUIVALENT AND APPROVED BY CITY OF LA BUREAU OF ENGINEERING

MATERIAL LIST

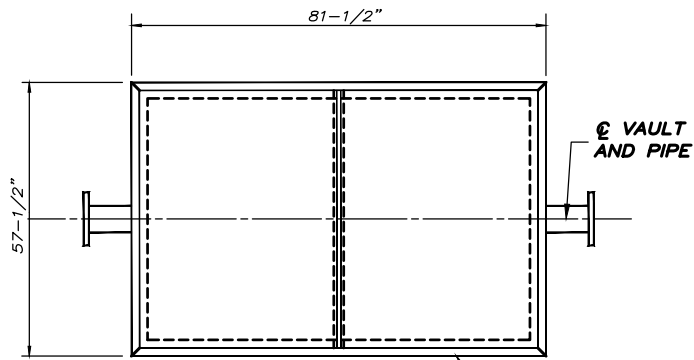
ITEM	QTY	DESCRIPTION
1	1	6" X D.I. R.G. FLG./BELL ADAPTOR AWWA
2	-	1/4" FELT EXPANSION JOINT MATERIAL
3	2	6" X 1-1/2" BRZ. CLAMP
4	2	1-1/2" CORP. BALL VALVE
5	1	6" COMP. METER
6	1	6" INSULATING JOINT KIT CLASS 125
7	2	6" X 250# D.I. FLG. GATE VALVE
8	1	6" X 18" D.I. SPOOL (OR OTHER OUTLET FITTING)
9	1	4'-0" X 6'-0" X 4'-0" REINFORCED POLYMER CONCRETE VAULT W/ TORSION ASSIST COVER **

6" DOMESTIC SERVICE IN REINFORCED POLYMER CONCRETE VAULT (D.I. PIPE)
(SIDEWALK LOADING ONLY)

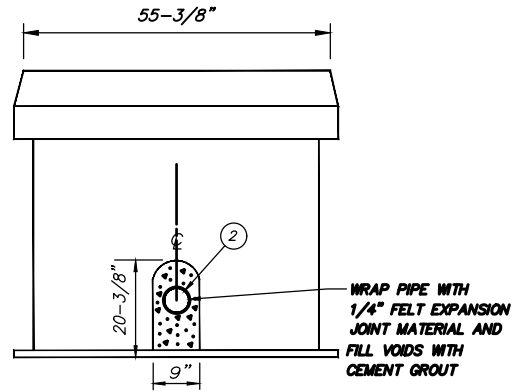
REVISIONS				APP'D
NO.	DATE	INIT.	DESCRIPTION	A.P.
1	6-23	W.M.	REVISED NOTES & CALLOUTS	

DEPARTMENT OF WATER AND POWER			
WATER SYSTEM			
CITY OF LOS ANGELES			
DESIGNED	NAME	DATE	APPROVED
	L. NUNO	1-90	APPROVED BY MONTH 'YR
	V. TOROMANIA	3-92	B. WEINSTEIN JUNE '92
	L. NUNO	3-92	

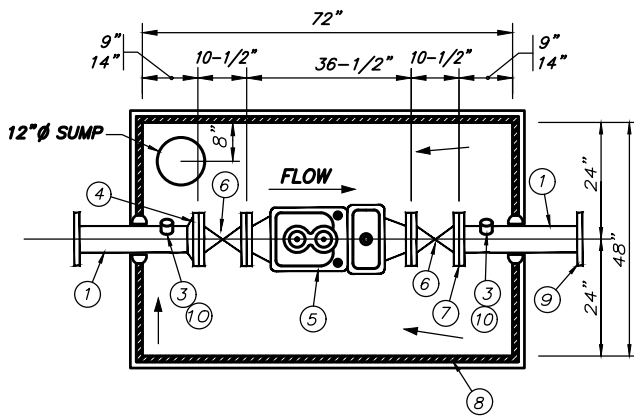
PC9479-1



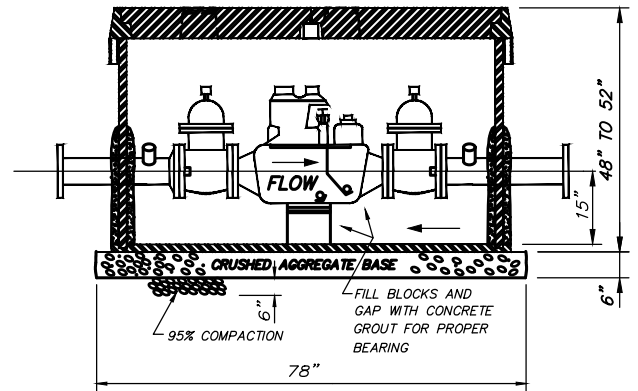
TOP VIEW



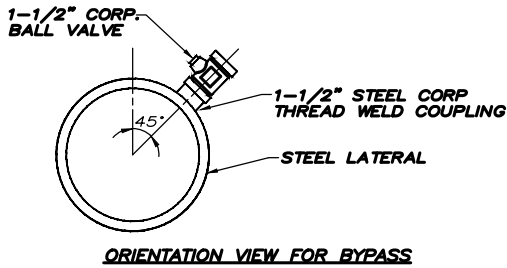
SIDE VIEW



PLAN



ELEVATION



ORIENTATION VIEW FOR BYPASS

NOTES:

1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.

* 2. ARMORCAST PRODUCTS
MODEL: A600-4872AX48MTB

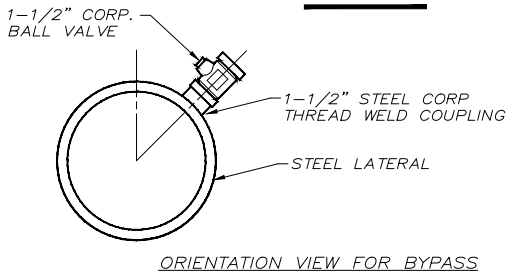
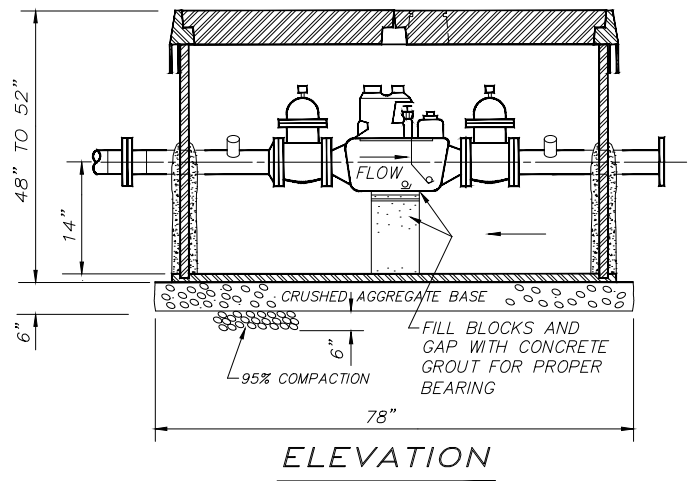
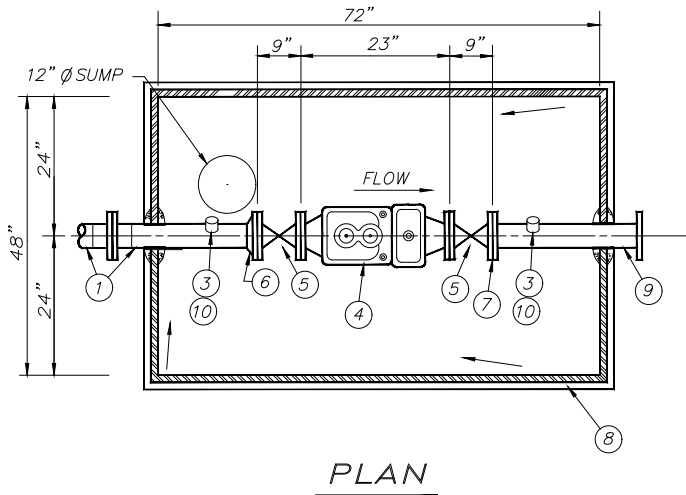
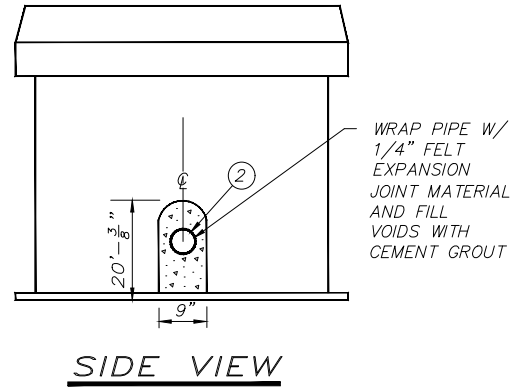
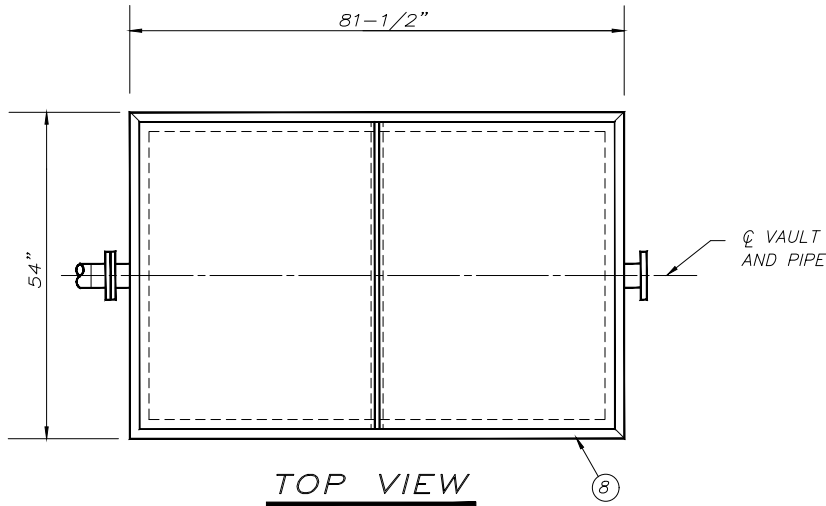
MATERIAL LIST

ITEM	QTY	DESCRIPTION
1	-	6-5/8" O.D. X 1/4" EN. UC., C.L. & C., S.J., WELD. STL. PIPE
2	-	1/4" FELT EXPANSION JOINT MATERIAL
3	2	1-1/2" B&S CORP. BALL VALVE
4	1	6" X 250# STL. WELD NECK FLANGE
5	1	6" COMP. METER
6	2	6" X 250# D.I. FLG. GATE VALVE
7	1	6" INSULATING JOINT KIT CLASS 150
8	1	4'-0" X 6'-0" X 4'-0" REINFORCED POLYMER CONCRETE VAULT W/ TORSION ASSIST COVER *
9	1	6" D.I. SPOOL (OR OTHER OUTLET FITTING)
10	1	1-1/2" STEEL CORP THREAD WELD COUPLING

**6" DOMESTIC SERVICE IN REINFORCED POLYMER CONCRETE VAULT (STL. PIPE)
(SIDEWALK LOADING ONLY)**

PC9479-2

REVISIONS				DEPARTMENT OF WATER AND POWER			
NO.	DATE	INIT.	APP'D	WATER SYSTEM		CITY OF LOS ANGELES	
1	6-23	W.M.	REVISED NOTES & CALLOUTS	A.P.			
DESIGNED	L. NUNO	DATE	1-90	APPROVED BY	MONTH 'YR		
DRAWN	V. TOROMANIA	DATE	3-92	B. WEINSTEIN	JUNE '92		
CHECKED	L. NUNO	DATE	3-92				



NOTES:

1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.

* 2. ARMORCAST PRODUCTS MODEL: A6004872AX48MTB OR EQUIVALENT AND APPROVED BY CITY OF LA BUREAU OF ENGINEERING

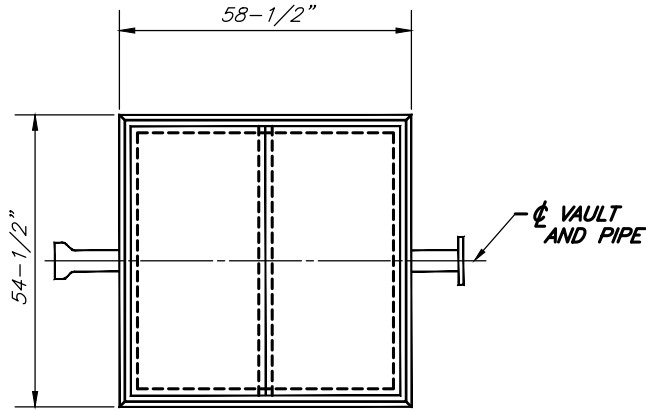
MATERIAL LIST		
ITEM	QTY	DESCRIPTION
1	-	4-1/2" O.D. X 1/4" CEMENT LINED CEMPP/CT SLIP JOINT STEEL PIPE
2	-	1/4" FELT EXPANSION JOINT MATERIAL
3	2	1-1/2" B&S CORP. BALL VALVE
4	1	4" TURBINE METER (REQUIRES 4" STRAINER; INCLUDED IN 23" DIMENSION)
5	1	4" X 250# D.I. FLG. GATE VALVE
6	2	4" X 150# STL. WELD NECK FLANGE
7	1	4" INSULATING JOINT KIT CLASS 150
8	1	4'-0" X 6'-0" X 4'-0" REINFORCED POLYMER CONCRETE VAULT W/ TORSION ASSIST COVER *
9	1	4" X 18" D.I. SPOOL (OR OTHER OUTLET FITTING)
10	1	1-1/2" STEEL CORP. THREAD WELD COUPLING

**4" IRRIGATION SERVICE IN REINFORCED POLYMER CONCRETE VAULT (STL. PIPE)
(SIDEWALK LOADING ONLY)**

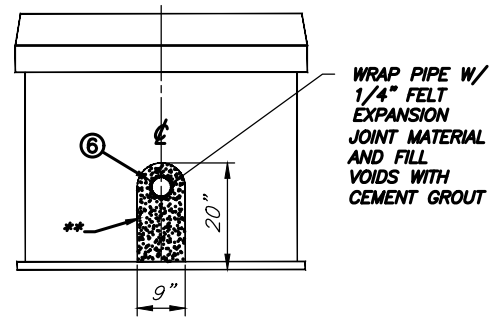
REVISIONS				APP'D
NO.	DATE	INIT.	REVISIONS	A.P.
1	6-23	W.M.	REVISED NOTES & CALLOUTS	

DEPARTMENT OF WATER AND POWER			
WATER SYSTEM		CITY OF LOS ANGELES	
DESIGNED	NAME	DATE	APPROVED
	L. NUNO	1-90	APPROVED BY MONTH 'YR
	V. TOROMANIA	3-92	B. WEINSTEIN JUNE '92
	L. NUNO	3-92	

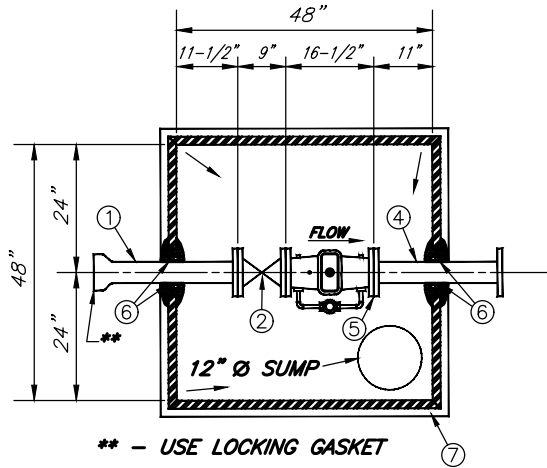
PC9479-3



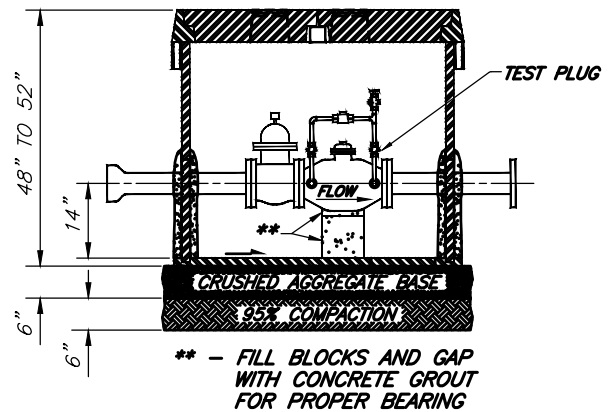
TOP VIEW



INLET VIEW



PLAN



ELEVATION

NOTES:

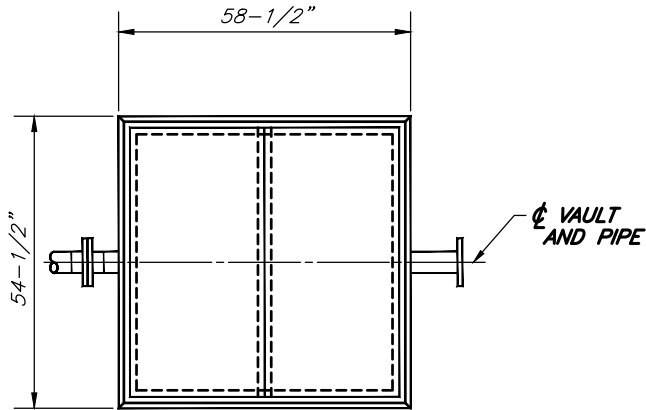
- 1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.
- * 2. USE LOCKING GASKET WITH THE FLANGE/BELL ADAPTOR.
- ** 3. ARMORCAST PRODUCTS MODEL: A6004872AX48MTB OR EQUIVALENT AND APPROVED BY CITY OF LA BUREAU OF ENGINEERING

MATERIAL LIST		
ITEM	QTY.	DESCRIPTION
1	1	4" D.I. R.G. FLG./BELL ADAPTOR AWWA
2	1	4" X 250# D.I. FLG. GATE VALVE
3	1	4" DETECTOR CHECK WITH BYPASS METER AND FITTINGS
4	1	4" X 24" D.I. SPOOL (OR OTHER OUTLET FITTING)
5	1	4" INSULATING JOINT CLASS 125
6	VAR.	1/4" FELT EXPANSION JOINT MATERIAL
7	1	48" X 48" X 48" REINFORCED POLYMER CONCRETE VAULT W/ TORSION ASSIST COVER (A6004848AX48MTB)

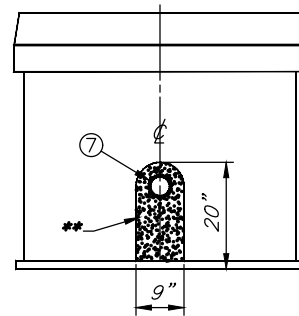
4" FIRE SERVICE IN REINFORCED POLYMER CONCRETE VAULT (D.I. PIPE)

REVISIONS				DEPARTMENT OF WATER AND POWER			
NO.	DATE	INIT.	APP'D	WATER SYSTEM		CITY OF LOS ANGELES	
1	6-23	W.M.	REVISED NOTES & CALLOUTS	A.P.	DESIGNED	L. NUNO	DATE 1-90
					DRAWN	V. TOROMANIA	3-92
					CHECKED	L. NUNO	3-92
				APPROVED		APPROVED BY MONTH 'YR	
				B. WEINSTEIN		JUNE '92	

PC9480

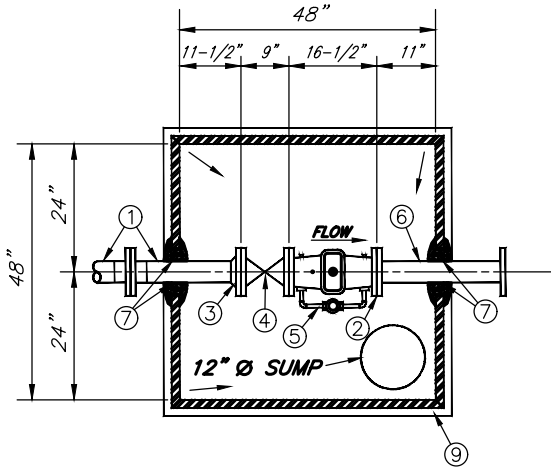


TOP VIEW

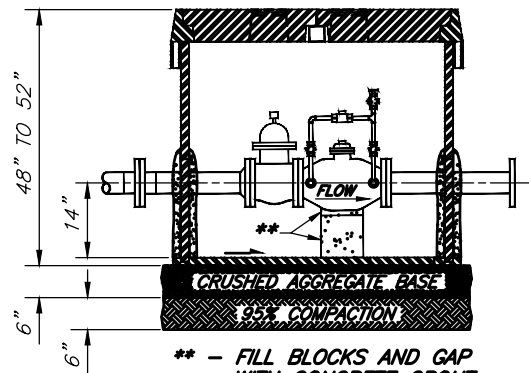


** - WRAP PIPE WITH 1/4" FELT EXPANSION JOINT MATERIAL AND FILL VOIDS WITH CEMENT GROUT

INLET VIEW



PLAN



** - FILL BLOCKS AND GAP WITH CONCRETE GROUT FOR PROPER BEARING

ELEVATION

NOTES:

1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.
- * 2. ARMORCAST PRODUCTS MODEL: A6004872AX48MTB OR EQUIVALENT AND APPROVED BY CITY OF LA BUREAU OF ENGINEERING

MATERIAL LIST

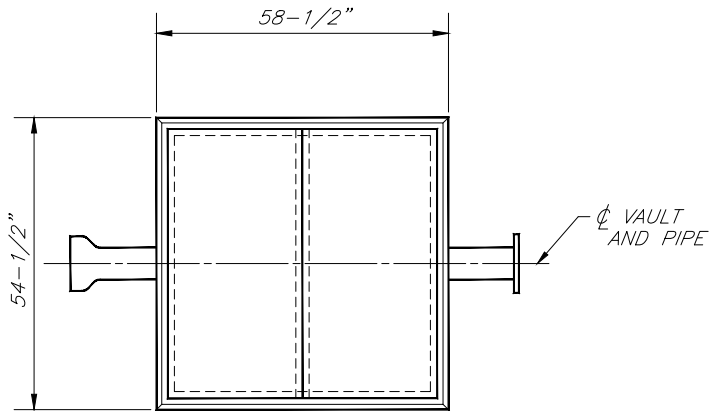
ITEM	QTY.	DESCRIPTION
1	VAR.	4-1/2" O.D. X 1/4" EN. UC., C.L. & C., S.J., WELDED STL. PIPE
2	1	4" INSULATING JOINT KIT CLASS 150
3	1	4" X 150# STL. WELD NECK FLANGE
4	1	4" X 250# D.I. FLG. GATE VALVE
5	1	4" DETECTOR CHECK WITH BYPASS METER AND FITTINGS
6	1	4" X 24" D.I. SPOOL (OR OTHER OUTLET FITTING)
7	VAR.	1/4" FELT EXPANSION JOINT MATERIAL
9	1	48" X 48" X 48" REINFORCED POLYMER CONCRETE VAULT W/ TORSION ASSIST COVER (A6004848AX48MTB)

4" FIRE SERVICE IN REINFORCED POLYMER CONCRETE VAULT (STL. PIPE)

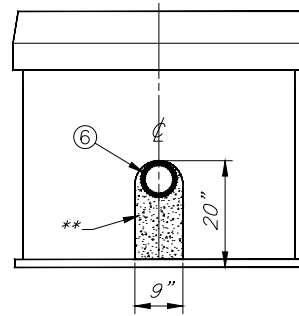
REVISIONS				APP'D
NO.	DATE	INIT.	REVISIONS	A.P.
1	6-23	W.M.	REVISED NOTES & CALLOUTS	

DEPARTMENT OF WATER AND POWER				
WATER SYSTEM				
CITY OF LOS ANGELES				
DESIGNED	NAME	DATE	APPROVED	
	L. NUNO	1-90	APPROVED BY	MONTH 'YR
	V. TOROMANIA	3-92	B. WEINSTEIN	JUNE '92
	L. NUNO	3-92		

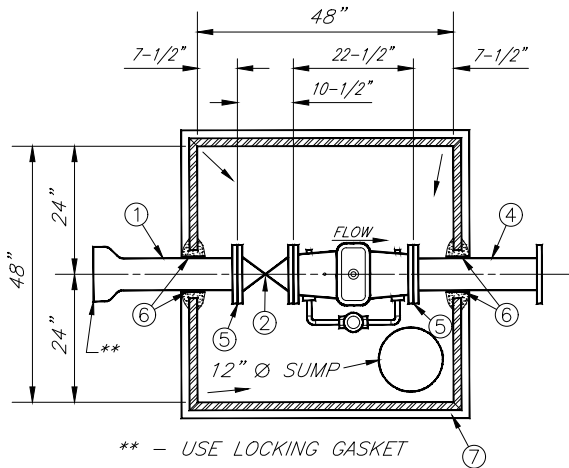
PC9481



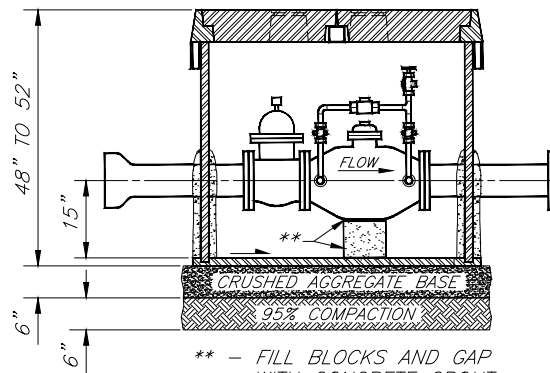
TOP VIEW



INLET VIEW



PLAN



ELEVATION

NOTES:

1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.
- * 2. USE LOCKING GASKET WITH THE FLANGE/BELL ADAPTOR.
- ** 3. ARMORCAST PRODUCTS MODEL: A6004872AX48MTB OR EQUIVALENT AND APPROVED BY CITY OF LA BUREAU OF ENGINEERING

MATERIAL LIST

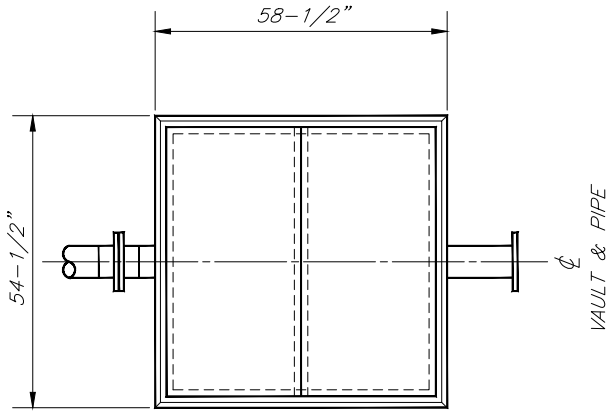
ITEM	QTY.	DESCRIPTION
1	1	6" D.I. R.G. FLG./BELL ADAPTOR AWWA
2	1	6" X 250# D.I. FLG. GATE VALVE
3	1	6" DETECTOR CHECK WITH BYPASS METER AND FITTINGS
4	1	6" X 24" D.I. SPOOL (OR OTHER OUTLET FITTING)
5	1	6" INSULATING JOINT CLASS 125
6	VAR.	1/4" FELT EXPANSION JOINT MATERIAL
7	1	48" X 48" X 48" REINFORCED POLYMER CONCRETE VAULT W/ TORSION ASSIST COVER (A6004848AX48MTB)

**6" FIRE SERVICE IN REINFORCED POLYMER CONCRETE VAULT (D.I. PIPE)
(SIDEWALK LOADING ONLY)**

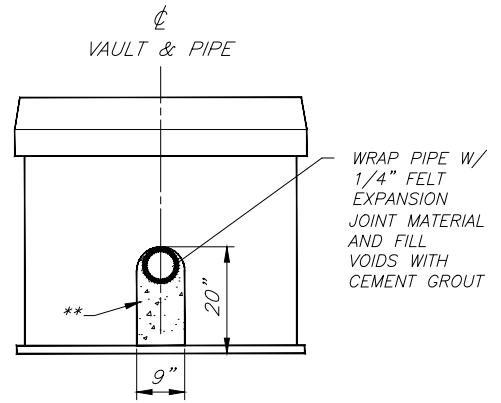
REVISIONS				APP'D
NO.	DATE	INIT.	REVISIONS	A.P.
1	6-23	W.M.	REVISED NOTES & CALLOUTS	

DEPARTMENT OF WATER AND POWER				
WATER SYSTEM			CITY OF LOS ANGELES	
DESIGNED	NAME	DATE	APPROVED BY	MONTH 'YR
L. NUNO		1-90	B. WEINSTEIN	JUNE '92
DRAWN	V. TOROMANIA	3-92		
CHECKED	L. NUNO	3-92		

PC9482

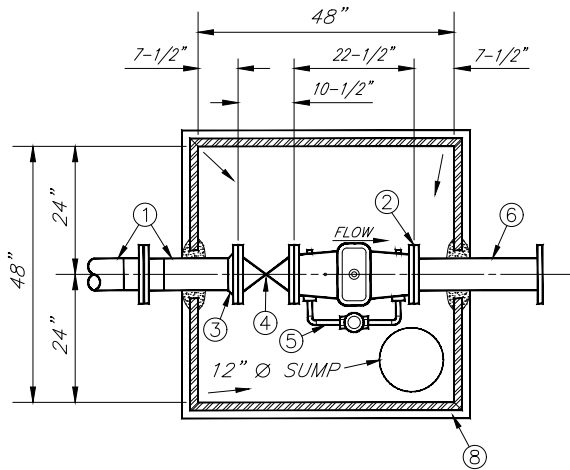


TOP VIEW

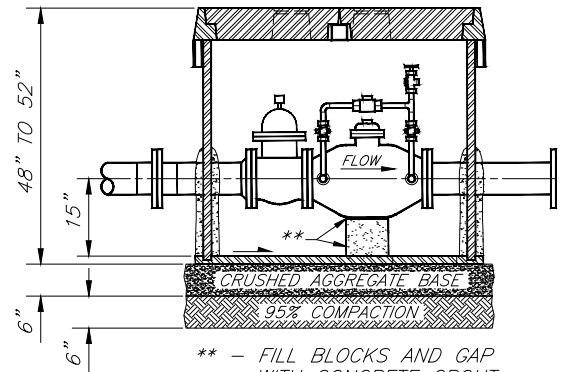


** - FILL VOIDS WITH CEMENT GROUT

INLET VIEW



PLAN



ELEVATION

NOTES:

1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.
- * 2. ARMORCAST PRODUCTS
MODEL: A6004872AX48MTB OR EQUIVALENT AND APPROVED BY CITY OF LA BUREAU OF ENGINEERING

MATERIAL LIST

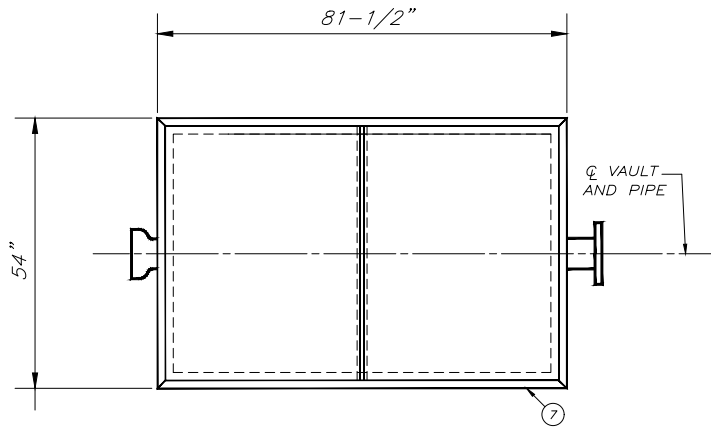
ITEM	QTY.	DESCRIPTION
1	VAR.	6-5/8" O.D. X 1/4" EN. UC., C.L. & C., S.J., WELDED STL. PIPE
2	1	6" INSULATING JOINT KIT CLASS 150
3	1	6" STL. WELD NECK FLANGE CLASS 150
4	1	6" X 250# D.I. FLG. GATE VALVE
5	1	6" DETECTOR CHECK WITH BYPASS METER AND FITTINGS
6	1	6" X 24" D.I. SPOOL (OR OTHER OUTLET FITTING)
8	1	4'-0" X 4'-0" REINFORCED POLYMER CONCRETE VAULT W/ TORSION ASSIST COVER (A6004848AX48MTB)

**6" FIRE SERVICE IN REINFORCED POLYMER CONCRETE VAULT (STL. PIPE)
(SIDEWALK LOADING ONLY)**

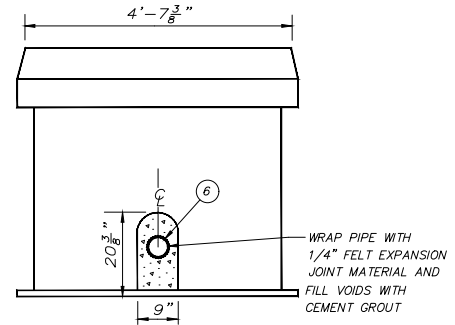
REVISIONS				APP'D
NO.	DATE	INIT.		A.P.
1	6-23	W.M.	REVISED NOTES & CALLOUTS	

DEPARTMENT OF WATER AND POWER WATER SYSTEM CITY OF LOS ANGELES			
DESIGNED	NAME	DATE	APPROVED
L. NUNO		1-90	APPROVED BY MONTH 'YR
DRAWN	V. TOROMANIA	3-92	B. WEINSTEIN JUNE '92
CHECKED	L. NUNO	3-92	

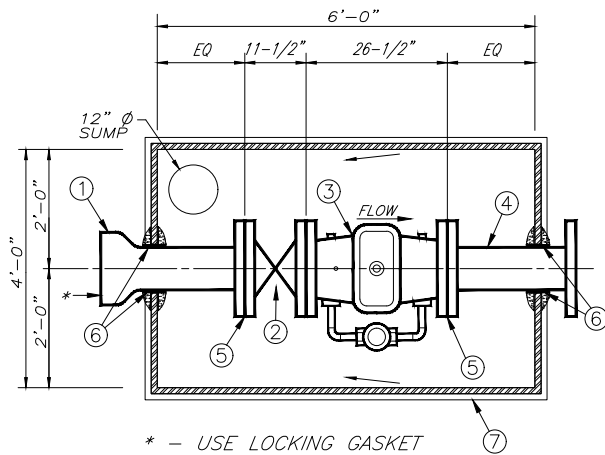
PC9483



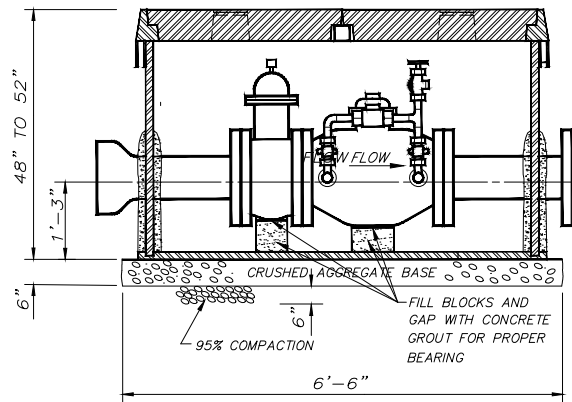
TOP VIEW



SIDE VIEW



PLAN



ELEVATION

NOTES:

1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.
- ** 2. 4' X 4' REINFORCED POLYMER CONCRETE VAULT W/ TORSION ASSIST COVER, ARMORCAST PRODUCTS (MODEL: A6004848AX48MTB) MAY BE USED WHEN SIDEWALK HAS LIMITED ROOM TO INSTALL 4' X 6' VAULT.
3. VAULT OPENNING MAY BE TRIMMED IF OPENNING IS TOO SMALL FOR PIPE

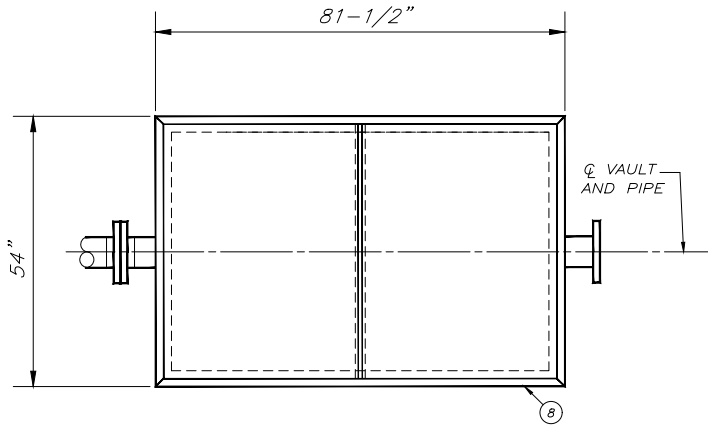
MATERIAL LIST

ITEM	QTY.	DESCRIPTION
1	1	8" D.I. R.G. FLG./BELL ADAPTOR AWWA
2	1	8" X 250# D.I. FLG. GATE VALVE
3	1	8" DETECTOR CHECK WITH BYPASS METER AND FITTINGS
4	1	8" X 24" D.I. SPOOL (OR OTHER OUTLET FITTING)
5	1	8" INSULATING JOINT CLASS 125
6	VAR.	1/4" FELT EXPANSION JOINT MATERIAL
7	1	4'-0" X 6'-0" X 4'-0" REINFORCED POLYMER CONCRETE VAULT W/ TORSION ASSIST COVER ARMORCAST PRODUCTS (MODEL: A600-4872AX48MTB) **

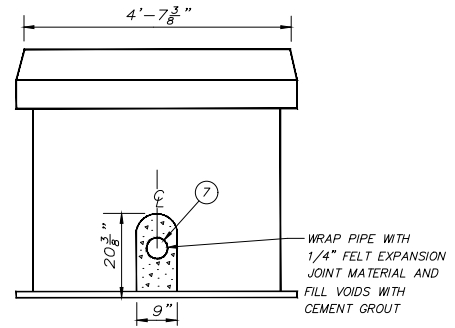
**8" FIRE SERVICE IN REINFORCED POLYMER CONCRETE VAULT (D.I. PIPE)
(SIDEWALK LOADING ONLY)**

REVISIONS				DEPARTMENT OF WATER AND POWER			
NO.	DATE	INIT.	APP'D	WATER SYSTEM		CITY OF LOS ANGELES	
1	6-23	W.M.	REVISED NOTES & CALLOUTS	A.P.	DESIGNED	L. NUNO	DATE 1-90
					DRAWN	V. TOROMANIA	DATE 3-92
					CHECKED	L. NUNO	DATE 3-92
				APPROVED		APPROVED BY MONTH 'YR	
				B. WEINSTEIN		JUNE '92	

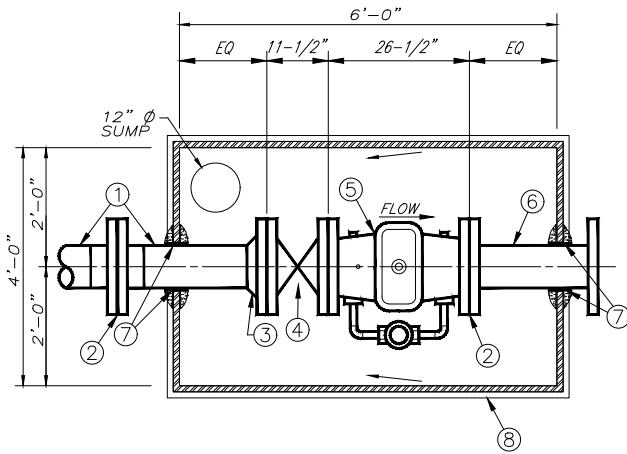
PC9484



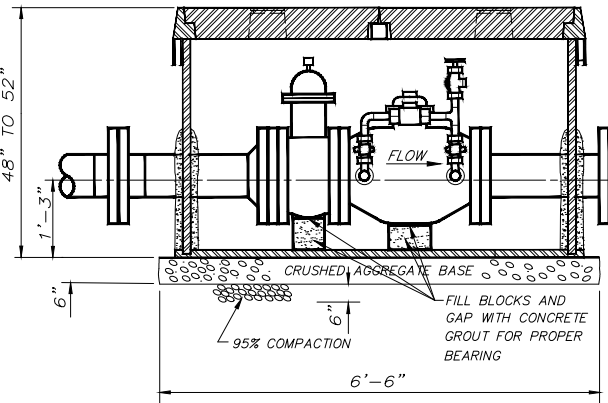
TOP VIEW



SIDE VIEW



PLAN



ELEVATION

NOTES:

1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.
- ** 2. 4' X 4' REINFORCED POLYMER CONCRETE VAULT W/ TORSION ASSIST COVER, ARMORCAST PRODUCTS (MODEL: A6004848AX48MTB) MAY BE USED WHEN SIDEWALK HAS LIMITED ROOM TO INSTALL 4' X 6' VAULT.
3. VAULT OPENNING MAY BE TRIMMED IF OPENNING IS TOO SMALL FOR PIPE

MATERIAL LIST

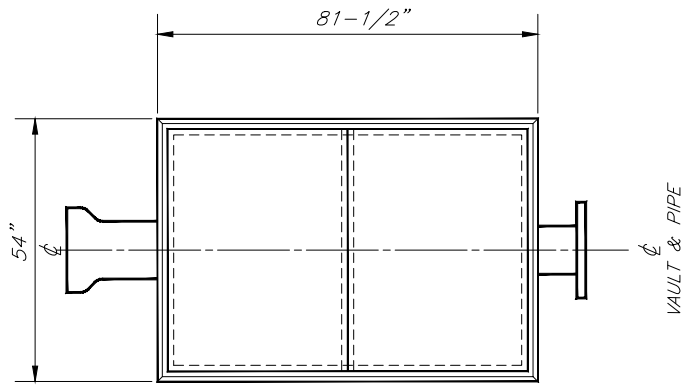
ITEM	QTY.	DESCRIPTION
1	VAR.	8-5/8" O.D. X 1/4" EN. UC., C.L. & C., S.J., WELDED STL. PIPE
2	1	8" INSULATING JOINT FLANGE KIT CLASS 150
3	1	8" X 150# STL. WELD NECK FLANGE
4	1	8" X 250# D.I. FLG. GATE VALVE
5	1	8" DETECTOR CHECK WITH BYPASS METER AND FITTINGS
6	1	8" X 24" D.I. SPOOL (OR OTHER OUTLET FITTING)
7	VAR.	1/4" FELT EXPANSION JOINT MATERIAL
8	1	4'-0" X 6'-0" X 4'-0" REINFORCED POLYMER CONCRETE VAULT W/ TORSION ASSIST COVER ARMORCAST PRODUCTS (MODEL: A600-4872AX48MTB) *

8" FIRE SERVICE IN REINFORCED POLYMER CONCRETE VAULT (STL. PIPE)
(SIDEWALK LOADING ONLY)

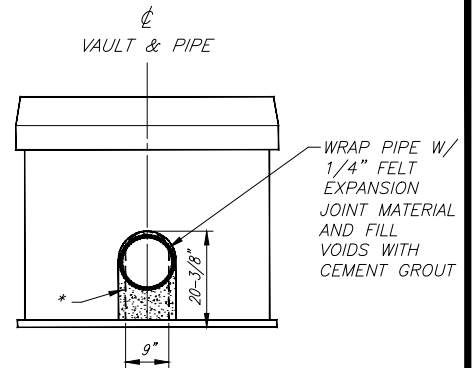
REVISIONS			APP'D
NO.	DATE	INIT.	A.P.
1	6-23	W.M.	

DEPARTMENT OF WATER AND POWER			
WATER SYSTEM			
NAME		DATE	APPROVED
DESIGNED	L. NUNO	1-90	APPROVED BY
DRAWN	V. TOROMANIA	3-92	MONTH 'YR
CHECKED	L. NUNO	3-92	B. WEINSTEIN
			JUNE '92

PC9485

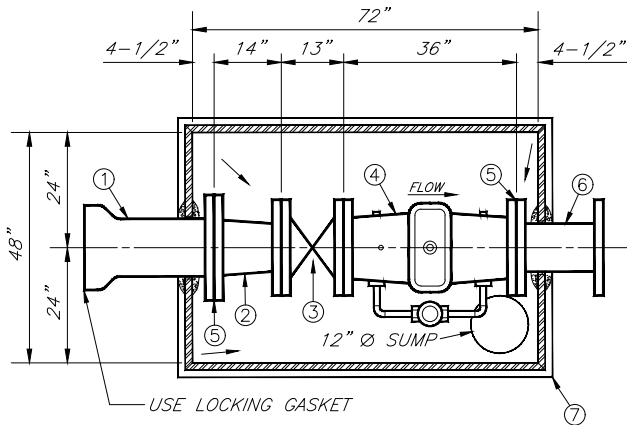


TOP VIEW

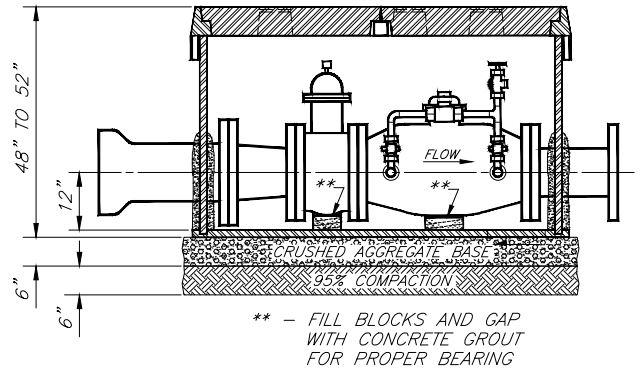


INLET VIEW

* - FILL VOIDS WITH CEMENT GROUT



PLAN



ELEVATION

NOTES:

1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.
- * 2. USE LOCKING GASKET WITH THE FLANGE/BELL ADAPTOR.
- ** 3. ARMORCAST PRODUCTS MODEL: A6004872AX48MTB

MATERIAL LIST

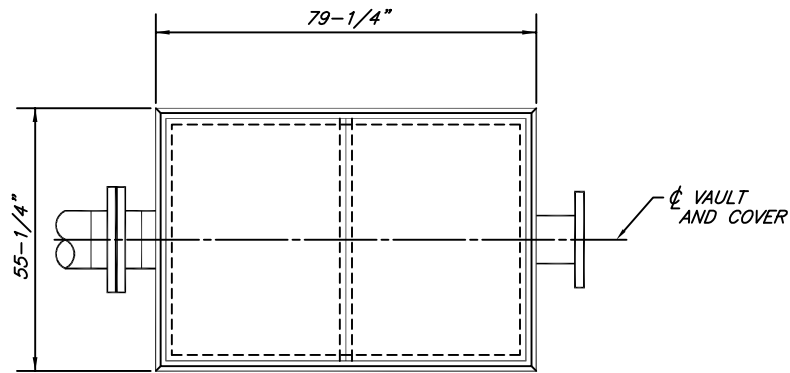
ITEM	QTY.	DESCRIPTION
1	1	12" D.I. R.G. FLG./BELL ADAPTOR AWWA
2	1	12" X 10" D.I. FLG. TAPER REDUCER
3	1	10" X 250# D.I. FLG. GATE VALVE
4	1	10" DETECTOR CHECK WITH BYPASS METER AND FITTINGS
5	1	10" INSULATING JOINT CLASS 125
6	1	10" X 18" D.I. SPOOL (OR OTHER OUTLET FITTING)
7	1	4'-0" X 6'-0" X 4'-0" REINFORCED POLYMER CONCRETE VAULT W/ TORSION ASSIST COVER ***

10" FIRE SERVICE IN REINFORCED POLYMER CONCRETE VAULT (D.I. PIPE)
(SIDEWALK LOADING ONLY)

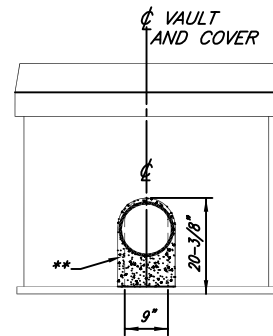
REVISIONS				APP'D
NO.	DATE	INIT.		A.P.
1	6-23	W.M.	REVISED NOTES & CALLOUTS	

DEPARTMENT OF WATER AND POWER				CITY OF LOS ANGELES	
DESIGNED	NAME	DATE	APPROVED BY	MONTH	'YR
DRAWN	V. TOROMANIA	3-92	B. WEINSTEIN	JUNE	'92
CHECKED	L. NUNO	3-92			

PC9486

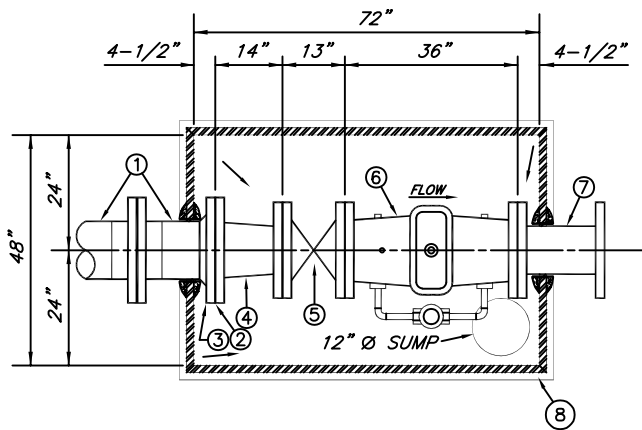


TOP VIEW

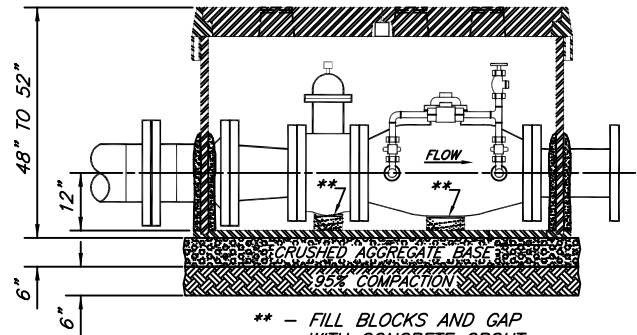


** - FILL VOIDS WITH CEMENT GROUT

INLET VIEW



PLAN



** - FILL BLOCKS AND GAP WITH CONCRETE GROUT FOR PROPER BEARING

ELEVATION

NOTES:

1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.
2. THIS DRAWING IS NOT TO SCALE.
3. ARMORCAST PRODUCTS MODEL: A6004872AX+8MTB

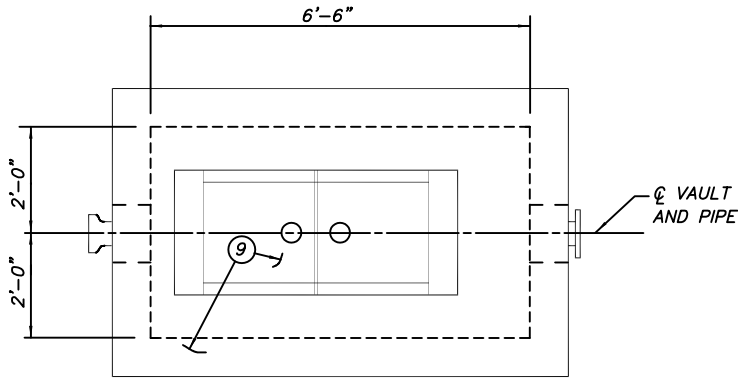
MATERIAL LIST

ITEM	QTY.	DESCRIPTION
1	VAR.	12-3/4" O.D. X 1/4" CEMENT LINED CEMPP/CP SLIP JOINT STL. PIPE
2	1	12" IJ KIT
3	1	12" STL. WELD NECK FLANGE CLASS 150
4	1	12" X 10" D.I. FLG. TAPER REDUCER
5	1	10" X 250# D.I. FLG. GATE VALVE
6	1	10" DETECTOR CHECK WITH BYPASS METER AND FITTINGS
7	1	10" X 18" C.I. SPOOL (OR OTHER OUTLET FITTING)
8	1	4' X 6' REINFORCED POLYMER CONCRETE VAULT AND COVER W/ TORSION ASSIST COVER ***

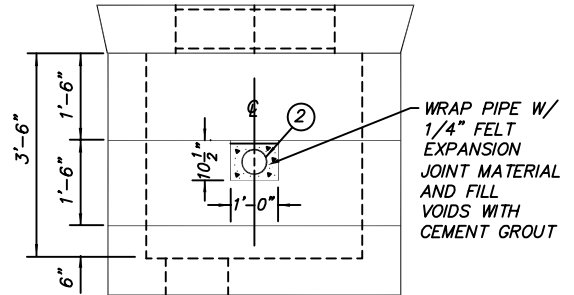
**10" FIRE SERVICE IN REINFORCED POLYMER CONCRETE VAULT (STL. PIPE)
(SIDEWALK LOADING ONLY)**

REVISIONS				DEPARTMENT OF WATER AND POWER			
NO.	DATE	INIT.	APP'D	WATER SYSTEM		CITY OF LOS ANGELES	
				DESIGNED	NAME	DATE	APPROVED
				DRAWN			APPROVED BY
				CHECKED			MONTH 'YR

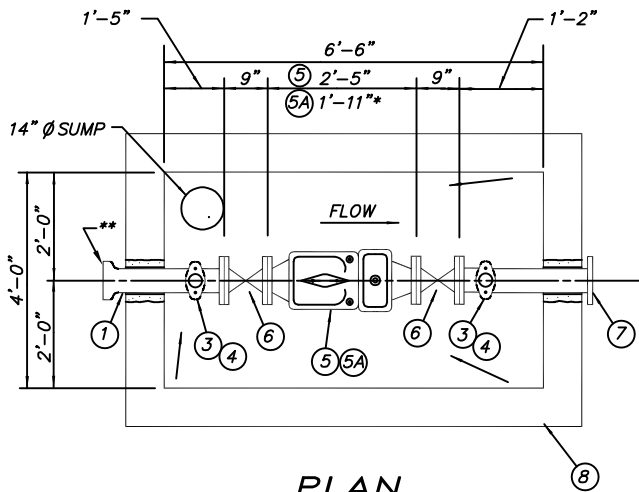
PC9487



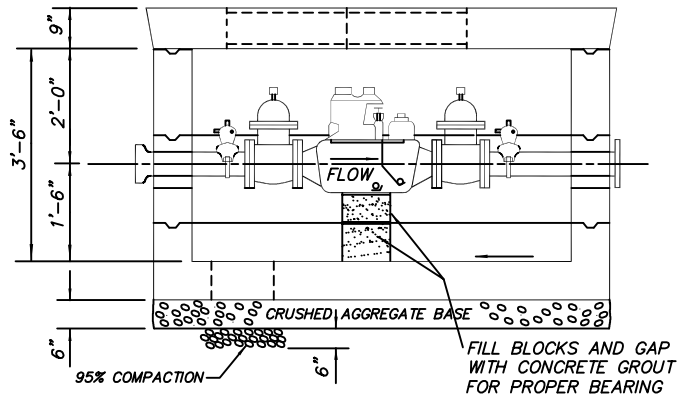
TOP VIEW



INLET VIEW



PLAN



ELEVATION

NOTES:

1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.
2. VAULT AND ACCESSORIES SHALL MEET THE DEPARTMENT'S LATEST "SPECIFICATIONS FOR PRECAST CONCRETE SUBSTRUCTURES AND ACCESSORIES".
- *3. 4" TURBINE METER REQUIRES 4" STRAINER (INCLUDED IN 1'-11" DIMENSION).
- **4. USE LOCKING GASKET WITH THE FLANGE/BELL ADAPTOR.
5. THIS DRAWING IS NOT TO SCALE.



MATERIAL LIST

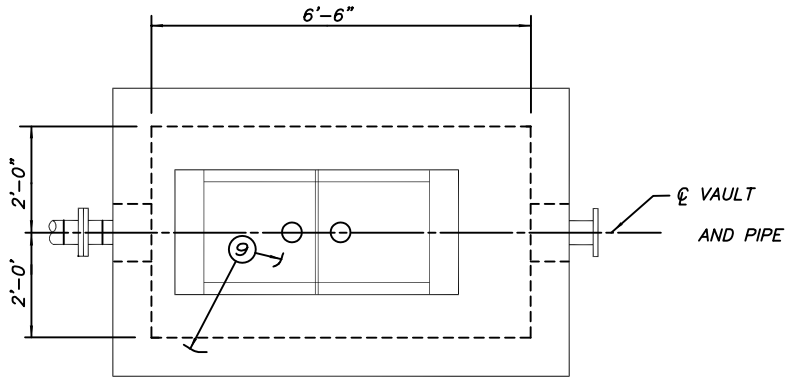
ITEM	QTY	DESCRIPTION
1	1	4" X 27" D.I. R.G. FLG./BELL ADAPTOR AWWA
2	-	1/4" FELT EXPANSION JOINT MATERIAL
3	2	4" X 1-1/2" BRZ. CLAMP
4	2	1-1/2" CORP. BALL VALVE
5/5A	1	4" COMP. METER / 4" TURBINE METER *
6	2	4" X 250# D.I. FLG. GATE VALVE
7	1	4" X 24" C.I. SPOOL (OR OTHER OUTLET FITTING)
8	1	4'-0" X 6'-6" PRECAST CONCRETE VAULT WITH 1" #3 STEEL HINGED COVER (DWP DWG. C5181)

10" FIRE SERVICE IN PRECAST CONCRETE VAULT (D.I. PIPE)
(TRAFFIC LOADING)

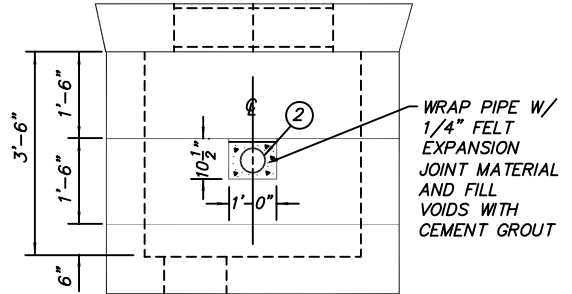
REVISIONS			APP'D
NO.	DATE	INIT.	
8/10	T.N.	REVISED, CHANGED MATERIAL	
10/18	DRG	REMOVED DETAIL	

DEPARTMENT OF WATER AND POWER			
WATER SYSTEM		CITY OF LOS ANGELES	
DESIGNED	NAME	DATE	APPROVED
L. NUNO		3-91	APPROVED BY
B. DONG		3-92	MONTH 'YR
L. NUNO		3-92	

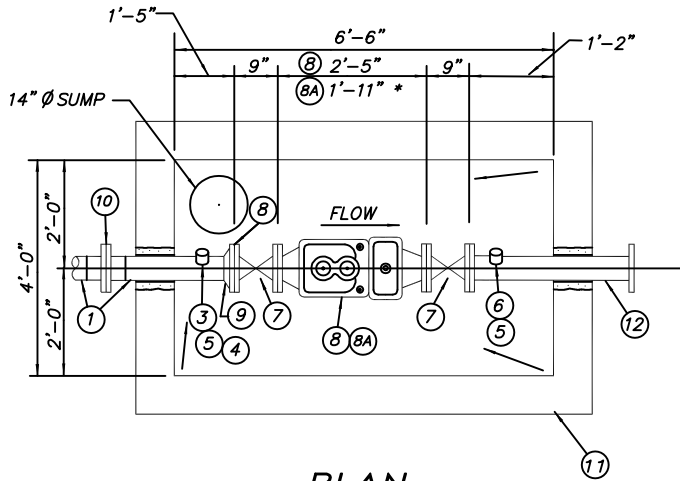
PC9488



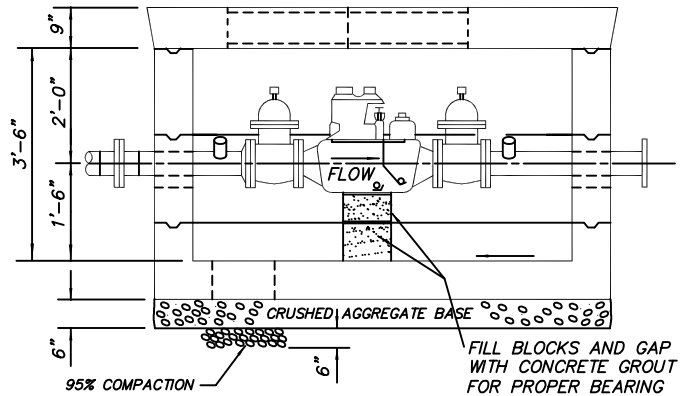
TOP VIEW



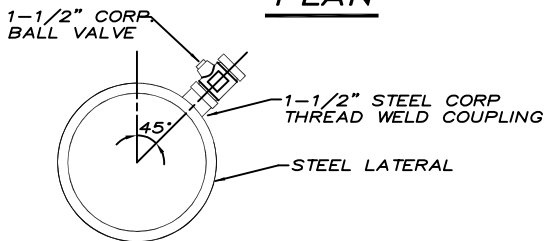
INLET VIEW



PLAN



ELEVATION



ORIENTATION VIEW FOR BYPASS

NOTES:

1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.
2. VAULT AND ACCESSORIES SHALL MEET THE DEPARTMENT'S LATEST "SPECIFICATIONS FOR PRECAST CONCRETE SUBSTRUCTURES AND ACCESSORIES".
- *3. 4" TURBINE METER REQUIRES 4" STRAINER (INCLUDED IN 1'-11" DIMENSION). TURBINE METERS ARE TYPICALLY USED FOR IRRIGATION.

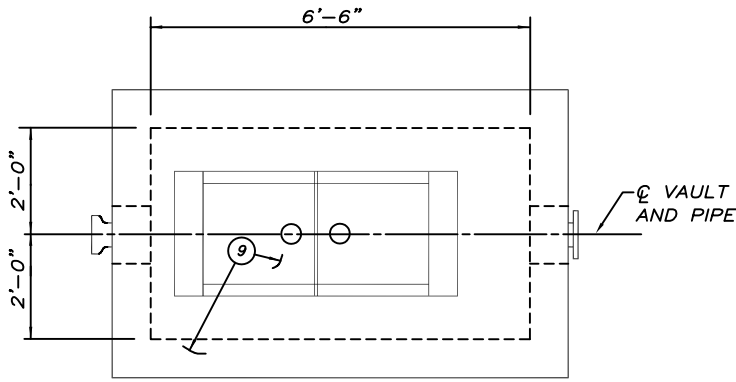
MATERIAL LIST		
ITEM	QTY	DESCRIPTION
1	-	4-1/2" O.D. X 1/4" EN. UC., C.L. & C., S.J., W. STL. PIPE
2	-	1/4" FELT EXPANSION JOINT MATERIAL
3	1	4" X 4" X 1/4" STL. WELD PAD
4	1	1-1/2" STL. WELD COUPLING
5	2	1-1/2" CORP. BALL VALVE
6	1	4" X 1-1/2" BRZ CLAMP
7	2	4" X 250# D.I. FLG. GATE VALVE
B/BA	1	4" COMP. METER / 4" TURBINE METER *
9	1	4" X 150# STL. WELD NECK FLANGE
10	1	4" INSULATING JOINT KIT CLASS 150
11	1	4'-0" X 6'-6" PRECAST CONCRETE VAULT WITH 1" #3 STEEL HINGED COVER (DWP DWG. C5181)
12	1	4" X 24" D.I. SPOOL (OR OTHER OUTLET FITTING)

**4" DOMESTIC SERVICE IN PRECAST CONCRETE VAULT (STL. PIPE)
(TRAFFIC LOADING)**

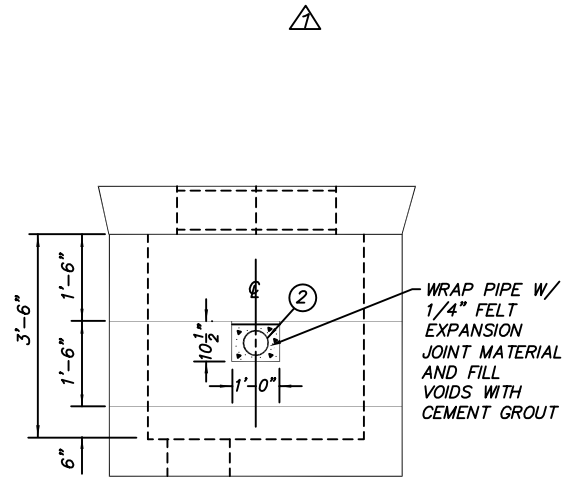
REVISIONS			APP'D
NO.	DATE	INIT.	
8-18	T.N.	REVISED, CHANGE MATERIAL	
10-18	DRG.	REMOVED DETAIL	
6-23	W.M.	REVISED NOTES & CALLOUTS	A.P.

DEPARTMENT OF WATER AND POWER WATER SYSTEM CITY OF LOS ANGELES			
DESIGNED	NAME	DATE	APPROVED
L. NUNO	L. NUNO	1-90	APPROVED BY MONTH 'YR
DRAWN	B. DONG & V.T.	3-92	
CHECKED	L. NUNO	3-92	

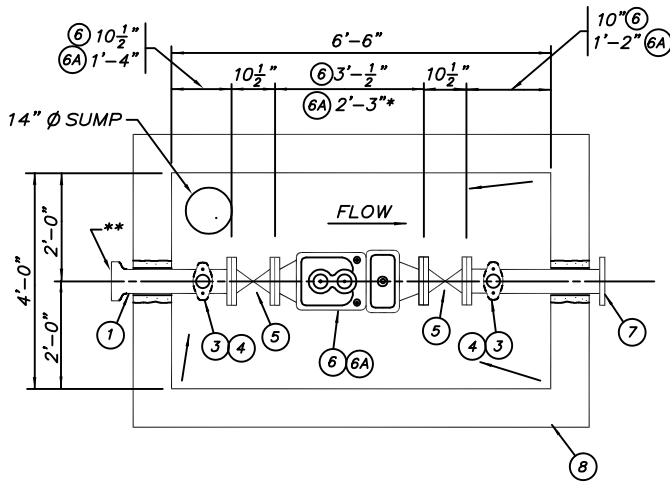
PC9489



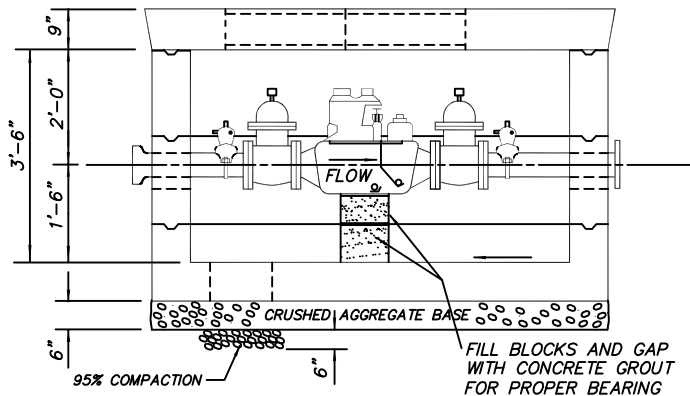
TOP VIEW



INLET VIEW



PLAN



ELEVATION

NOTES:

1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.
2. VAULT AND ACCESSORIES SHALL MEET THE DEPARTMENT'S LATEST "SPECIFICATIONS FOR PRECAST CONCRETE SUBSTRUCTURES AND ACCESSORIES".
- *3. 6" TURBINE METER REQUIRES 6" STRAINER (INCLUDED IN 2'-3" DIMENSION).
- **4. USE LOCKING GASKET WITH THE FLANGE/BELL ADAPTOR.
5. THIS DRAWING IS NOT TO SCALE.

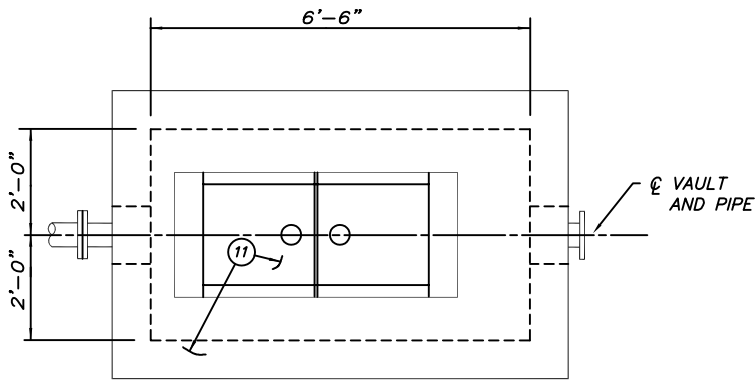
MATERIAL LIST

ITEM	QTY	DESCRIPTION
1	1	6" X 27" D.I. R.G. FLG./BELL ADAPTOR AWWA
2	-	1/4" FELT EXPANSION JOINT MATERIAL
3	2	6" X 1-1/2" BRZ. CLAMP
4	2	1-1/2" CORP. BALL VALVE
5	2	6" X 250# D.I. FLG. GATE VALVE
6/6A	1	6" COMP. METER / 6" TURBINE METER *
7	2	6" X 24" D.I. SPOOL (OR OTHER OUTLET FITTING)
8	1	4'-0" X 6'-6" PRECAST CONCRETE VAULT WITH 1" #3 STEEL HINGED COVER (DWP DWG. C5181)

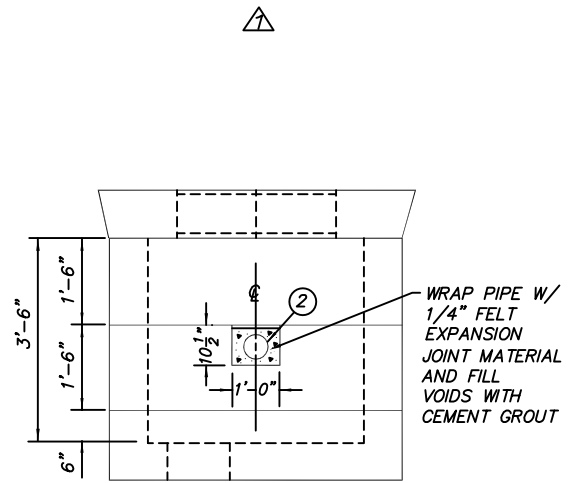
**6" DOMESTIC SERVICE IN PRECAST CONCRETE VAULT (D.I. PIPE)
(TRAFFIC LOADING)**

REVISIONS				DEPARTMENT OF WATER AND POWER			
NO.	DATE	INIT.	APP'D	WATER SYSTEM		CITY OF LOS ANGELES	
8/18	T.N.	REVISED MATERIAL		DESIGNED	L. NUNO	DATE	1-90
10/18	DRG	REMOVED DETAIL		DRAWN	B. DONG & V.T.	DATE	3-92
6/23	W.M.	REVISED NOTES & CALLOUTS	A.P.	CHECKED	L. NUNO	DATE	3-92
				APPROVED		APPROVED BY MONTH 'YR	
				B. WEINSTEIN		JUNE '92	

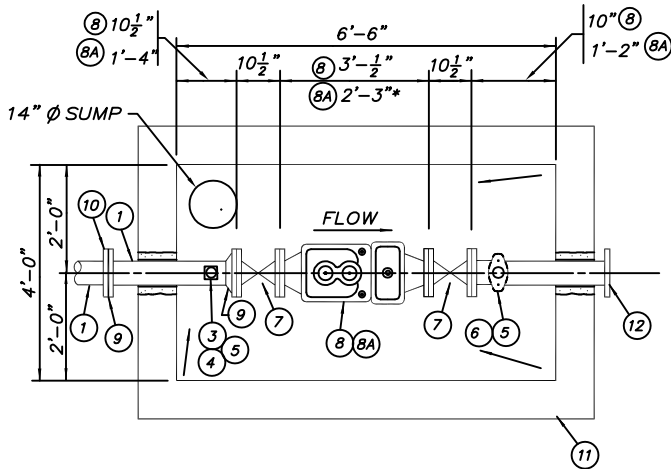
PC9490



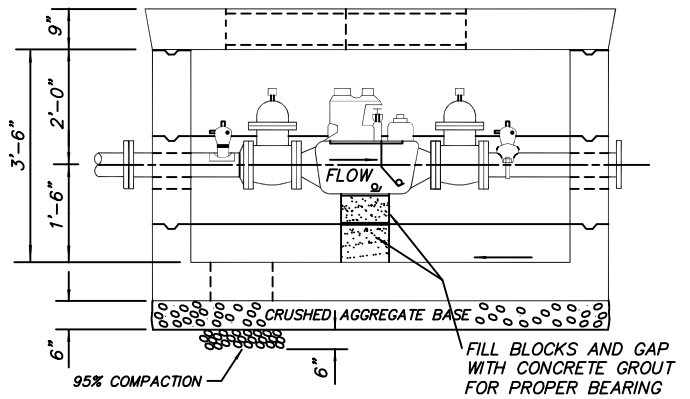
TOP VIEW



INLET VIEW



PLAN



ELEVATION

NOTES:

1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.
2. VAULT AND ACCESSORIES SHALL MEET THE DEPARTMENT'S LATEST "SPECIFICATIONS FOR PRECAST CONCRETE SUBSTRUCTURES AND ACCESSORIES".
- *3. 6" TURBINE METER REQUIRES 6" STRAINER (INCLUDED IN 2'-3" DIMENSION).
4. THIS DRAWING IS NOT TO SCALE.

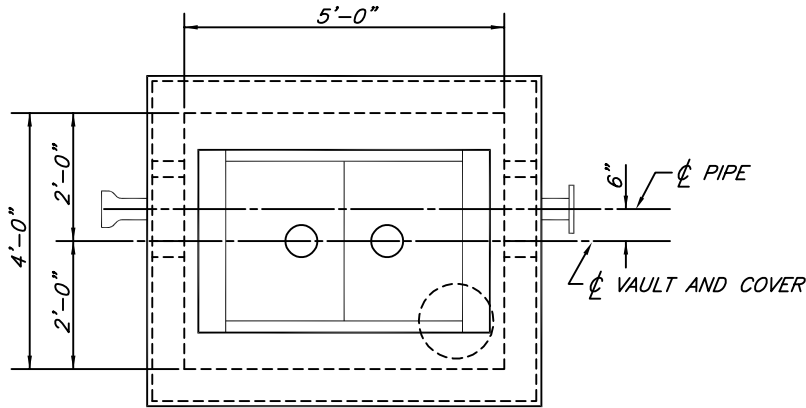
MATERIAL LIST

ITEM	QTY	DESCRIPTION
1	-	6-5/8" O.D. X 1/4" EN. UC., C.L. & C., S.J., W. STL. PIPE
2	-	1/4" FELT EXPANSION JOINT MATERIAL
3	1	4" X 4" X 1/4" STL. WELD PAD
4	1	1-1/2" STL. WELD COUPLING
5	2	1-1/2" CORP. BALL VALVE
6	1	6" X 1-1/2" BRZ. CLAMP
7	2	6" X 250# D.I. FLG. GATE VALVE
8/8A	1	6" COMP. METER / 6" TURBINE METER *
9	3	6" X 150# STL. WELD NECK FLANGE
10	1	6" INSULATION JOINT KIT CLASS 150
11	1	4'-0" X 6'-6" PRECAST CONCRETE VAULT WITH 1" #3 STEEL HINGED COVER (DWP DWG. C5181)
12	1	6" X 24" C.I. SPOOL (OR OTHER OUTLET FITTING)

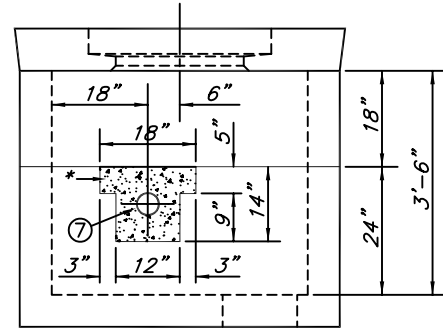
6" DOMESTIC SERVICE IN PRECAST CONCRETE VAULT (STL. PIPE)
(TRAFFIC LOADING)

REVISIONS				DEPARTMENT OF WATER AND POWER			
NO.	DATE	INIT.	DESCRIPTION	WATER SYSTEM		CITY OF LOS ANGELES	
8-18	T.N.		REVISED MATERIAL	DESIGNED	L. NUNO	DATE	9-90
10-18	DRG		REMOVED DETAIL	DRAWN	B. DONG & V.T.	DATE	3-92
				CHECKED	L. NUNO	DATE	3-92
				APPROVED		APPROVED BY	
						B. WEINSTEIN	
						MONTH 'YR	
						JUNE '92	

PC9491

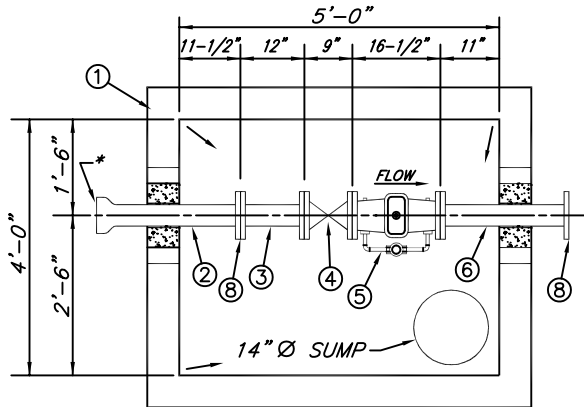


TOP VIEW

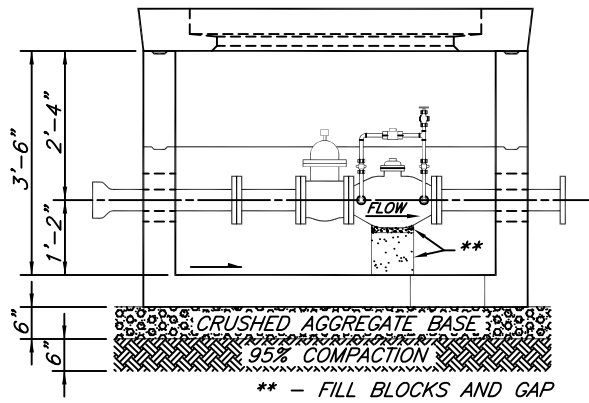


* - WRAP PIPE WITH 1/4" FELT EXPANSION JOINT MATERIAL AND FILL VOIDS WITH CEMENT GROUT

INLET VIEW



* - USE LOCKING GASKET
PLAN



** - FILL BLOCKS AND GAP WITH CONCRETE GROUT FOR PROPER BEARING

ELEVATION

NOTES:

1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.
2. VAULT AND ACCESSORIES SHALL MEET THE DEPARTMENT'S LATEST "SPECIFICATIONS FOR PRECAST CONCRETE SUBSTRUCTURES AND ACCESSORIES".
3. THIS DRAWING IS NOT TO SCALE.

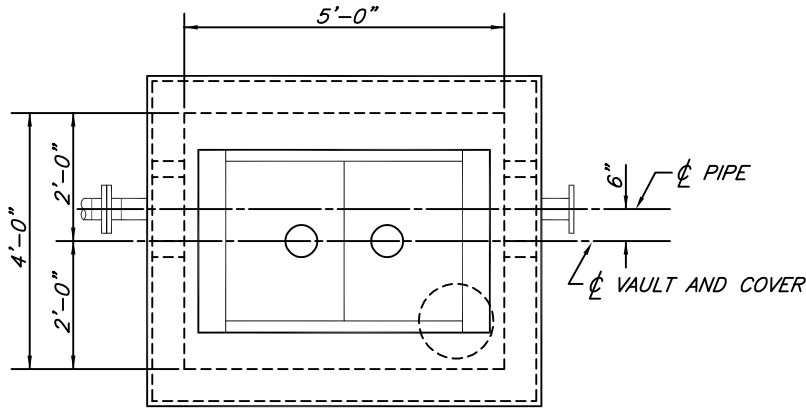
MATERIAL LIST		
ITEM	QTY.	DESCRIPTION
1	1	4'-0" X 5'-0" PRECAST CONCRETE VAULT WITH 1" #3 STEEL HINGED COVER (DWP DWG. C5189)
2	1	4" X 27" D.I. R.G. FLG./BELL ADAPTOR AWWA
3	1	4" X 12" C.I. SPOOL
4	1	4" X 250# C.I. FLG. GATE VALVE
5	1	4" DETECTOR CHECK WITH BYPASS METER AND FITTINGS
6	1	4" X 24" C.I. SPOOL (OR OTHER OUTLET FITTING)
7	VAR.	1/4" FELT EXPANSION JOINT MATERIAL
8	2	6" INSULATION JOINT KIT CLASS 150

**4" FIRE SERVICE IN PRECAST CONCRETE VAULT (D.I. PIPE)
(TRAFFIC LOADING)**

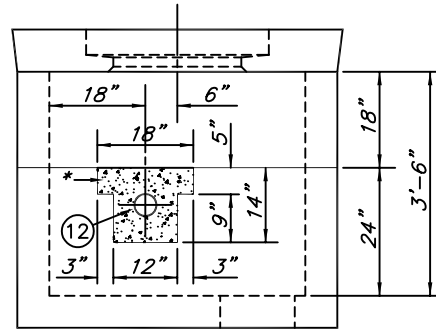
REVISIONS				APP'D
NO.	DATE	INIT.	DESCRIPTION	
	2-18	T.N.	REVISED MATERIAL	
	10-18	DRG	REMOVED DETAIL	

DEPARTMENT OF WATER AND POWER WATER SYSTEM				CITY OF LOS ANGELES	
DESIGNED	NAME	DATE	APPROVED		
L. NUNO	V. TOROMANIA	3-91	APPROVED BY	MONTH 'YR	
		4-92	B. WEINSTEIN	JUNE '92	
CHECKED	L. NUNO	4-92			

PC9492

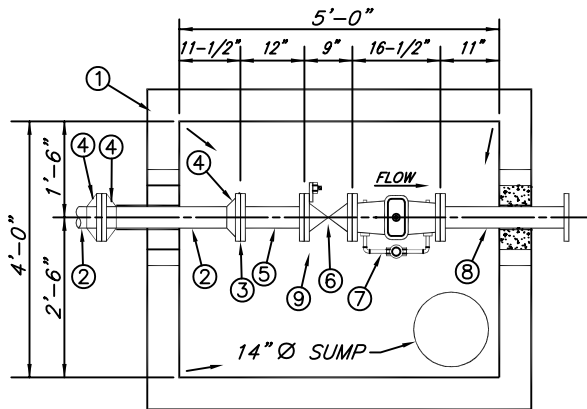


TOP VIEW

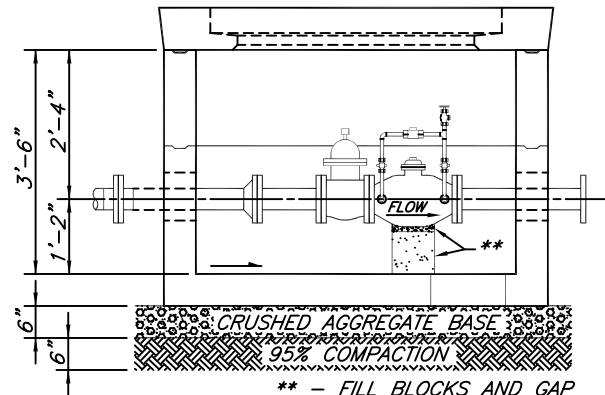


* - WRAP PIPE WITH 1/4" FELT EXPANSION JOINT MATERIAL AND FILL VOIDS WITH CEMENT GROUT

INLET VIEW



PLAN



** - FILL BLOCKS AND GAP WITH CONCRETE GROUT FOR PROPER BEARING

ELEVATION

NOTES:

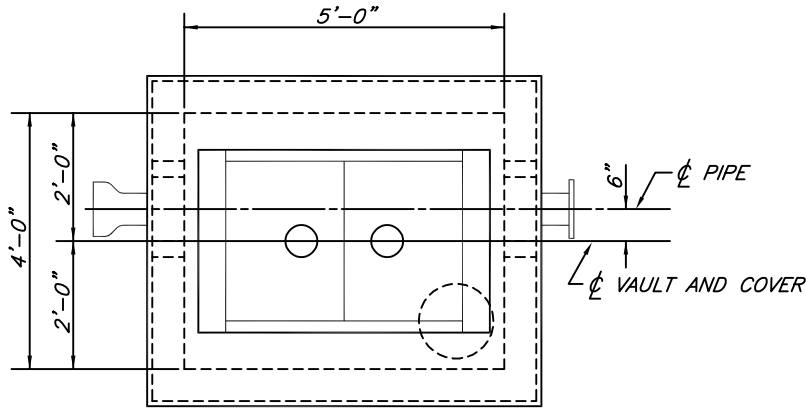
1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.
2. VAULT AND ACCESSORIES SHALL MEET THE DEPARTMENT'S LATEST "SPECIFICATIONS FOR PRECAST CONCRETE SUBSTRUCTURES AND ACCESSORIES".
3. THIS DRAWING IS NOT TO SCALE.

MATERIAL LIST		
ITEM	QTY.	DESCRIPTION
1	1	4'-0" X 5'-0" PRECAST CONCRETE VAULT WITH 1" #3 STEEL HINGED COVER (DWP DWG. C5189)
2	VAR.	4-1/2" O.D. X 1/4" EN. UC., C.L. & C., S.J., WELDED STEEL PIPE
3	1	4" INSULATION JOINT KIT CLASS 150
4	1	4" STEEL WELD NECK FLANGE CLASS 150
5	1	4" X 12" D.I. SPOOL
6	1	4" X 250# D.I. FLG. GATE VALVE
7	1	4" DETECTOR CHECK WITH BYPASS METER AND FITTINGS
8	1	4" X 24" D.I. SPOOL (OR OTHER OUTLET FITTING)
9	VAR.	1/4" FELT EXPANSION JOINT MATERIAL

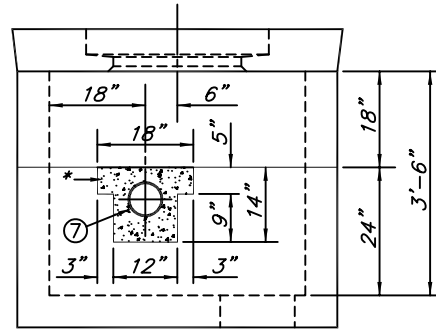
**4" FIRE SERVICE IN PRECAST CONCRETE VAULT (STL. PIPE)
(TRAFFIC LOADING)**

REVISIONS				DEPARTMENT OF WATER AND POWER			
NO.	DATE	INIT.	APP'D	WATER SYSTEM		CITY OF LOS ANGELES	
1	11/18/16	P.W.		DESIGNED		APPROVED	
				L. NUNO	DATE	APPROVED BY MONTH 'YR	
2	11/9/17	P.W.		DRAWN			
				V. TOROMANIA	4-92		
3	10/18	DRG		CHECKED			
				L. NUNO	4-92		

PC9493

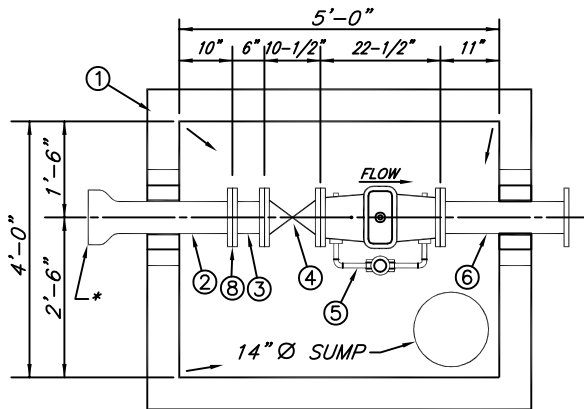


TOP VIEW



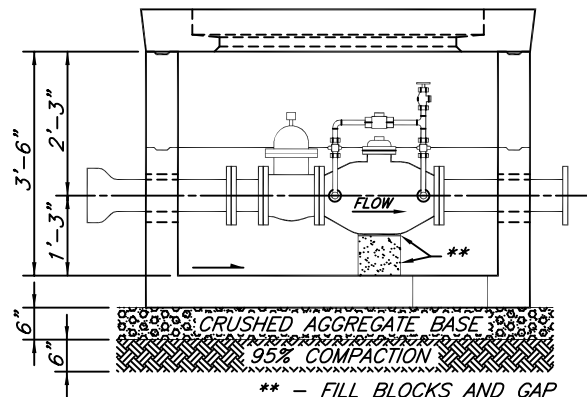
* - WRAP PIPE WITH 1/4" FELT EXPANSION JOINT MATERIAL AND FILL VOIDS WITH CEMENT GROUT

INLET VIEW



* - USE LOCKING GASKET

PLAN



** - FILL BLOCKS AND GAP WITH CONCRETE GROUT FOR PROPER BEARING

ELEVATION

NOTES:

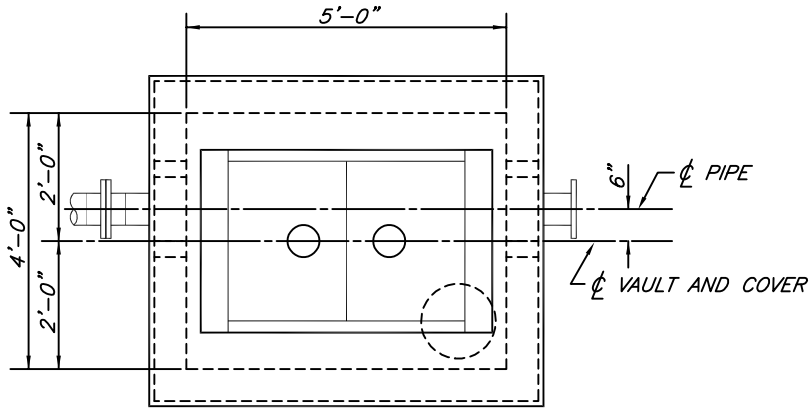
1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.
2. VAULT AND ACCESSORIES SHALL MEET THE DEPARTMENT'S LATEST "SPECIFICATIONS FOR PRECAST CONCRETE SUBSTRUCTURES AND ACCESSORIES".
3. THIS DRAWING IS NOT TO SCALE.

MATERIAL LIST		
ITEM	QTY.	DESCRIPTION
1	1	4'-0" X 5'-0" PRECAST CONCRETE VAULT WITH 1" #3 STEEL HINGED COVER (DWP DWG. C5189)
2	1	6" X 27" D.I. R.G. FLG./BELL ADAPTOR AWWA
3	1	6" X 6" D.I. SPOOL
4	1	6" X 250# D.I. FLG. GATE VALVE
5	1	6" DETECTOR CHECK WITH BYPASS METER AND FITTINGS
6	1	6" X 24" D.I. SPOOL (OR OTHER OUTLET FITTING)
7	VAR.	1/4" FELT EXPANSION JOINT MATERIAL
8	1	6" INSULATION JOINT KIT CLASS 150

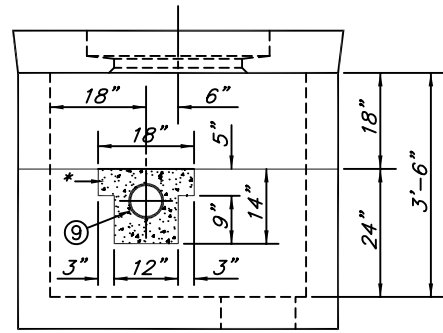
**6" FIRE SERVICE IN PRECAST CONCRETE VAULT (D.I. PIPE)
(TRAFFIC LOADING)**

NO. DATE INIT.		REVISIONS	APP'D	DEPARTMENT OF WATER AND POWER WATER SYSTEM CITY OF LOS ANGELES			
1	11/18/16	P.W. REVIEWED BUT NO CHANGE		DESIGNED	L. NUNO	DATE	3-91
2	11/9/17	P.W. REVISED MATERIALS		DRAWN	V. TOROMANIA	DATE	4-92
				CHECKED	L. NUNO	DATE	4-92
				APPROVED BY _____ MONTH 'YR			

PC9494

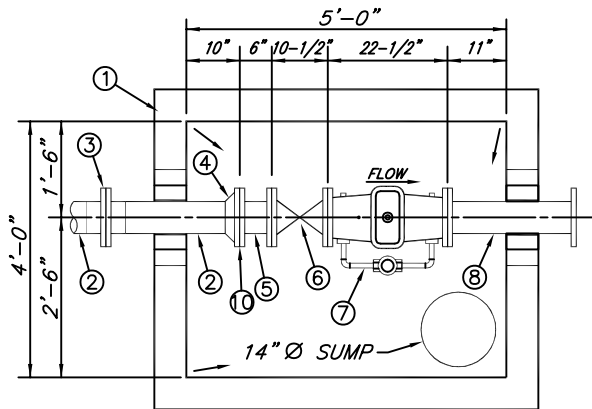


TOP VIEW

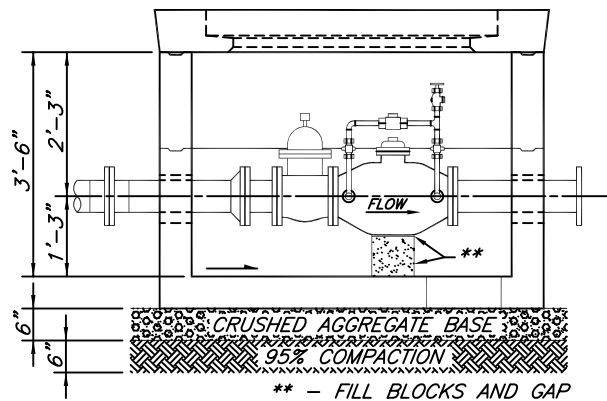


* - WRAP PIPE WITH 1/4" FELT EXPANSION JOINT MATERIAL AND FILL VOIDS WITH CEMENT GROUT

INLET VIEW



PLAN



ELEVATION

NOTES:

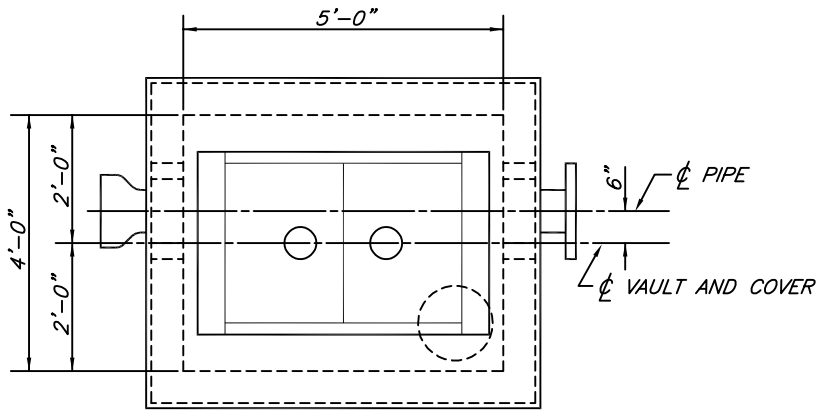
1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.
2. VAULT AND ACCESSORIES SHALL MEET THE DEPARTMENT'S LATEST "SPECIFICATIONS FOR PRECAST CONCRETE SUBSTRUCTURES AND ACCESSORIES".
3. THIS DRAWING IS NOT TO SCALE.

MATERIAL LIST		
ITEM	QTY.	DESCRIPTION
1	1	4'-0" X 5'-0" PRECAST CONCRETE VAULT WITH 1" #3 STEEL HINGED COVER (DWP DWG. C5189)
2	VAR.	6-5/8" O.D. X 1/4" EN. UC., C.L. & C., S.J., WELDED STEEL PIPE
3	1	6" PRE-ASSEMBLED INS. FLANGE TYPE II-D
4	1	6" X 150# STEEL WELD NECK FLANGE
5	1	6" X 6" D.I. SPOOL
6	1	6" X 200# D.I. FLG. GATE VALVE
7	1	6" DETECTOR CHECK WITH BYPASS METER AND FITTINGS
8	1	6" X 24" D.I. SPOOL (OR OTHER OUTLET FITTING)
9	VAR.	1/4" FELT EXPANSION JOINT MATERIAL
10	1	6" INSULATING JOINT KIT CLASS 150

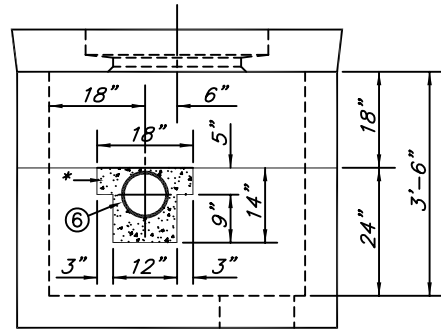
**6" FIRE SERVICE IN PRECAST CONCRETE VAULT (STL. PIPE)
(TRAFFIC LOADING)**

REVISIONS				DEPARTMENT OF WATER AND POWER			
NO.	DATE	INIT.	APP'D	WATER SYSTEM		CITY OF LOS ANGELES	
1	11/18/16	P.W.		DESIGNED	L. NUNO	DATE	3-91
2	11/9/17	P.W.		DRAWN	V. TOROMANIA	DATE	4-92
3	10/18	DRG		CHECKED	C. HAMVAS	DATE	4-92
				APPROVED		APPROVED BY _____ MONTH 'YR	

PC9495

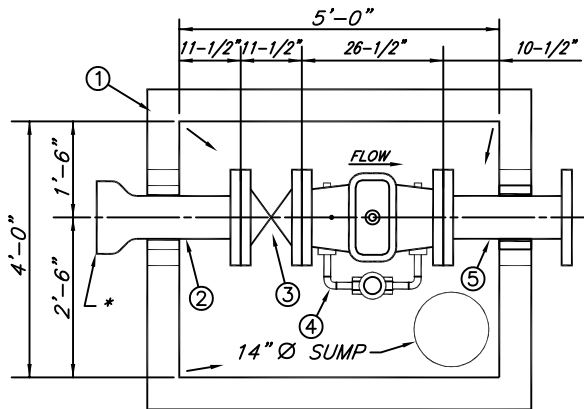


TOP VIEW



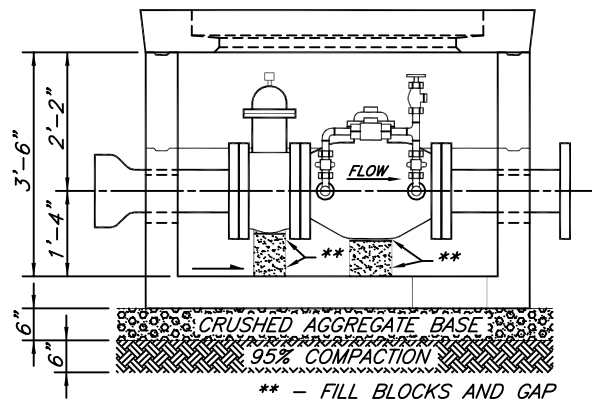
* - WRAP PIPE WITH 1/4" FELT EXPANSION JOINT MATERIAL AND FILL VOIDS WITH CEMENT GROUT

INLET VIEW



* - USE LOCKING GASKET

PLAN



** - FILL BLOCKS AND GAP WITH CONCRETE GROUT FOR PROPER BEARING

ELEVATION

NOTES:

1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.
2. VAULT AND ACCESSORIES SHALL MEET THE DEPARTMENT'S LATEST "SPECIFICATIONS FOR PRECAST CONCRETE SUBSTRUCTURES AND ACCESSORIES".
3. THIS DRAWING IS NOT TO SCALE.

MATERIAL LIST

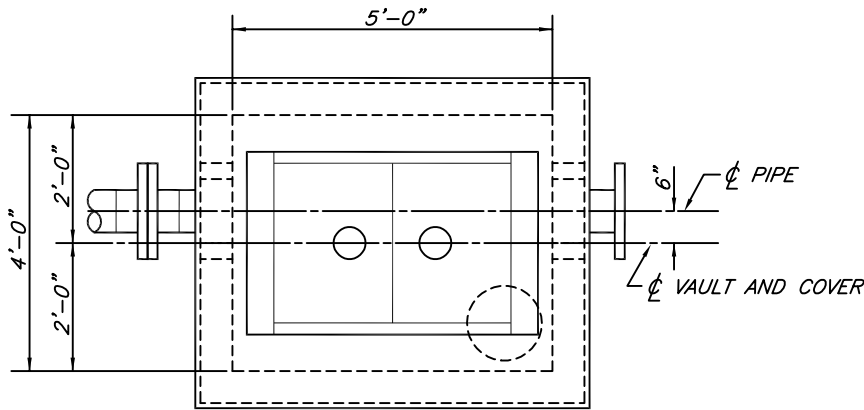
ITEM	QTY.	DESCRIPTION
1	1	4'-0" X 5'-0" PRECAST CONCRETE VAULT WITH 1" #3 STEEL HINGED COVER (DWP DWG. C5189)
2	1	8" X 27" D.I. R.G. FLG./BELL ADAPTOR AWWA
3	1	8" X 200# D.I. FLG. GATE VALVE
4	1	8" DETECTOR CHECK WITH BYPASS METER AND FITTINGS
5	1	8" X 24" D.I. SPOOL (OR OTHER OUTLET FITTING)
6	VAR.	1/4" FELT EXPANSION JOINT MATERIAL

**8" FIRE SERVICE IN PRECAST CONCRETE VAULT (D.I. PIPE)
(TRAFFIC LOADING)**

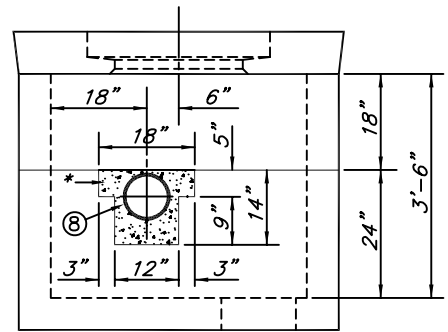
REVISIONS			APP'D
NO.	DATE	INIT.	
1	11/18/16	P.W.	
			REVIEWED BUT NO CHANGE
2	11/9/17	P.W.	
			REVISED MATERIALS
3	10/18	DRG	
			REMOVED DETAIL

DEPARTMENT OF WATER AND POWER			
WATER SYSTEM		CITY OF LOS ANGELES	
DESIGNED	NAME	DATE	APPROVED
L. NUNO		3-91	APPROVED BY
V. TOROMANIA		4-92	MONTH 'YR
C. HAMVAS		4-92	

PC9496

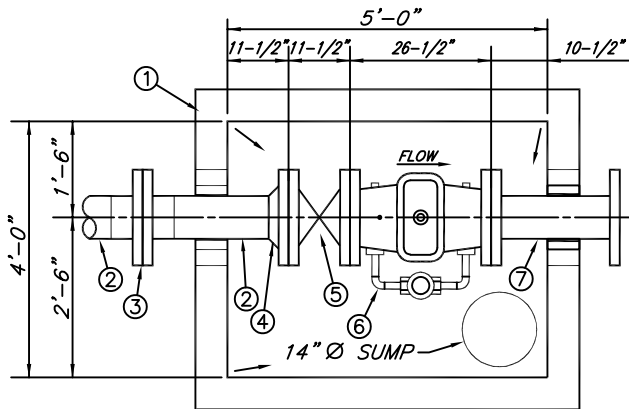


TOP VIEW

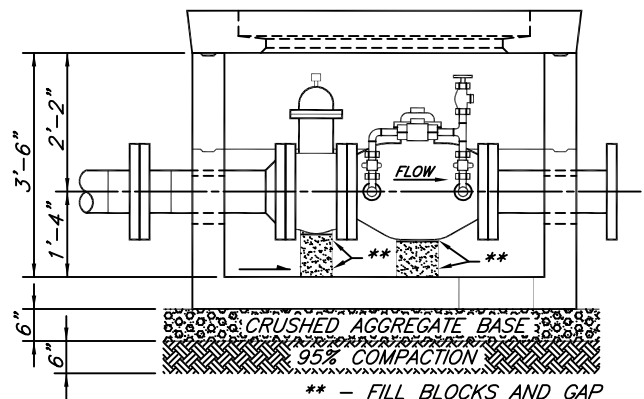


* - WRAP PIPE WITH 1/4" FELT EXPANSION JOINT MATERIAL AND FILL VOIDS WITH CEMENT GROUT

INLET VIEW



PLAN



** - FILL BLOCKS AND GAP WITH CONCRETE GROUT FOR PROPER BEARING

ELEVATION

NOTES:

1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.
2. VAULT AND ACCESSORIES SHALL MEET THE DEPARTMENT'S LATEST "SPECIFICATIONS FOR PRECAST CONCRETE SUBSTRUCTURES AND ACCESSORIES".
3. THIS DRAWING IS NOT TO SCALE.

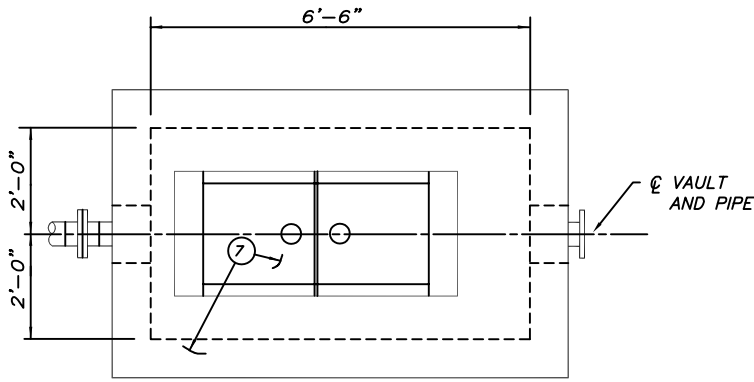
MATERIAL LIST

ITEM	QTY.	DESCRIPTION
1	1	4'-0" X 5'-0" PRECAST CONCRETE VAULT WITH 1" #3 STEEL HINGED COVER (DWP DWG. C5189)
2	VAR.	8-5/8" O.D. X 1/4" EN. UC., C.L. & C., S.J., WELDED STEEL PIPE
3	1	8" PRE-ASSEMBLED INS. FLANGE TYPE II-D
4	1	8" X 150# STEEL WELD NECK FLANGE
5	1	8" X 200# D.I. FLG. GATE VALVE
6	1	8" DETECTOR CHECK WITH BYPASS METER AND FITTINGS
7	1	8" X 24" D.I. SPOOL (OR OTHER OUTLET FITTING)
8	VAR.	1/4" FELT EXPANSION JOINT MATERIAL

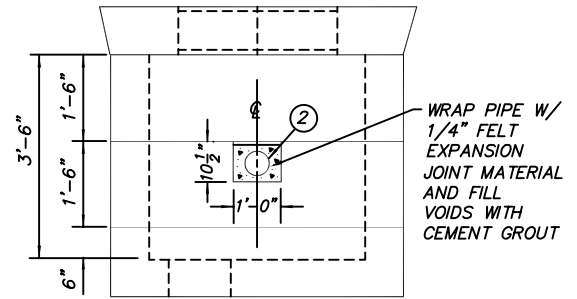
**8" FIRE SERVICE IN PRECAST CONCRETE VAULT (STL. PIPE)
(TRAFFIC LOADING)**

REVISIONS				DEPARTMENT OF WATER AND POWER			
NO.	DATE	INIT.	APP'D	WATER SYSTEM		CITY OF LOS ANGELES	
1	11/18/16	P.W.		DESIGNED	L. NUNO	DATE	3-91
2	11/9/17	P.W.		DRAWN	V. TOROMANIA	DATE	4-92
3	10/18	DRG		CHECKED	C. HAMVAS	DATE	4-92
				APPROVED		APPROVED BY MONTH 'YR	

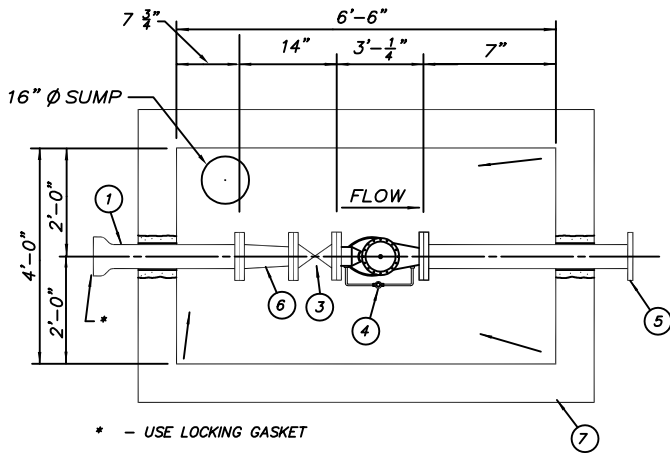
PC9497



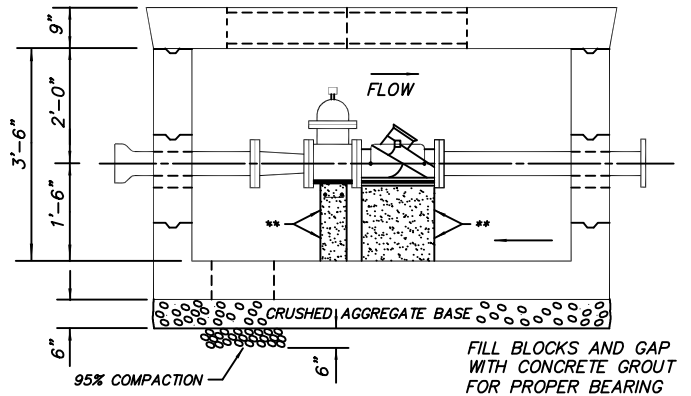
TOP VIEW



INLET VIEW



PLAN



ELEVATION

NOTES:

1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.
2. VAULT AND ACCESSORIES SHALL MEET THE DEPARTMENT'S LATEST "SPECIFICATIONS FOR PRECAST CONCRETE SUBSTRUCTURES AND ACCESSORIES".
3. THIS DRAWING IS NOT TO SCALE.

MATERIAL LIST

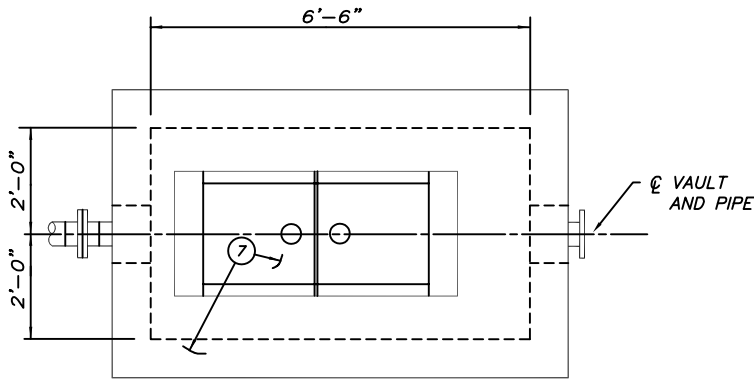
ITEM	QTY	DESCRIPTION
1	1	12" X 27" D.I. R.G. FLANGE/BELL ADAPTOR AWWA
2	-	1/4" FELT EXPANSION JOINT MATERIAL
3	1	10" X 250# D.I. FLG. GATE VALVE
4	1	10" DETECTOR CHECK W/ BYPASS METER & FITTINGS
5	1	10" X 18" D.I. SPOOL (OR OTHER OUTLET FITTING)
6	1	12" X 10" D.I. TAPER REDUCER
7	1	4'-6" X 6'-6" PRECAST CONCRETE VAULT WITH 1-IN.#3 STEEL HINGED COVER (DWP DWG. C5181)

**10" FIRE SERVICE IN PRECAST CONCRETE VAULT (D.I. PIPE)
(TRAFFIC LOADING)**

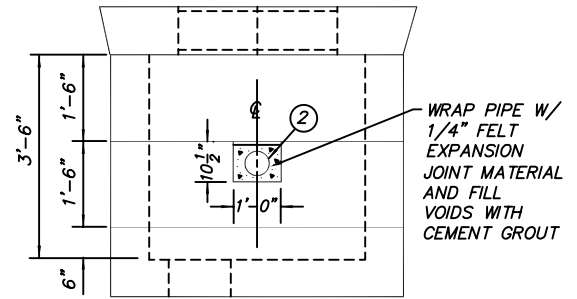
REVISIONS			APP'D
NO.	DATE	INIT.	
1	10/16	K.B.	REVISED MATERIAL LIST
2	10/23	KCB	REVISED DRAWING

DEPARTMENT OF WATER AND POWER			
WATER SYSTEM		CITY OF LOS ANGELES	
DESIGNED	L. NUNO	DATE	4-91
DRAWN	B. DONG & V.T.	APPROVED	APPROVED BY MONTH 'YR
CHECKED	L. NUNO		

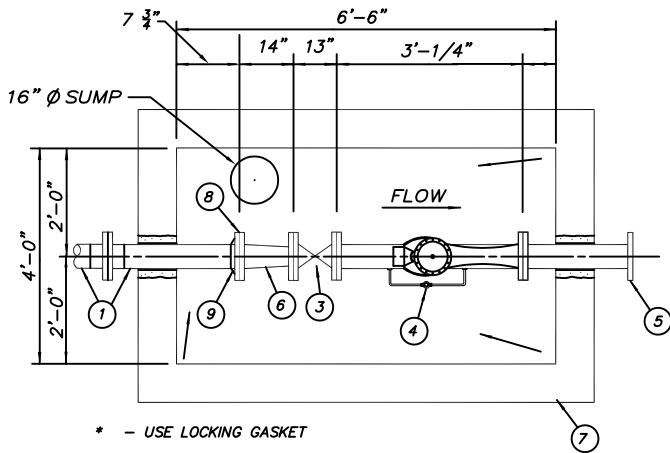
PC9498



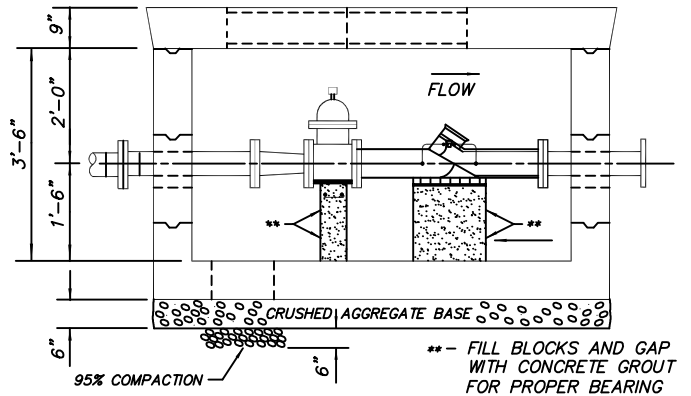
TOP VIEW



INLET VIEW



PLAN



ELEVATION

NOTES:

1. CRUSHED AGGREGATE BASE MATERIAL SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" LATEST EDITION, SUBSECTION 200-2.
2. VAULT AND ACCESSORIES SHALL MEET THE DEPARTMENT'S LATEST "SPECIFICATIONS FOR PRECAST CONCRETE SUBSTRUCTURES AND ACCESSORIES".
3. THIS DRAWING IS NOT TO SCALE.

MATERIAL LIST

ITEM	QTY	DESCRIPTION
1		12-3/4" O.D. X 1/4" EN. UC. C.L. & C., S.J., WELDED STEEL PIPE
2	-	1/4" FELT EXPANSION JOINT MATERIAL
3	-	10" X 250# D.I. FLG. GATE VALVE
4	1	10" DETECTOR CHECK W/ BYPASS METER & FITTINGS
5	1	10" X 18" D.I. SPOOL (OR OTHER OUTLET FITTING)
6	1	12" X 10" D.I. TAPER REDUCER
7	1	4'-6" X 6'-6" PRECAST CONCRETE VAULT WITH 1" #3 STEEL HINGED COVER (DWP DWG. C5181)
8	1	12" INSULATION JOINT KIT CLASS 150
9	1	12" X 150# STL. WELD NECK FLANGE

10" FIRE SERVICE IN PRECAST CONCRETE VAULT (STL. PIPE)
(TRAFFIC LOADING)

REVISIONS			APP'D
NO.	DATE	INIT.	
1	10/16	K.B.	REVISED MATERIAL LIST
2	10/23	KCB	REVISED DRAWING

DEPARTMENT OF WATER AND POWER			
WATER SYSTEM		CITY OF LOS ANGELES	
DESIGNED	NAME	DATE	APPROVED
L. NUNO	B. DONG & V.T.	4-91	APPROVED BY MONTH 'YR
DRAWN	B. DONG & V.T.	3-92	
CHECKED	L. NUNO	3-92	

PC9499